

Original Physical Education and Sport Sciences Articles



A Special issue on

""Health and Sport Sciences""

February 2021

SP-14/Feb/202

DOI: <http://dx.doi.org/10.22376/ijpbs/ijlpr/SP14/jan/2021.1-383>

In conjunction with



ABOUT THIS SPECIAL ISSUE

If we want to know the importance of exercise in human health, we will see that the beneficial effects of exercise in the prevention - treatment and control of many cardiovascular and respiratory disorders show that life is more important today.

It is not bad to mention here the statistics of patients with heart diseases and heart attacks, which kill a large number of people every year, according to the latest research conducted in Turkey, is the highest rate of death from heart disease.

Health and physical ability are divine blessings. Man always wants health and vitality. The happiness of every human being depends on a force of his body and soul.



For this reason, many researchers and university professors study the effects of exercise on human health and every day we see new findings from this research. This collection is a very small part of the researchers' findings that are made available to those interested readers.

Peer review committee

The following Peer reviewers were appointed by the organisers to review the content of the articles and were confirmed to be of satisfactory scholastic content after rectification by the respective authors. These reviewers solemnly take the responsibility of the scholastic and research content along with the organisers and the publishing journal is no way responsible for the same.

Reviewer name	Qualification and Designation	Signature
Dr. Mir Hamid Salehian	Assoc. Prof., Department of Physical Education, Tabriz branch, Islamic Azad University, Tabriz, Iran	Hamid Salehian
Dr. Mehmet ILKIM	Assoc. Prof., Department of Exercise and Sport Education in Disabilities, Inonu University, Malatya, Turkey	Mehmet Ilkim
Dr. Amir Dana	Assoc. Prof., Department of Physical Education, Tabriz branch, Islamic Azad University, Tabriz, Iran	Amir Dana
Dr. Jafar Barghi Moghaddam	Assoc. Prof., Department of Physical Education, Gorgan branch, Islamic Azad University, Gorgan, Iran	Jafar Barghi Moghaddam
Dr. Ahdiyeh YadollahZadeh	Assoc. Prof., Department of Physical Education, Farhangian University, Tehran, Iran	Ahdiyeh YadollahZadeh
Dr. Sheida Ranjbar	Assoc. Prof., Department of Physical Education, Urmia branch, Islamic Azad University, Urmia, Iran	Sheida Ranjbar
Dr. Sepideh Sarvari	Assoc. Prof., Department of Physical Education, Urmia University of Technology, Iran	Sepideh Sarvari
Dr. Ismaeil Kiumarhi	Assist. Prof., Department of Physical Education, Urmia University of Technology, Iran	Ismaeil Kiumarhi
Dr. Marina Daneghian	Assist. Prof., Department of Physical Education, Tabriz branch, Islamic Azad University, Tabriz, Iran	Marina Daneghian

CONTENT (ORIGINAL RESEARCH / REVIEW ARTICLE)

S.NO	TITLE	Page No.
SP-1	"WHAT MAKES LIFE WORTH LIVING?": DIVERS' EXPERIENCES ON RECREATIONAL CAVE DIVING AND SENSE OF WELL-BEING	7-11
SP-2	EXAMINATION OF EXERCISE IN INDIVIDUALS WITH DISABILITIES AND INQUIRY SKILLS OF STUDENTS IN SPORTS EDUCATION DEPARTMENT	12-16
SP-3	THE ROLE OF GENDER IN GOAL ORIENTATION AND MOTIVATION OF PARTICIPATION IN WHEELCHAIR BASKETBALL PLAYERS	17-20
SP-4	EXAMINATION OF THE PERSONALITY TRAITS OF ATHLETES AND THEIR LEVEL OF EXCELLENT PERFORMANCE	21-28
SP-5	INVESTIGATION OF THE SPIRITUAL INTELLIGENCE FEATURES OF PHYSICALLY HANDICAPPED BADMINTON PLAYERS IN TERMS OF VARIOUS VARIABLES	29-35
SP-6	THE EFFECT ON JOB SATISFACTION OF EXECUTIVE SUPPORT PERCEPTION OF COACHES IN TURKEY	36-40
SP-7	THE EXPERIENCES OF THE LIFEGUARDS WORKING ON THE COASTALS: A QUALITATIVE STUDY ON THE STUDENTS OF THE FACULTIES OF SPORTS SCIENCES	41-45
SP-8	ANALYZING OF ATTITUDE LEVELS OF STUDENTS AT ELAZIG TOURISM VOCATIONAL HIGH SCHOOL TOWARDS PHYSICAL EDUCATION COURSE	46-49
SP-9	MINDFULNESS AND PHYSICAL ACTIVITY: PSYCHOMETRIC PROPERTIES OF THE STATE MINDFULNESS SCALE FOR PHYSICAL ACTIVITY	50-56
SP-10	CLIMATE OF AMPUTEE FOOTBALL PLAYERS IN GOAL DIRECTION	57-60
SP-11	EFFECTS OF KINESIO TAPING ON SPRINT, BALANCE AND AGILITY PERFORMANCE IN 10-12 YEARS OLD BADMINTON PLAYERS	61-66
SP-12	VOLLEYBALL REFEREES' SELF-EFFICACY AND LIFE SATISFACTION	67-70
SP-13	POST-ACTIVATION POTENTIATION (PAP): EFFECT ON TARGET PERFORMANCE IN ARCHERY	71-75
SP-14	EVALUATION OF SPORTS AWARENESS OF PARENTS OF INDIVIDUALS WITH AUTISM ATTENDING TO SPORTS CLUBS	76-80
SP-15	THE EFFECT OF SELF-TALK ON DRIBBLING AND LAY-UPS IN BASKETBALL DURING A 12-WEEKS TRAINING	81-84
SP-16	INVESTIGATING THE EFFECT OF FEEDBACK ON SHOOTING PERFORMANCE OF FOOTBALL PLAYERS DURING 10-WEEKS TRAINING	85-87
SP-17	DETERMINATION OF FOOTBALLERS ANXIETY AND SLEEP QUALITY OF GETTING NEW TYPE CORONAVIRUS	88-93
SP-18	COMPARISON OF SPINAL CURVES OF 13-15 YEARS OLD ATHLETES IN DIFFERENT BRANCHES	94-99
SP-19	INVESTIGATION OF STATE ANXIETY AND LIFE SATISFACTION CHARACTERISTICS OF TENNIS PLAYERS	100-103

SP-20	INVESTIGATION OF NOMOPHOBI LEVELS OF INDIVIDUALS CONTINUING TO YOUTH CENTER	104-109
SP-21	THE EFFECT OF MOBILE PHONE ON THE FINGER MUSCLES IN SEDENTARY AND ATHLETES	110-115
SP-22	THE EFFECT OF WRIST GRIP ANGLE ON TRAUMATIC SYMPTOMS IN BODYBUILDERS	116-118
SP-23	THE EFFECTS OF KINESIO TAPING APPLIED TO THE FOOT AREA ON THE SPEED, AGILITY AND BALANCE PERFORMANCE OF TABLE TENNIS ATHLETES	119-122
SP-24	PRELIMINARY ASSESSMENT OF SERUM WNT1 INDUCIBLE SIGNALING PATHWAY PROTEIN 1 (WISPI) AS CAN BE USED TUMOR BIOMARKER FOR ACROMEGALY?	123-128
SP-25	INVESTIGATION OF STATIC AND DYNAMIC BALANCE CAPACITY OF 5-9 YEAR-OLD CHILDREN IN GYMNASTICS EDUCATION	129-132
SP-26	WILL MY SENSATIONS AFFECT THE RESULT OF THE COMPETITION? ALEXITHYMIC BEHAVIOR OF TURKISH REFEREES	133-138
SP-27	THE INVESTIGATION OF THE EFFECT OF BASIC FOOTBALL EDUCATION ON PULMONARY FUNCTION TEST AND CARDIOPULMONARY EXERCISE TEST PARAMETERS IN SMOKER HEARING-IMPAIRED ATHLETES	139-143
SP-28	COMPARISON OF PHYSICAL CHARACTERISTICS, SPEED, AGILITY, MUSCULAR ENDURANCE, AEROBIC POWER AND RECOVERY ABILITIES BETWEEN FEMALE VOLLEYBALL AND BASKETBALL PLAYERS	144-149
SP-29	HOW MUCH FLUID LOSS AND URINE DENSITY CAUSED BY AEROBIC EXERCISE AND SAUNA IN TENNIS PLAYERS? A DESCRIPTIVE STUDY?	150-155
SP-30	EFFECT OF COVID-19 ON AMATEUR FOOTBALL: PERSPECTIVE OF PHYSICAL ACTIVITY, NUTRITION AND MOOD	156-163
SP-31	SPORTS ACTIVITIES IN THE COVID-19 PANDEMIC PROCESS	164-167
SP-32	THE RELATIONSHIP BETWEEN HEALTH LITERACY, HEALTH PROMOTING LIFESTYLE AND SCHOOL SPORTS PARTICIPATION AMONG ADOLESCENTS	168-174
SP-33	COMPARISON OF THE 100 M SPEED PARAMETER OF ATHLETES IN INDIVIDUAL AND TEAM SPORTS	175-178
SP-34	OBESITY PREVALENCE AND FATHER-CHILD BMI RELATIONSHIP IN PRE-SCHOOL CHILDREN 5-6 YEARS OLD	179-182
SP-35	EVALUATION OF PROCESS-BASED MANAGEMENT FOR SPORTSBUSINESSES	183-187
SP-36	RISK EVALUATION FOR SPORTS ACTIVITIES IN COVID-19 PANDEMIC	188-193
SP-37	EFFECTS OF EXERGAMES AND KANGOO JUMPS TRAININGS ON STRENGTH IN 14-22 YEARS OLD HEARING IMPAIRED SEDENTARY WOMEN	194-199
SP-38	THE EFFECTS OF TECHNICAL AND TACTICAL CRITERIA ON SUCCESS IN 2016 FIVB WOMEN'S VOLLEYBALL WORLD CLUB CHAMPIONSHIP'	200-203
SP-39	A METAPHOR: DOES COVID-19 IS AN OBSTACLE FOR ADOLESCENT ATHLETES?	204-210
SP-40	SELF-ESTEEM LEVEL AND ANGER CONTROL IN TRAINERS (AN EXAMPLE FROM ANKARA)	211-216
SP-41	RELATIONSHIP BETWEEN DECISION-MAKING STYLES AND COGNITIVE FLEXIBILITY LEVELS OF SPORTS SCIENCE STUDENTS	217-221
SP-42	THE INFLUENCE OF PERSONALITY TRAITS IN STADIUM MARKETING	222-227
SP-43	THE EFFECT OF AEROBIC EXERCISE ON SOME BLOOD PARAMETERS OF PARTICIPANT WITH AUTISM	228-232

SP-44	ACUTE EFFECTS OF YO-YO INTERMITTENT RECOVERY TEST LEVEL I (YO-YOIRI) PERFORMED IN THE MORNING AND EVENING ON BIOCHEMICAL PARAMETERS	233-238
SP-45	ANALYSIS OF AGGRESSION AND PERSONALITY TRAITS IN VOLLEYBALL PLAYERS	239-244
SP-46	INVESTIGATION OF THE EFFECT OF 8-WEEK PILATES AND STRETCHING EXERCISES ON SPINAL CORD DEFORMATION IN CERABREL PALCY PATIENTS (CASE STUDY)	245-248
SP-47	INVESTIGATION OF THE PSYCHOLOGICAL LEVELS OF SPORTS-EDUCATED UNIVERSITY STUDENTS	249-253
SP-48	THE EFFECTS OF OMEGA-3 SUPPLEMENTS COMBINED WITH ENDURANCE EXERCISES ON ALBUMIN, BILURIBIN AND THYROID METABOLISM	254-257
SP-49	RELATION BETWEEN BODY MASS INDEX AND PHYSICAL FITNESS IN ELDERLY MEN	258-263
SP-50	WHAT ARE THE PHYSIOLOGICAL RESPONSES OF STEP - AEROBIC EXERCISES IN SEDANTER WOMEN?	264-268
SP-51	THE RELATIONSHIP BETWEEN IN FINANCIAL MARKETS: A RESEARCH ON TURKISH FOOTBALL	269-278
SP-52	INTENSIVE PHYSICAL EXERCISE AND KETOSIS IN TYPE I DIABETES: LITERATURE REVIEW ON A CASE AFTER COVID-19 QUARANTINE	279-284
SP-53	THE RELATIONSHIP BETWEEN MOTOR SKILLS AND TECHNICAL SKILLS SPECIFIC TO VOLLEYBALL IN ADOLESCENT VOLLEYBALL PLAYERS	285-295
SP-54	THE NATIONAL ENTERTAINMENTS AND GAMES OF THE KYRGYZ PEOPLE IN THE LATE 19TH CENTURY AND EARLY 20TH CENTURY*	296-302
SP-55	THE EFFECT OF STATIC AND DYNAMIC CORE TRAINING ON SOME MOTORIC CHARACTRISTIC AND TENNIS SERVICE VELOCITY OF TENNIS ATHLETES	303-314
SP-56	INVESTIGATION OF THE RELATIONSHIP BETWEEN THE ATTITUDE TOWARDS DANCE AND HAPPINESS LEVELS OF INDIVIDUALS ATTENDING DANCE EDUCATION	315-321
SP-57	THE ANALYSIS OF GOALS SCORED AT 2018 FIFA World Cup RUSSIA AND WOMEN'S WORLD CUP FRANCE 2019	322-330
SP-58	THE ADVANTAGE OF HOME MATHES IN DIFFERENT PROFESSIONAL LEAGUES IN FOOTBALL	331-336
SP-59	A FIELD SURVEY ON THE RELATIOSHIP BETWEEN EXPENSE LEVEL OF THE STAFF WORKING IN LIBRARY SERVICES AND JOB SATISFACTION	337-341
SP-60	MODERN DON QUIXOTES: SAMPLE OF HORROR THEMED ESCAPE ROOMS AS AN ALTERNATIVE ADVENTURE ACTIVITY	342-346
SP-61	EXAMINATION OF VIEWS OF SPORTS SCIENCES STUDENTS STUDYING IN BORDER PROVINCES REGARDING SUSTAINABILITY IN SPORTS	347-352
SP-62	OPINIONS OF STUDENTS IN PERFORMANCE SPORTS ON THE DURATIONS OF OFFICIAL LEAVE PERMISSION	353-358
SP-63	PSYCHOLOGICAL RESILIENCE IN INDIVIDUALS WHO DO ACTIVE SPORTS	359-364
SP-64	WHICH TYPE OF EXERCISE IS MORE EFFECTIVE ON BODY COMPOSITION OF SEDENTARY WOMEN?	365-371
SP-65	EFFECT OF 12-WEEK VOLLEYBALL TRAINING ON SOME CONDITIONAL PARAMETERS OF YOUNG FEMALE VOLLEYBALL PLAYERS	372-383

SP-01

"WHAT MAKES LIFE WORTH LIVING?": DIVERS' EXPERIENCES ON RECREATIONAL CAVE DIVING AND SENSE OF WELL-BEING**ŞAKIR TÜFEKÇİ and YALIN AYGÜN**

Assistant Professor, Faculty of Sport Sciences, University of Inonu, Malatya, Turkey

sakir.tufekci@inonu.edu.tr- yalin.aygun@inonu

ORCID:0000-0002-7815-5710-ORCID:0000-0002-1018-657X

Corresponding author: Sakir.tufekci@inonu.edu.tr**ABSTRACT**

Recreational cave diving experience during leisure can enhance overall well-being in life. The purpose of this study was to explore scuba divers' experiences on recreational cave diving, with a focus on well-being. We conducted in-depth semi-structured interviews with recreational cave divers (total N = 12). We employed a theoretical thematic analysis guided by Seligman's five domains of well-being (PERMA; [P]ositive emotions, [E]ngagement, [R]elationships, [M]eaning, and [A]ccomplishment) conjunction with positivity resonance theory and flow concept. The analysis resulted in a synthesis of the various ways divers experienced happiness, fulfillment, and flourishing through positive emotions, co-experienced positive affect, relationships, engagement, flow, meaning, and accomplishment. Themes that reflect positive experiences are important to recreational cave diving and the broader context of leisure.

KEYWORDS: *Flow, leisure, PERMA, positivity resonance, scuba diving***INTRODUCTION**

Researchers in leisure studies have very recently identified participant experience in recreational scuba diving, focusing on subjective well-being (SWB) which is a hedonic approach to well-being. From those early studies, we know that satisfaction¹⁻⁵, comfort⁶, and sensorium.⁷⁻¹¹ are some of the most commonly reported positive experiences for participants. However, a hedonic approach appears to fall short in exploring experiences in recreational scuba diving and the meaning participants infer from such experiences. Beyond the studies primarily applying SWB framework to understand participants' experience in recreational scuba diving, Aygün and Tüfekçi¹² applying Seligman's¹³ PERMA framework examined participant experience on wreck diving activity and found that this activity is experienced as a motivating force that shows a kaleidoscopic and unique view of flourishing. Analogously, Kler and Tribe² utilizing the same approach to investigate well-being among participants of recreational scuba diving and revealed that participants make out meaning and fulfillment from the acts of learning and personal growth, and they are motivated to dive because this activity promotes positive experiences, which may lead to the happiness. While the existing literature provides an understanding of recreational scuba diving experience in terms of positive outcomes related to both hedonic and eudemonic elements, none of these studies have focused on these positive outcomes for recreational cave diving, as a special interest. Therefore, the purpose of this study was to explore divers' experiences where recreational cave diving is the foundation for overall well-being that appear to underpin their experiences. As such, the links between experience in leisure participation and positive psychology were explored for the facilitation and promotion of special interest of recreational cave diving.

Leisure and a special combination of well-being

Seligman¹³ noted that well-being extends psychology beyond a major focus on relieving human suffering and involves hedonic (e.g., positive affect) and eudemonic facets (e.g., meaning) and that help individuals feel happy as they want to thrive, not just survive. Seligman¹⁴ initially suggested that enhanced engagement, meaning, and positive emotions lead to well-being/flourishing which is descriptive, not prescriptive. Nine years later, Seligman¹³ augmented accomplishments and relationships to the earlier three domains and asserted the PERMA framework suggesting that the fundamental of positive psychology is well-being that "is essentially a theory of uncoerced choice, and its five elements comprise what free people will choose for their own sake... The five elements are positive emotion, engagement, positive relationships, meaning, and accomplishment. A handy mnemonic is PERMA" (p. 16). Positive emotions about the past (e.g., gratitude, forgiveness), present (mindfulness, satisfaction, gratification [an elusive feeling], fulfillment), and future (e.g., hope, optimism) uniquely contribute to the well-being and tend to fluctuate within limits¹⁴. Engagement produces an experience called "flow"¹⁵ and refers to an in-depth immersion and interest related to a positive state of mind and happiness that individuals experience in an activity¹⁶. The third domain is the relationship which is a fundamental aspect of well-being. At this point, integrating The Positivity Resonance Theory^{17,18} into the relationship domain of the PERMA framework can give insight into overall well-being as it centers on the special case of co-experienced positive effect which particularly contributes to mental health outcomes. Meaning and accomplishment are eudemonic routes to well-being that refer to beliefs derive from belonging to something bigger and having senses of achievement, competence, success, and mastery within personal goals¹³. Seligman¹⁴ conceptualization of authentic happiness (i.e., the PERMA framework) appears to be a more

holistic approach that focus both eudemonic (i.e., meaningful) and hedonic (e.g., positive affect) domains of sports and leisure participants' optimal functioning and fulfillment^{2,12,20-23}. As evident in the synthesis of the positive psychology studies, our knowledge of the well-being outcomes of experience in sports and leisure activities, particularly from a perspective that centers on the special case of experienced both hedonic and eudemonic elements of well-being, is still scant. Additionally, none of these studies have explored leisure participants' experiences focusing on a trilateral combination of PERMA, Flow, and Positivity Resonance. Thus, the current study contributes to the existing body of knowledge by fostering our understanding of the in-depth and overall well-being outcomes of a leisure experience by examining data collected during interviews with recreational cave divers.

METHODS

Participants

To secured potential participants through purposive and snowball sampling²⁴, we introduced the research to the staff working in various scuba clubs within Turkey. We asked staff to assist us in assigning participants who were registered at their scuba clubs. We instructed the staff to choose participants who varied in age, sex, scuba certification level, and the number of cave dives to achieve consideration of variation in data (e.g., different assumptions, multiple meanings)²⁵. To maintain confidentiality, we assigned participants pseudonyms. The participant group (total $N = 12$) was comprised of five women and seven men ranging in age from 21 to 54 (mean = 37.7 years). Regarding certification level, two participants were divemaster, four were open water instructor, two were master diver trainer, two were staff instructor, and two were course director. The number of cave dives undertaken also revealed wide variation and extends from seventy-eight to as few as ten.

Data collection

We collected data through the google meet video conferencing platform by using semi-structured in-depth interviews²⁶. We asked interviewees to reminisce about their cave diving experiences thus far. All interviews started with the trigger question, "Can you please tell me about your experiences of cave diving?" Then, depending on the interviews' answers, we asked follow-up questions by focusing on meanings associated with experiences on cave diving (talk to me about what you like about cave diving. Why do you like it? What does it mean to you to cave diving?), accomplishments associated with experiences on cave diving (talk to me about your achievements in cave diving? What is your greatest accomplishment in cave diving?), and the social aspects of experience (talk to me about your cave diving companions? Who are your cave diving buddies? Do your friends/family members cave dive?). During the interviews, we briefly took notes to go back to specific expressions and/or repeat what the interviewees had said earlier for follow-up questions. We revised and refined the protocol at various stages of the research process via constant comparative methods²⁷. Therefore, we reworded, added, and eliminated questions to modify them. The interviews lasted between 25 and 45 minutes. The interviews lasted between 25 and 45 minutes and comprised of an average of 86 pages of text. As the later interviewees began to provide the same or similar information, we made no further efforts to collect data.

Data analysis

We conducted a thematic analysis²⁸ in a theoretical or deductive or top-down way described by Braun and Clarke. They noted that the purpose of theoretical thematic analysis was to provide less a rich description of the data overall, and a more detailed analysis of some aspects of the data. A special combination of the PERMA framework¹³, the flow concept¹⁵, and the Positivity Resonance Theory¹⁷ guided the coding and analysis of the data. We identified and categorized the most frequent and significant codes into themes. Themes that reflected this combination were drawn to structure the paper.

RESULTS AND DISCUSSION

The purpose of this study was to explore scuba divers' experiences on recreational cave diving, with a focus on well-being. PERMA was utilized as an overarching framework to Flow and Positivity Resonance.

Positive emotions

Positive emotions related to the PERMA framework emerged throughout the divers' interview process as they reflected on their past and present experiences. Scuba diving, as well as the cave environment under the water, seemed to generate a range of positive emotions: fun, enjoyment, excitement, relaxation, serenity, and a sense of freedom and escape. When asked about their reasons for being happy or feeling happy in cave diving Ayşe, a 22-year-old divemaster, said, "It's just great fun and I love the special feeling about being where nobody else has ever been before. You know, spectacular cave decorations are sure to be eyes-worthy and they give me a feeling of relaxation and isolation." Similarly, Kerim, a 51-year-old master diver trainer, stated, "Because it's really fun, and I think the warm, dark blue waters always allow me an impressive sense of freedom. It offers me the perfect escape." Analogously, Murat, a 44-year-old staff instructor, explained, "The serenity in the caves is only made more magical by the folklore and history surrounding them. There are beauty, peace, and wonder..." Jale, a 27-year-old open water instructor, appeared to experience positive emotions in an elusive way. She said: "Entering a secret world hidden away from the masses is pretty fun, it also allows me to view cave geology, as well as the brimming full of beautiful fauna, forestry or plant life that make me feel relax and free." We stress that positive emotions consisted with one domain of well-being in the PERMA framework¹³ were apparent as divers experienced fun, enjoyment, excitement, relaxation, serenity, and a sense of freedom and escape through being weightless under the water, seeing the cave decoration, and experiencing the silent or isolated environment. These results not only mirror earlier work on satisfaction, motivation, comfort, and sense in recreational scuba diving^{4,8,11,29}, but these studies illustrate cumulative support for the supposition that experience is particularly associated with a special need for serenity. Seligman³⁰ suggests that there is subtle segregation between pleasure (conscious positive emotions),

and gratification (elusive feelings). It appeared as though the divers experienced a combination of both types. Many of them emphasized about conscious emotions (e.g., fun, enjoyment), while others used metaphors to express their beggar descriptions. These results are consistent with Mirehie and Gibson's²² study on women's participation in snow-sports and might be linked to the state of flow¹⁵.

Engagement

According to the PERMA framework, engagement refers to the high degree of interest and full immersion one experiences in an activity¹³. Csikszentmihalyi¹⁵ calls this unique experience "flow" which required fully deployed skills, strengths, and attention for a challenging activity. In this study, engagement was utilized in a twofold conceptualization: (a) as in-depth immersion in the challenging activity and environment and (b) as psychological commitment. The engagement has emerged when divers' skills were just sufficient for a challenging cave diving activity, with immediate feedback on progress toward the clear goal. Divers' concentrations seemed to be fully absorbed at the moment, and their self-awareness disappeared as time was distorted in retrospect. For example, Cennet, a 32-year-old open water instructor, said, "It puts you in an amazing and unparalleled world. As I am looking for really challenging adventures, not every diver experiences, this is the place for me." For Beril, a 21-year-old master diver trainer, being in the cave underwater felt like being among the stars in the sky, she said, "One of the most amazing things about diving in a cave is a feeling that time stops. I think that it can challenge the way we view ourselves." Vural, a 48-year-old divemaster, expressed, "Seeing the light at the end of the cave is like transiting different planets in outer space. It's a unique experience for me." Engagement also was possible in the form of a strong psychological commitment to the activity. For example, Murat said, "The way the water and the sediments moved told me a different story. After numerous setbacks and challenges, I found that there is no replacement for diving into the caves." By shedding light on our results, we believe that strong psychological commitment and full immersion in some divers' experiences reflect a state of flow¹⁵ that Seligman¹³ posited as one facet of well-being in the PERMA framework. This seems to address a motive in attitudes and behaviors of divers who are intensely involved in a particular leisure activity, namely recreational cave diving. This aligns with previous studies^{22,31}. The common themes in these studies are that a high degree of engagement in an activity is highly likely to result in achieving flow, optimal, or peak experience. As Csikszentmihalyi¹⁵ posits, these results advocate that there is an optimal balance between challenge and participants' skills, resulting in happiness.

Relationships

From a social perspective, family and friends were central to cave diving activity for some divers and contributed to building positive interpersonal relationships. Numerous statements described the presence of positive emotions (e.g., fun, enjoyment) that were co-experienced with other people. Berkan, a 39-year-old open water instructor, linked positive emotions to relationships acquired from his cave diving experience. He said, "Even if you just do it once, it's something you'll always have together. It'll give you countless fantastic feelings that you'll never forget with your bellowed ones." Likewise, Beril highlighted shared positive affect, "The caves under the water inspire me, and to be able to dive and share that inspiration with a loved one is an amazing feeling. It's also really amazing to laugh and have fun together." Similarly, for Ahmet, a 27-year-old open water instructor, the special case of co-experienced positive effect was the main motive. He said, "It is an incredible experience that will leave you with many treasured memories for years... We (a family) enjoy the same thing... I love that we have something in common that gives us multiple opportunities to share fun, joy, and recreation, not just tell each other or show the picture." A closer look at the data demonstrates that several divers' narratives center on the special case of co-experienced positive effect. Thus, we interpret that high-quality emotional connection termed "positivity resonance"¹⁷ played a uniquely important role in enhancing cave divers' overall well-being since it's a strong contributor to positive mental health outcomes. Previous studies' results^{32,33} show that experiences of positivity are greater in social aspects. Such results can also be expected to fortify participants' well-being.

Meaning

The meaning associated with PERMA was mainly depicted in the interpretations of the advanced level divers who have plethoric cave diving experience. These divers showed a stronger emotional attachment to recreational scuba diving, to the cave systems and its protection, and to the underwater environment all of which generated a sense of meaning and purpose for them. Seligman¹³ posits that a central part of the meaning domain is a sense derived from belonging to and serving something bigger than the self. For divers, this manifested in inspiration to explore their passions, finding their self-fulfillments, and building connections to the world around them. Müslüm, a 54-year-old course director, for example, said, "I think, one can realize their self through cave diving. When this occurs, people find deeper purpose and help others find theirs." Sezen, a 45-year-old staff instructor, expressed, "I remember that my first dive in Alaadin's cave in Fethiye helped me discover my new self. It fuelled my passion to dive till a die." Growing up swimming and snorkeling the Turkey's Mediterranean coast instilled in Mehmet, a 43-year-old course director, an in-depth love of the sea and an even powerful desire to protect it which creates meaning for him: "The natural beauty and marine life I encountered at the surface piqued my curiosity about what could be discovered at deeper depths. You know, those formations (caves) under the water propelled and inspired me to make scuba diving a career." Within the broader context of leisure and adventure experiences findings from this study support the view that for advanced level divers, cave diving is a central part of life, and diving into a cave generates a sense of meaning which appears to be consistent with Seligman's¹³ conception of the meaning domain. Buning and Gibson³⁴ highlighted similar motives for cyclists in the final and most advanced stage of the active-sport-event travel careers. Analogously, Mirehie and Gibson²² revealed that the advanced level skier/snowboarders infer additional meaning and purpose from snow-sports by participating in activities (e.g., charity snow-sports events, joining a club, leading snow-sports trips, and coaching) that signify a deeper degree of engagement.

Accomplishment

Accomplishment related to the PERMA framework emerged as the final element through the divers' narratives about their sense of achievement, competence, success, and mastery in recreational cave diving. Interpretations about challenging one's self, trying to dive more difficult caves, developing skill, and mastering were linked with a sense of achievement. For example, Vural expressed, "To me, learning new challenging skills for cave diving adventure has a way of helping us to encounter the parts of ourselves we have not met yet." Jale explained many times during her interview that she enjoyed the challenge and struggles: "I think, it is a hidden world where you will probably encounter some struggles. Before dive into a cave, I always challenge with my skills and try to develop them. Yet, the challenge and struggle are really exciting and fantastic for me." Sezen liked to progress and had a similar insider view: "I feel like I need to be open to new opportunities and directions by expanding my capabilities and qualifications. To be able to dive under the water where a challenging cave can be found in my real reason for staying informed and relevant in scuba education." In line with Seligman's¹³ fifth PERMA domain, divers seemed to unveil a sense of accomplishment via cave diving experience by challenging themselves and struggling with environmental boundaries or boosting their skills. These motives contribute to both the hedonic and eudemonic aspects of well-being. Challenge seems to be the case of flow concept¹⁵ and hence contributes to the engagement domain of PERMA as well. Each of these five domains of PERMA is pursued for its own sake, not as a means to an end, and is defined and measured independently of the other domains. Furthermore, different domains of PERMA are cogently intertwined. This is the paradigm of positive emotions and relationships, positive emotions and accomplishment, engagement and accomplishment. However, as noted in Mirehie and Gibson's study²² on women's participation in snow-sports and sense of well-being, the domains of relationships and positive emotions, relationships and accomplishment, positive emotions and accomplishment are overlapped.

CONCLUSION

The scope of past research on well-being utilizing a PERMA framework during leisure is scant and bushing out. Furthermore, no research to date has utilized PERMA along with Positivity Resonance Theory and Flow Concept in explaining leisure participants' well-being through the. We stress that divers experiencing recreational cave diving have a strong linkage to well-being and hence we suggest a conceptualization of Seligman's¹³ PERMA framework that consists of the five domains of well-being in line with a special overlap (positive emotions and relationships) which bring forth positivity resonance¹⁷ a powerful sustainer of mental health. Our results provide support for the existence of the five dimensions of PERMA as suggested by Seligman¹³ and support the view that recreational cave diving adventure leads to happiness, fulfillment, and flourishing as addressed by Filo and Coghlan²¹ and Mirehie and Gibson²².

Limitations and future directions

Even though rich illustrations of the phenomena were possible to acquire from in-depth interviews, our data collection process was predominantly based on interpretative. Also, the main goal of our study was not to generalize but rather to provide an in-depth, contextualized understanding of the well-being aspect of diver experience during a leisure activity, namely recreational cave diving. However, the diver experience on recreational cave diving from special well-being aspects could have been examined better by a mixed-method research. Recreational scuba diving represents a rapidly growing multi-billion-dollar industry worldwide³⁵. Therefore, promoting recreational cave diving through well-being outcomes may be a powerful tool for the dive industry and leisure to attract and maintain more participants. Being aware of the presence of different domains of PERMA in other types of recreational scuba diving such as deep, ice night diving may provide scuba professionals with insights as to how to leverage the benefits of participation and train more divers.

DISCLOSURE STATEMENT

The authors have no known conflicts of interest to report.

REFERENCES

1. Ince T, Bowen D. Consumer satisfaction and services: Insights from dive tourism. *Serv Ind J.* 2011;31(11):1769–92.
2. Kler BK, Tribe J. Flourishing through SCUBA: understanding the pursuits of dive experiences. *Tour Mar Environ* [Internet]. 2012;8(1):19–32. Available from: <http://openurl.ingenta.com/content/xref?genre=article&issn=1544-273X&volume=8&issue=1&page=19>
3. Kunthea P. Experiences and satisfaction of scuba dive tourists in Cambodia: A case study of Sihanoukville. Auckland University; 2016.
4. Musa G. Sipidan: An over-exploited scuba-diving paradise? An analysis of tourism impacts, diver satisfaction and management priorities. In: Garrod B, Wilson JC, editors. *Marine Ecotourism: Issues and Experiences*. Clevendon: Channel View Publications; 2003. p. 122–37.
5. Musa G, Sharifah Latifah Syed A. K, Lee L. Layang: An empirical study on scuba diver's satisfaction. *Tour Mar Environ.* 2006;2(2):89–102.
6. Dimmock K. Finding comfort in adventure: Experiences of recreational SCUBA divers. *Leis Stud.* 2009;28(3):279–95.
7. Allen-Collinson J, Hockey J. Feeling the way: notes toward a haptic phenomenology of distance running and scuba diving. *Int Rev Sociol Sport.* 2011;46(3):330–45.
8. Merchant S. Negotiating underwater space: the sensorium, the body and the practice of scuba-diving. *Tour Stud.* 2011;11(3):215–34.
9. Merchant S. Submarine geographies: The body, the senses and the mediation of tourist experience [Internet]. University of Exeter; 2012. Available from: <https://ore.exeter.ac.uk/repository/handle/10036/3519>

10. Merleau-Ponty M. *Phenomenology of Perception*, trans. Smith C. London: Routledge & Kegan Paul; 2001.
11. Straughan ER. Touched by water: The body in scuba diving. *Emot Sp Soc* [Internet]. 2012;5(1):19–26. Available from: <http://dx.doi.org/10.1016/j.emospa.2010.10.003>
12. Aygün Y, Tüfekçi Ş. A lust for rust: going back in time and exploring a museum without gravity. In: *Anatolia* [Internet]. Routledge; 2020. p. 1–15. Available from: <https://doi.org/10.1080/13032917.2020.1830137>
13. Seligman MEP. *Flourish: A visionary new understanding of happiness and well-being*. New York: NY: Free Press; 2011.
14. Seligman ME. *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. New York, NY: Free Press; 2002.
15. Csikszentmihalyi M. *Flow: The psychology of optimal experience*. NY: Harper and Row; 1990.
16. Diener E, Seligman MEP. Very happy people. *Psychol Sci*. 2002;13(1):81–4.
17. Fredrickson BL. Love: Positivity resonance as a fresh, evidence-based perspective on an age-old topic. In: Barret LF, Lewis M, Haviland-Jones JM, editors. *Handbook of emotions*. 4th ed. Guilford Press; 2016. p. 847–858.
18. Fredrickson BL. *Love 2.0*. Hudson Street Press; 2013.
19. Duyan M, Günel İ. The effect of leisure satisfaction on job satisfaction: a research on physical education teachers. *Int J Appl Exerc Physiol*. 2020;9(12):68–75.
20. Bosnjak M, Brown CA, Lee DJ, Yu GB, Sirgy MJ. Self-expressiveness in sport tourism: determinants and consequences. *J Travel Res*. 2016;55(1):125–34.
21. Filo K, Coghlan A. Exploring the positive psychology domains of well-being activated through charity sport event experiences. *Event Manag*. 2016;20(2):181–99.
22. Mirehie M, Gibson HJ. Women's participation in snow-sports and sense of well-being: a positive psychology approach. *J Leis Res*. 2020;51(4):397–415.
23. Gündoğdu C, Aygün Y, Akyol B, Tüfekçi Ş, İlkin M, Canpolat B. A football player's insider view: inspiring the success story of the Turkey amputee football national team. *Turkish J Sport Exerc* [Internet]. 2020;22(2):311–7. Available from: <https://dergipark.org.tr/en/pub/tsed/issue/56502/736036>
24. Patton MQ. *Qualitative research & evaluation methods: Integrating theory and practice*. 4th ed. Thousand Oaks, CA: Sage; 2014.
25. Miles MB, Huberman AM, Saldana J. *Qualitative Data Analysis: A Method Sourcebook*. 3th Editio. United States of America: Sage Publication Ltd; 2014.
26. Seidman I. *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. 3rd ed. New York: Teacher College Press; 2006. 1–162 p.
27. Glaser BG, Strauss AL. *The discovery of grounded theory: strategies for qualitative research* [Internet]. Vol. 1, *Observations*. United States of America: Aldine Transaction; 1967. Available from: <http://www.amazon.com/dp/0202302601>
28. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101.
29. Meisel C, Cottrell S. Differences in motivations and expectations of divers in the Florida Keys. In: *Proceedings of the 2003 Northeastern Recreation Research Symposium*. Bolton Landing, NY; 2004.
30. Seligman MEP. Can happiness be taught? *Daedalus*. 2004;133(2):80–7.
31. Havitz ME, Mannell RC. Enduring involvement, situational involvement, and flow in leisure and non-leisure activities. *J Leis Res*. 2005;37(2):152–77.
32. Monnier C, Syssau A, Blanc N, Brechet C. Assessing the effectiveness of drawing an autobiographical memory as a mood induction procedure in children. *J Posit Psychol* [Internet]. 2018;13(2):174–80. Available from: <http://dx.doi.org/10.1080/17439760.2016.1257048>
33. Kurtz LE, Algae SB. When sharing a laugh means sharing more: testing the role of shared laughter on short-term interpersonal consequences. *J Nonverbal Behav*. 2017;41(1):45–65.
34. Buning RJ, Gibson H. The evolution of active-sport-event travel careers. *J Sport Manag*. 2015;29(5):555–69.
35. Dimmock K, Cummins T, Musa G. The business of scuba diving. In: Musa G, Dimmock K, editors. *Scuba diving tourism*. Abington, Oxon: Routledge; 2013. p. 161–73.

EXAMINATION OF EXERCISE IN INDIVIDUALS WITH DISABILITIES AND INQUIRY SKILLS OF STUDENTS IN SPORTS EDUCATION DEPARTMENT

MEHMET ILKIM*, BARIS MERGAN**

*Associate Professor, Department of Exercise and Sport Education in Disabilities, Inonu University, Malatya, Turkey

**Postgraduate Student of the Department of Physical Education and Sports, Inonu University, Malatya, Turkey

Corresponding author. mehmet.ilkim@inonu.edu.tr, barimergan@gmail.com,

ORCID:0000-0003-0033-8899

ABSTRACT

This study aims to examine the exercise in individuals with disabilities and inquiry skills of students in the sports education department. The population of the study consists of students studying at Inonu University, Faculty of Sport Sciences, Department of Exercise and Sports Education for the Disabilities. The research was conducted using quantitative research methods. The analysis of the data was analyzed in the SPSS 22.00 program. While there were no significant differences between the sub-scale dimensions depending on the gender and age variables of the students participating in the study, significant differences were found depending on the variable of doing sports.

Keywords: Inquiry, Inquiry Skills, exercise for the disabled

INTRODUCTION

According to Kumari, Arora, and Tiwari, questioning is the process of reaching the truth by asking questions and researching information.¹ The concept of inquiry is linked to asking and curiosity. In another definition, questioning means exploring, showing interest, being motivated, finding and solving problems, forming hypotheses, thinking, making relationships, and creating meaning.² The existence of a problem situation, which is emphasized jointly in the definitions related to inquiry, the production of creative solutions for the solution of the problem, and the need for analysis to reach information are seen.³ Questioning has an important place in life. Since the philosophers were accepted as the first thinkers, inquiries have been made regarding the subjects of knowledge, truth, interpretation, justice, state, etc. Speaking of the virtues of Aristotle's thinking skill and action, Socrates 'starting questioning from the realization of ignorance, Protagoras' relative skepticism, the fact that Heraclitus supports the flow theory, that is, he states that all things are constantly changing and at the same time they are the biggest foundation of the skepticism of the sophists, these are situations that indicate the historical existence of the act of questioning.⁴ According to Branch and Solowan, since inquiry is a learning method that puts the student at the center for asking questions, critical thinking, and problem-solving, it provides the opportunity to develop the skills students will need throughout their lives.⁵ Thus, it helps students find solutions to problems. Inquiry, although the process in which the question is asked is not limited, requires high-level interaction in the context of teacher, student, content, and environment. The questions designed to be asked are handled in the context of high-level thinking dimensions and prepared by considering all processes such as research, examination, and discovery in which the learner is involved in the process. This is a kind of asking question game.⁶

Advanced individuals with questioning abilities and skills are thought to possess some characteristics. According to Doganay, the characteristics of individuals with questioning skills are as follows:

- They are active rather than passive when they are present as individuals.
- They do not give up immediately against the problems they experience and are determined.
- They behave objectively without being tied to people or authorities.
- They have an open mind.
- They can explain the reasons for situations in which they have a say and express their opinion.
- They do not accept the information they have obtained as it is. They consider different points of view using different sources and then make a judgment.
- They have content knowledge of the topics they talk about.
- They can share their ideas with the people around them. They learn the ideas and thoughts of other individuals. They also question other ideas.
- They can empathize by looking at the events from the perspective of other individuals.
- They are not prejudiced.
- They make predictions about situations.⁷

INQUIRY SKILLS

There are sub-skills such as researching skill is included in this study as an inquiry skill, to make meaningful predictions, decide on the suitability of the research environment, deciding how and how much evidence to collect in research, by planning to work with a scientific approach, know how to observe and compare, using tools and equipment, to reveal the way to present the findings by making accurate and detailed measurements, the decision whether it is necessary by repeating the results, by establishing a link between the results and the original thoughts, the decision of its support and adequacy by examining the

findings, and deciding whether the expectations of the findings are met.⁸ The inquiry skills are explained by John Dewey as "inquiry learning skills", asking questions on the subject to be learned, examining the answers, revealing new information while gathering information on some subjects, and reflecting the newly learned knowledge by talking to existing ones with experience⁹. A change was made in the education programs with the changing information. The inquiry is one of the skills teachers and students use in their daily lives. For this reason, teachers should have the skill of inquiry and practice in many places and enable students to gain this skill effectively¹⁰. Inquiry skill helps the person to solve the problems of himself and those around him by thinking through various methods. Questioning is used at every stage of everyday life. Most of all, its importance in schools has increased with the changes in science curricula¹¹. When the inquiry skill is examined, it is stated that it is an important learning way for the science lesson¹². The method in which the inquiry skill is employed is the inquiry-based teaching method.

Types of Inquiry Skills

Types of inquiry skills are defined in their studies by more than one researcher. D'Avanzo and McNeal argued that inquiry skills can be classified in three ways when various approaches are organized as a whole, according to the students' levels and the degree to which they gain some inquiry skills¹³.

Guided Inquiry

The teacher provides focus questions, then encourages and supervises students' use of approaches that appeal to their questions.

Open-Ended Questioning

The teacher helps students to choose their questions and inquiry approaches in this process.

Teacher Cooperative Inquiry

Teachers and students are researchers. Together, everyone chooses questions and questioning methods to find answers they do not know.

MATERIALS and METHODS

The study is quantitative research, and the scanning model, one of the descriptive research methods, was used in the study. In quantitative research, statistical data are obtained by using data collection methods such as questionnaires, scales, or structured interviews with the use of survey-type studies with large participation¹⁴.

Population and Sample

The population of this study is Inonu University Faculty of Sport Sciences, Exercise Department for the Disabilities. The sample group consists of 100 students who are accepted voluntarily using the random method.

Data Collection Tool

The "Inquiry Skills Scale" used in the study is a 5-point Likert type. Each item, consisting of fourteen items, was scaled into five categories: 1. Never, 2. Rarely, 3. Sometimes, 4. Often, and 5. Always. Since the arithmetic mean score of the scale is between 1.00-5.00, it has been accepted that as the scores approach 5.00, the inquiry skills of the prospective teachers are high, and the higher they approach 1.00, the lower it is. The scale has three factors: "acquisition of information", "controlling information" and "self-confidence". The total variance explained by the factors is 51.98%. The KMO value of the scale is .854; Bartlett's Test of Sphericity χ^2 value was found to be 1513.582 ($p < 0.01$). The Cronbach's alpha reliability coefficient of the scale was calculated as 0.82. According to the sub-dimensions, the Cronbach-alpha value is 0.76 for "acquisition of information"; 0.66 for "controlling information"; 0.82 for "self-confidence". In this thesis, the Cronbach-alpha value is 0.73 for the whole scale, 0.59 for "obtaining information"; 0.59 for "checking information"; 0.75 for "self-confidence".

Data Analysis

The data obtained in the study were subjected to statistical analysis in the SPSS 22.00 program. Kolmogorov-Smirnov and Shapiro-Wilk normality tests were conducted to determine the tests to be made on the data obtained in the study. Since the data did not show normal distribution, Mann-Whitney U and Kruskal-Wallis tests were performed.

RESULTS

The analysis results after the answers given by the students participating in the study to the questions in the scale are shown in tables in this section.

Table 1: Gender distribution of the students participating in the study

GENDER	%	N
Male	57	57
Female	43	43
TOTAL	100	100

Table 1 shows the distribution of the students participating in the study by gender variable. The study consisted of n = 57 males and n = 43 females, total n = 100 students.

Table 2: Age distribution of students participating in the study

AGE	%	N
18-21	45	45
22-25	55	55
TOTAL	100	100

Table 2 shows the distribution of the students participating in the research by age variable. The age groups of the students participating in the study are n = 45 between the ages of 18-21 and n = 55 between the ages of 22-25.

Table 3: Doing Sports Status of the students participating in the research

ACTIVE DOING SPORTS STATUS	%	N
Doing individual sports	37	37
Doing team sports	34	34
Not doing sports	29	29
TOTAL	100	100

Table 3 shows the distribution of the students participating in the research according to their active sports status. The number of students doing individual sports was n = 37, the number of students doing team sports was n = 34, and the number of students not doing sports was n = 29.

Table 4: Mann Whitney U test results on scale sub-dimensions depending on the Gender Variable

ACQUISITION OF KNOWLEDGE	N	M.R	R.S.	U	Z	P
Male	57	53,44	304,00	105,00	-1,170	.242
Female	43	46,60	204,00			
SELF-CONFIDENCE	N	M.R	R.S.	U	Z	P
Male	57	53,21	303,00	107,00	-1,084	.278
Female	43	46,91	201,00			
CONTROLLING KNOWLEDGE	N	M.R	R.S.	U	Z	P
Male	57	52,95	301,00	108,00	-,976	.329
Female	43	47,26	208,00			

No significant differences were found in the sub-dimension of acquisition of information for male and female students depending on the gender variable ($p > 0.05$) (p, 242). No significant differences were found between male and female students in the self-confidence subscale ($p > 0.05$) (p, 278). No significant differences were found between male and female students in the subscale of controlling knowledge ($p > 0.05$) (p, 329).

Table 5: Mann Whitney U test results on scale sub-dimensions depending on the age variable

ACQUISITION OF KNOWLEDGE	N	M.R.	R.S.	U	Z	P
18-21	45	53,28	239,50	112,50	-,869	.385
22-25	55	48,23	265,50			
SELF-CONFIDENCE	N	M.R.	R.S.	U	Z	P
18-21	45	55,87	251,00	756,00	-1,686	.092
22-25	55	46,11	253,00			
CONTROLLING KNOWLEDGE	N	M.R.	R.S.	U	Z	P
18-21	45	53,44	240,00	455,00	-,923	.356
22-25	55	48,09	264,00			

Depending on the age variable, no significant differences were found in the subscale of acquisition of knowledge of 18-21 and 22-25 students ($p > 0.05$) (p, 385). No significant differences were found between 18-21 and 22-25 students in the self-confidence subscale ($p > 0.05$) (p, 092). No significant differences were found between 18-21 and 22-25 students in the controlling knowledge sub-dimension ($p > 0.05$) (p, 356).

Table 6: The results of the Kruskal-Wallis test applied to the sub-dimensions of the scale depending on the active exercise variable of the students

SCALE	GROUP	N	M.R	X ²	P	DISCREPANCY
ACQUISITION OF KNOWLEDGE	Individual sports (1)	37	62,80			
	Team sports (2)	39	51,66			

SELF-CONFIDENCE	Not Doing Sports (3)	24	33,45	16,818	.000	(1,3)-(2,3)
	Individual sports (1)	37	60,55			
	Team sports (2)	39	55,37			
	Not Doing Sports (3)	24	31,97	17,511	.000	(1,3)-(2,3)
CONTROLLING KNOWLEDGE	Individual sports (1)	37	64,16			
	Team sports (2)	39	54,00	24,923	.000	(1,3)-(2,3)
	Not Doing Sports (3)	24	28,97			

Depending on the gender variable, no significant differences were found in the sub-dimension of acquisition of knowledge for male and female students ($p > 0.05$) (p, 242). No significant differences were found between male and female students in the self-confidence sub-dimension ($p > 0.05$) (p, 278). No significant differences were found between male and female students in the subscale of controlling knowledge ($p > 0.05$) (p, 329). Depending on the age variable, no significant differences were found in the subscale of 18-21 and 22-25 students' acquisition of knowledge ($p > 0.05$) (p, 385). No significant differences were found between 18-21 and 22-25 students in the self-confidence subscale ($p > 0.05$) (p, 092). No significant differences were found between 18-21 and 22-25 students in the controlling knowledge sub-dimension ($p > 0.05$) (p, 356). Significant differences were determined between students who do individual sports (M.R = 62,80) and non-sports (M.R = 33,45) in the subscale of acquisition of knowledge, and this significant difference shows results in favor of students who do individual sports. In the sub-dimension of acquisition of knowledge, a significant difference was found between students who do team sports (M.R = 51.66) and those who do not do sports (M.R = 33.45), and this difference shows results in favor of students who do team sports. In the self-confidence sub-dimension, significant differences were detected between students who do individual sports (M.R = 60.55) and those who do not do sports (M.R = 31.97), and this significant difference shows results in favor of students who do individual sports. In the self-confidence sub-dimension, a significant difference was found between students who do team sports (M.R = 55.37) and those who do not do sports (M.R = 31.97), and this difference shows results in favor of students who do team sports. Significant differences were found between students who do individual sports (M.R = 64.16) and those who do not do sports (M.R = 28.97) in the sub-dimension of checking knowledge, and this significant difference shows results in favor of students who do individual sports. In the sub-dimension of controlling knowledge, a significant difference was found between students who do team sports (M.R = 54.06) and those who do not do sports (M.R = 28.97), and this difference shows results in favor of students who do team sports.

DISCUSSION

In a study conducted by Dervisoglu and Arseven¹⁵ in which the inquiry skills of pre-service history teachers were examined, it was stated that the teacher candidates had a high level of knowledge acquisition, could control information, and have self-confidence, and it is similar to the study we conducted with the students of the exercise and sports department for disabled people. Karamustafaoglu stated that there were no significant differences in the inquiry skills of teacher candidates according to the variables of the department¹⁶. He stated that there are significant differences in the sub-dimension of "acquisition of knowledge" among the pre-service teachers according to the department variable. In the study we conducted with students of the department of exercise and sports for disabilities, no significant differences were detected in variables such as gender and age, but significant differences were found in the variable of whether they do active sports or not. Isik investigated the inquiry skills of elementary school students and stated that there was a significant difference in favor of female students between students' inquiry skills by gender¹⁶. In our study on exercise and sports students with disabilities, no significant difference was found in any sub-dimension by gender. Inaltekin and Akcay¹⁷, Karademir¹⁸, Yilmaz, and Karamustafaoglu¹⁰ stated in the research results of Akcay¹⁹ that pre-service teachers' inquiry skills did not differ according to gender variable. In the study we conducted with students of the department of exercise and sports for disabled people, no significant difference was found in any sub-dimensions according to gender, and the studies are similar in this context. As a result, many organizations in our country and abroad have mentioned the importance of inquiry-based teaching. The National Research Council and the American Science Development Board have recently declared the purpose of scientific research as motivating teachers to use inquiry in lessons²⁰.

REFERENCES

1. Kumari P, Arora SK, Tiwari S. 2015. Impact of Inquiry-based teaching model on Academic Achievements in Social Science subject of 9th class student of secondary Schools located in an urban area. *International Journal of Recent Research Aspects* 2(4), 154-158.
2. Delcourt MAB, Mckinnon J. 2011. Tools for Inquiry: Improving Questioning in the Classroom. *Learning Landscapes*, 4(2), 145-159.
3. Kaplan-Parsa M. 2016. Collaborative Inquiry-Based Learning Environments Creative Thinking, Inquiry Learning Skills, The Effect of Attitude Towards Science and Technology Lesson, Phd Thesis. Marmara University Institute of Educational Sciences. İstanbul.
4. Kabasoglu G. 2015. 1960s and Reflections in the Combination of the Action of Inquiry with Art-Space. Unpublished Master's Thesis. Mimar Sinan University of Institute Science, İstanbul.
5. Branch JL, Solowan DG. 2003. Inquiry-Based Learning: The Key to Student Success. *School Libraries in Canada*. 22 (4), 6-12.

6. Babadogan C, Gürkan T. 2002. The Effect of Inquiry Teaching Strategy on Academic Achievement. *Educational Sciences and Practice Journal*. 1(2), 147-160.
7. Doganay A, Unal F, 2006. Teaching Critical Thinking. (Edt: A. Simsek): Instruction Based on Content Types. Ankara: Nobel Publishing, (209- 264).
8. MEB. 2005. Primary 1-5 class Schedules Introduction Handbook, State Books Directorate Printing House: Ankara.
9. Taskoyan SN. 2008. Inquiry Learning Skills of Students of Inquiry Learning Strategies in Science and Technology Teaching. Effects on Academic Success and Attitudes. Unpublished Master's Thesis. Dokuz Eylül University of Institute Educational Sciences, İzmir.
10. Karamustafaoglu S, Havuz A. 2016. Research Inquiry Based Learning and Effectiveness. *International Journal of Assessment Tools in Education*. 3, 1, 40-54.
11. Wang F, Kinzie MB, McGuire P. 2010. Applying Technology to Inquiry-Based Learning in Early Childhood Education. *Early Childhood Education Journal*. 37, 381-389.
12. NG P. 2010. Teaching science through inquiry. In: Innovative Thoughts, Invigorating Teaching: Proceedings of the Sunway Academic Conference (The 1st Pre-University Conference), Swan Convention Centre, Bandar Sunway. Proceedings of the Sunway Academic Conference. Friday 7 August 2009, Sunway University College, Petaling Jaya, 31-37.
13. Trautman N, Avery L, Krasny M, Cunningham C. 2002. University science students as facilitators of high school inquiry-based learning. Annual Meeting of the National Association for Research in Science Teaching, New Orleans, LA.
14. Dawson C. 2007. A practical guide to research methods. Oxford: How to Content a Division of How to Books Limited.
15. Arseven A, Dervisoglu MF, Arseven I. 2015. The Relationship Between Pre-Service History Teachers Inquiry Skills and their Critical Thinking Dispositions. *International Journal of Social Science*. 32, 171-185.
16. Isik G. 2011. Determining the Relationship Between Learning Styles and Inquiry Learning Skills of Primary Schools 6th, 7th and 8th Grade Students. Unpublished Master's Thesis. Adnan Menderes University of Institute Science, Aydın.
17. Inaltekin T, Akcay H. 2012. Investigation of Inquiry Based Science Teaching Self Efficacy of Science and Technology Teacher Candidates. X. National Science and Mathematics Congress, Nigde University. 27-30.
18. Karademir C. 2013. The Effects of Pre-Services Teachers Inquiry and Critical Thinking Skills on Teacher Self-Efficacy Level. Unpublished Master's Thesis. Adnan Menderes University Institute of Social Sciences, Aydın.
19. Akcay A. 2015. Investigation of Programming Skills Self-Efficacy in the Context of Problem Solving and Inquiry Skills. Unpublished Master's Thesis. Necmettin Erbakan University Institute of Education Sciences. Konya.
20. Minner DD, Levy AJ, Century J. 2010. Inquiry- based science instruction—what is it and does it matter? Results from a research synthesis years 1984 to 2002. *Journal of research in science teaching*, 47(4), 474-496.

THE ROLE OF GENDER IN GOAL ORIENTATION AND MOTIVATION OF PARTICIPATION IN WHEELCHAIR BASKETBALL PLAYERS

Toprak KESKIN¹ and Turhan TOROS^{*2}

¹Nevsehir Haci Bektas Veli University- School of Sports Sciences and Technology- <https://orcid.org/0000-0001-9439-0094>

²Department of Sports Sciences, Mersin University, Mersin

Corresponding author: Turkey-turhantoros@yahoo.com. <https://orcid.org/0000-0002-8328-2925>

ABSTRACT

In this study, it was aimed to examine the relationship between the goal orientation of wheelchair basketball players and their motivation to participate in sports. A total of 91 wheelchair basketball players, 40 women, and 51 men were determined as the sample. The average age of wheelchair basketball players in the study is 29.34 ± 2.91 years. The "Task and Ego Orientation Scale in Sports" ^{8, 22} and the "Motivation for Participation in Sports for Persons with Disabilities Scale (MPSPDS)" developed by Tekkursun et al. (2018) were used as data collection tools. "Ethics Committee Approval" document and research permissions were obtained from the Ethics Committee for the application of data collection tools to wheelchair basketball players. With the scales uploaded to the online platform called Google Forms, the data were collected on the internet using the scale method. In the analysis of the research data, the arithmetic means, frequency, standard deviation, and percentage values among the descriptive statistics, and the Kolmogorov-Smirnov (K-S) test were used to examine whether the scale data showed normal distribution or not to determine whether parametric analysis would be performed. Independent t-test analysis was used for the pair comparisons showing normal distribution. As a result of the t-test, there is a statistically significant difference between the mean of task orientation of women and men ($t = - 6.502$; $p < 0.05$). There is a statistically significant difference between the ego orientation averages of men and women ($t = 7.620$; $p < 0.05$). As a result of the t-test, there is no statistically significant difference between the intrinsic motivation averages of men and women ($t = - 1.720$; $p > 0.05$). There is no statistically significant difference between the extrinsic motivation averages of women and men ($t = - 1.624$; $p > 0.05$). There is no statistically significant difference between the motivation averages of women and men ($t = - 1.699$; $p > 0.05$). The obtained findings showed that the goal orientation differentiated according to the gender variable, and the motivation to participate in sports did not differ in terms of gender.

Keywords: Ego orientation, task orientation, intrinsic motivation, extrinsic motivation, motivation, wheelchair basketball.

1. INTRODUCTION

Athletes try to achieve goals related to themselves. Concerning the goals, athletes especially athletes with disabilities make great efforts. Therefore, for the last 30 years, sports psychologists have been interested in goal orientation. ^{13, 14, 15} For example, achieving specific goals is considered an important element of motivation to participate. ¹⁶ The goal orientations that athletes can have are considered as task and ego-oriented goals. ^{6, 8} In goal orientation, athletes with high task-oriented goals give priority to improving their skills and skills and focus on increasing their performance. ^{23, 24} Studies have shown that task orientation is important. ^{6, 24} The other goal orientation is ego-oriented goals. Ego orientation includes feelings of superiority. Athletes who prioritize achieving ego-oriented goals concentrate on overcoming others and being the best during the competition. It has been stated that elite athletes have more ego-oriented goals than non-elite athletes. ^{6, 17} Similarly, in young elite Dutch footballers, a positive relationship was observed between ego-oriented goals and perceived achievement. ²⁵

Participation is used to physically attract athletes to competition and training. When the researches about participation in sports is examined, they mostly cover children and young adults. ¹ The motivation for the participation of wheelchair basketball players is determined to define the reasons that direct athletes participating in sports and physical activities to participate in competitions. ¹⁹ Motivation is internal and external motives that direct a person to a certain action. Extrinsic motivation is the interest and pleasure received when the athlete reaches the goal. ²⁶ There are many studies in our country on the motivation of athletes to participate in sports. ^{2, 5} The awareness of wheelchair basketball players' goal orientation, task and ego-oriented goals, motivation level, desire to participate in sports, and knowing what they want will ensure success. In the light of all this information, it will be possible if goal orientation and motivation come to the fore in wheelchair competitions. In this study, it was aimed to examine the relationship between the goal orientation of wheelchair basketball players and their motivation to participate in sports.

2. MATERIALS AND METHODS

This research is designed in a descriptive survey model. Descriptive scanning is an information gathering method that symbolizes the relevant people and is used to examine the relationships between categories by querying them with a standard process.

Research Sample:

The universe of the study consists of wheelchair basketball players who play in the amateur category in Turkey. A total of 91 wheelchair basketball players, 40 women, and 51 men were determined as the sample. The average age of wheelchair basketball players in the study is 29.34 ± 2.91 years.

Data Collection Tools:

Task and Ego Orientation Scale in Sports

Task and Ego Orientation in Sports Scale consist of 13 items, 7 of which are task and 6 of which are ego orientation. Respondents of the scale make their participation in each item according to the 5-point evaluation system. The adaptation study of the scale for Turkish athletes was conducted by Toros (2001). The construct validity study of the scale was conducted with the help of explanatory factor analysis, and two factors, task orientation, and ego orientation were found (Duda, 1989; Duda et al., 1995). In the study about the scale, the internal consistency of the scale was determined as .79 for task orientation and .81 for ego orientation.⁶

Sports Participation Motivation Scale for Persons with Disabilities

The 22-item "Motivation for Participation in Sports for Persons with Disabilities Scale (MPSPDS)", developed by Tekkursun et al. (2018), was used as a data collection tool. The scale includes the sub-dimensions "Intrinsic Motivation" consisting of 12 items, "Extrinsic Motivation" consisting of 5 items, and "Motivation" consisting of 5 items. The Cronbach's Alpha reliability coefficient obtained in the study of Tekkursun et al. (2018) was calculated as .83 for the Intrinsic Motivation sub-dimension, .87 for the Extrinsic Motivation sub-dimension, and .88 for the Lack of Motivation sub-dimension.

Data Collection Process

"Ethics Committee Approval" document and research permissions were obtained from the Ethics Committee for the application of data collection tools to wheelchair basketball players. With the scales uploaded to the online platform called Google Forms, the data were collected on the internet using the scale method. An informing consent form was added to the athletes at the beginning of the forms, explaining the purpose of the study, and a check box was added so that the athletes cannot pass to the questionnaire forms without giving consent that they participated in the study voluntarily.

Data Analysis

SPSS 22.0 program was used to analyze the data collected in the study. In the analysis of the research data, the arithmetic means, frequency, standard deviation, and percentage values among the descriptive statistics, and the Kolmogorov-Smirnov (K-S) test were used to examine whether the scale data showed normal distribution or not to determine whether parametric analysis would be performed. Independent t-test analysis was used for the pair comparisons showing normal distribution.

3.RESULTS

The results of the goal orientation (task and ego orientation) and participation motivation analysis results of wheelchair basketball players are given in detail below.

Table 4.1. T-Test Results for the Sub-Dimension Task Orientation of Wheelchair Basketball Players and the Gender Variable

	GENDER	n	X	STD. D.	T	P
TASK ORIENTATION	WOMAN	40	3,34	1,09	-6,502	0,000
	MAN	51	4,61	1,21		

As seen in the table, the average task orientation of women is 3.34 and the average task orientation of men is 4.61. As a result of the t-test, there is a statistically significant difference between the mean of task orientation of women and men ($t = -6.502$; $p < 0.05$). This difference is in favor of men.

Table 4.2. T-Test Results of the Goal Orientation Sub-Dimension of Wheelchair Basketball Players for Ego Orientation and the Gender Variable

	GENDER	n	X	STD. D.	T	P
EGO ORIENTATION	WOMAN	40	4,73	1,66	7,620	0,000
	MAN	51	3,09	1,69		

As seen in the table, the ego orientation average of women is 4.73 and the ego orientation average of men is 3.09. As a result of the t-test, there is a statistically significant difference between the ego orientation averages of men and women ($t = 7.620$; $p < 0.05$). This difference is in favor of women.

Table 4.3. T-Test Results on the Motivation for Participation in Sports Sub-Dimension of Wheelchair Basketball Players for Intrinsic Motivation and the Gender Variable

	GENDER	n	X	STD. D.	T	p
INTRINSIC MOTIVATION	WOMAN	40	4,55	0,86	-1,720	0,086
	MAN	51	4,59	0,74		

As seen in the table, the intrinsic motivation average of women is 4.55 and the intrinsic motivation average of men is 4.59. As a result of the t-test, there is no statistically significant difference between the intrinsic motivation averages of men and women ($t = -1.720$; $p > 0.05$).

Table 4.4. T-Test Results on the Motivation for Participation in Sports Sub-Dimension of Wheelchair Basketball Players for the Extrinsic Motivation and Gender

	GENDER	n	X	STD. D.	T	p
EXTRINSIC MOTIVATION	WOMAN	40	4,41	0,83	-1,624	0,082
	MAN	51	4,46	0,79		

As seen in the table, the extrinsic motivation average of women is 4.41 and the intrinsic motivation average of men is 4.46. As a result of the t-test, there is no statistically significant difference between the extrinsic motivation averages of women and men ($t = -1.624$; $p > 0.05$).

Table 4.5. T-Test Results on the Motivation of Wheelchair Basketball Players to Participate in Sports Subscale Amotivation and Gender Variable

	GENDER	n	X	STD. D.	T	p
AMOTIVATION	WOMAN	40	4,50	0,80	-1,699	0,087
	MAN	51	4,56	0,91		

As seen in the table, the amotivation average of women is 4.50 and the average amotivation of men is 4.56. As a result of the t test, there is no statistically significant difference between the amotivation averages of men and women ($t = -1.699$; $p > 0.05$).

4.DISCUSSION

As a result of the T-test, there is a statistically significant difference between the averages of task orientation of women and men. This difference is in favor of men. As a result of the T-test, there is a statistically significant difference between the ego orientation averages of men and women. This difference is in favor of women. As with many sports, a lot of training and competitions are needed for wheelchair basketball players. Athletes reveal their orientation to task or ego to achieve performance and result goals. The fact that men are more task-oriented is the result of their efforts to improve themselves and rise above their performance. Women, on the other hand, choose a rival for themselves and try to surpass him and do better than him. These efforts reveal that women are ego-oriented.^{11, 22} Parameters have shown that athletic in hearing-impaired develop balance, reaction time, and muscle strength more than gymnastic. Hearing-impaired individuals can be directed to the sport of athletics to increase daily living activity levels and quality of life.¹²

As a result of the T-test, no statistically significant difference was found between the intrinsic motivation averages of women and men. As a result of the T-test, no statistically significant difference was found between the extrinsic motivation average of women and men. As a result of the T-test, no statistically significant difference was found between the motivation averages of women and men. While these findings are similar to some research results in the literature, they are not similar to some research results. Since participation motivation studies on wheelchair basketball players are limited, the number of studies subject to the discussion is limited. When this limited literature was examined, results similar to the results of this study were found. Bozkurt, et al. (2019) found a significant difference between the groups in favor of female athletes in the extrinsic motivation dimension of motivation to participate in sports as a result of their research on deaf athletes. Similarly, Blinde and McCallister (1999) concluded in their study that female athletes with disabilities are more willing to participate in sports than male athletes. Shihui et al. (2007), the results of the studies on disabled athletes are similar to the results of this study. Therefore, it shows that female athletes strive to be appreciated by others, avoid negative warnings and be successful, compared to men.

5. CONCLUSION

The purpose of this study is to reveal whether the motivations for goal orientation and participation in sports differ according to the gender variable. In this context, the findings obtained from the analysis made to determine the goal orientation

and participation motivation of wheelchair basketball players; showed that the goal orientation differs according to the gender variable, while the motivation for participation in sports does not differ in terms of gender. Although there are many studies on goal orientation and participation motivation in sports psychology, there is no scale developed for wheelchair basketball players. Therefore, in the future, it may be considered to conduct a scale development study for these athletes.

REFERENCES

1. Acar, Z. Y. (2012). Examination of Primary Schools Students Motivation to Participate in Physical Education and Extracurricular Activities. (Doctoral dissertation, Ankara University of Institute of Health Sciences Department of Physical Education and Sport.).
2. Ardahan, F. (2013). Analysis of Factors that Motivate Individuals to Recreative Sports Activities According to Various Demographic Variables Using the Rem Scale: ANTALYA Example. *Pamukkale Journal of Sport Sciences*, 4(2).
3. Blinde, E. M. ve McCallister, S. G. (1999). Women, disability, and sport and physical fitness activity: The intersection of gender and disability dynamics. *Research Quarterly for Exercise and Sport*, 70(3), 303-312.
4. Bozkurt, T. M., Demir, G. T. ve Dursun, M. (2019). Examining the Motivation of Physical, Haring and Visually Impaired Athletes to Participate in Sports . Examination Of Motivations Of Physically, Hearing And Visually Impaired Athletes. *The Journal*, 12(67).
5. Demir, G. T., & Cicioglu, H. İ. (2018). Motivation Scale For Participation In Physical Activity (MSPPA): A study of validity and reliability Physical Activity Participation Motivation Scale (FAKMÖ): Validity and Reliability Study. *Journal of Human Sciences*, 15(4), 2479-2492.
6. Duda, J.L. & White, S.A. (1992). Goal orientations and beliefs about the causes of success among elite athletes. *The Sport Psychologist*, 6, 334-343.
7. Duda, J.L. & Whitehead, J. (1998). Measurement of goal perspectives in the physical domain. In J.L. Duda (Ed.), *Advances in sport and exercise psychology measurement*, Morgantown, WV: Fitness Information Technology, Inc.
8. Duda, J.L. (1989). Goal perspectives and behavior in sport and exercise settings. In C. Ames & M. Maehr (Eds.), *Advances in motivation and achievement*. Greenwich, CT: JAI Press.
9. Duda, J.L. (1992). Motivation in sport settings: A goal perspective analysis. In G. Roberts (Ed.), *Motivation in sport and exercise*. Champaign, IL: Human Kinetics.
10. Duda, J.L., Chi, L., Newton, M.L., Walling, M.D. & Catley, D. (1995). Task and ego orientation and intrinsic motivation in sport. *International Journal of Sport Psychology*, 26, 40-63.
11. Gursel, F. (2006). The Effect of Physical Education and Sports Classes for the Disabled on Students Attitudes Towards Disabled People. *Hacettepe University Journal of the Faculty Education*, 31(31), 67-73.
12. Ilkim M, Akyol B. (2018). The Comparison of Some Motoric Characteristics of Hearin İmpaired Individuals Sports Athletic an Gymnastic. *Universal Journal of Educational Research* 6(10): 2148-2152.
13. Kesilmis, İ., & Yıldız, R. (2018). The relation between body awareness and track and field athletes' goal setting. *Journal of Human Sciences*, 15(4), 2454-2461. doi:10.14687/jhs.v15i4.5501
14. Kesilmis, İ., Tastan, Z., & Toros, T. (2020). Comparison of the Perceived Motivation Climate and Rewarding Behavior of Football Players According to Their Positions, *Journal of Sports Educations*, 4(1), 115-122.
15. Nicholls, J. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
16. Papaioannou, A. (1994). Development of a questionnaire to measure achievement orientations in physical education. *Research Quarterly for Exercise and Sport*, 65, 11-20.
17. Reilly, T., Williams, A.M., Nevill, A. & Franks, A. (2000). A multidisciplinary approach to talent identification in soccer. *Journal of Sports Sciences*, 18, 695- 702.
18. Shihui, C., Jin, W., Mei, J. ve On, L. K. (2007). Motivation of sport participation in elite athletes with physical disabilities in mainland China. *Asian Journal of Exercise and Sports Science*, 4(1), 63-67.
19. Soyer, F., Can, Y., Güven, H., Hergüner, G., Bayansalduz, M., & Tetik, B. (2010). Investigation of the Relationship Between Success Motivation and Team Unity in Athletes. *International Journal of Human Sciences*, 7(1), 225-239.
20. Tastan, Z., Kesilmis, İ., & Toros, T. (2020). Comparison of the Democratic and Autocratic Behavior Perceived by Basketball Players from Coaches According to Their Positions .*Gaziantep University Journal of Sport Sciences* , 5(3), 219-230.
21. Tekkursun, D. G., İlhan, E. L., Esentürk, O. K. ve Adnan, K. A. N. (2018). Motivation Scale for Participation in Sports (eskmö) Validity and Reliability Study of Persons with Disabilities .*Sports Meters Journal of Physical Education and Sport Sciences*, 16(1), 95-106.
22. Toros, T. (2001). Effect of goal orientations, motivational climates on life satisfaction among the elite and non elite Turkish basketball players. Unpublished master thesis, Mersin University, Mersin/TURKEY.
23. Toros, T. (2002). Goal orientations, motivational climates on life satisfaction among the elite and non elite Turkish basketball players. *Hacettepe University Journal of Sport Sciences*. 13(3), 24-36.
24. Toros, T., Akyüz, U., Bayansalduz, M., & Soyer, F. (2010). Examining the relationship between task-and ego-oriented goals and life satisfaction (a study of people doing mountaineering sports). *Journal of Human Sciences*, 7(2), 1039-1050.
25. Van-Yperen, N.W. & Duda, J.L. (1999). Goal orientations, beliefs about success and performance improvement among young elite Dutch soccer players. *Scandinavian Journal of Medicine and Science in Sports*, 9, 358-364.
26. Wann, D. L. (2006). Understanding the positive social psychological benefits of sport team identification: The team identification-social psychological health model. *Group Dynamics: Theory, Research, and Practice*, 10(4), 272.

EXAMINATION OF THE PERSONALITY TRAITS OF ATHLETES AND THEIR LEVEL OF EXCELLENT PERFORMANCE

İLKER GÜNEL^{1*} AND MEHDI DUYAN²

¹Usak University, Faculty of Sport Science, Usak, Turkey ORCID:0000-0001-7642-1707

²Inonu University, Faculty of Sport Science, Malatya, Turkey-ORCID:0000-0003-1060-0838

Corresponding author.mehdi.duyan@inonu.edu.tr

ABSTRACT

This study aims to examine the personality characteristics of athletes and their level of excellent performance in sports in terms of various variables. The target population of the study consists of the athletes in volleyball, basketball, and swimming clubs operating in Usak and Antalya. The sample of this study consists of 180 licensed athletes from basketball, swimming, and volleyball clubs. "Big Five Personality Traits Scale" and "Validation of Performance Perfectionism Scale" were used as data collection tools. No significant difference was found between the gender variable of athletes and their personality traits. It has been observed that the level of the excellent performance of men in sports is higher than that of women. A significant difference was determined between the personality traits of the athletes and the sports branch. No significant differences have been determined between the levels of excellent performance in sports and the branches of sports. A significant difference was found between the personality traits of athletes and the variable of encouraging sports. A significant difference was determined between the excellent performance of athletes in sports and the variable of encouraging sports. It has been determined that the excellent performance of the athletes in sports is at a medium level and their personality traits are at a high level. Athletes who train between 5-6 hours a week and whose sports branch is swimming are found to be more compatible as a personality, have a responsibility, are more open to innovations and new experiences, are more friendly and warm-blooded. It has been observed that the athletes who started sports with the encouragement of their father adapt to social life faster and are more compatible. It has been determined that the athletes who were encouraged by their friends to do sports have higher levels of excellent performance in sports.

KEYWORDS: Athletes, excellent, performance, personality, traits.

INTRODUCTION

The concept of personality has been a subject that has long attracted the attention of both societies and scientific circles, as society is concerned with both its essence and the essence of the individuals around it, and this concept affects every point of life. Along with the conceptualization of Personality, Personality Psychology is also positioned at a very different point from the Social Sciences.¹ Various definition have been made for the concept of personality in the literature. Accordingly, personality can be defined as all of the individual's specific attitudes, intelligence, and spiritual structures of the stable behavior patterns of the individual due to different environmental conditions, people, and his / her behavioral patterns.²⁻⁴ The personality notion of individuals has been expressed according to various models.⁵ These three-factor personality traits are included in the five-factor personality model, which includes the factors of extraversion, openness, intelligibility, neuroticism, and conscientiousness.⁶ are examining the interaction between the five-factor personality traits model and sports activities.⁷⁻¹⁰ Although the relationship between personality and sports performance has been studied very widely in this literature, a very large part of the research has been limited to a critical point of view of methods and methodology.^{11,12} However, the study was conducted using different research designs examining the relationship between personality and sports performance, albeit a little.¹³ In this context, it can be mentioned that sports have a positive effect on the personality traits of individuals in the relationship between personality and sports performance.¹⁴ These effects can be said that individuals who play sports are more extroverted, warm-blooded, responsible, and less anxious, and have a higher level of independent personality.¹⁵ It can be said that positive emotions about the future affect performance.¹⁶ Sport and performance are intertwined integrated elements. Because of this situation, athletes want to have the highest scores at the level of sporting performance, which is specific to the phenomenon of sports.¹⁷ The concept of perfect performance in sports is more closely linked to the concept of perfectionism. In this respect, there are two different dimensions of perfectionism. There are two types of perfectionism approaches to this concept. One of these is compatible perfectionism. Compatible perfectionism has shown that people can set very high personal performance standards while recognizing and accepting errors within the boundaries of personal characteristics that may hinder proper or perfect performance. Since they enjoy working very hard, they also have high self-esteem. On the contrary, incompatible perfectionists label themselves as failing unless their performance is perfect.^{18,19}

In the literature, there are limited studies on personality and excellent performance levels in sports.²⁰⁻²² However, no study has been found in the literature for in our study in terms of the personality characteristics of the athletes, their excellent performance in sports, and the factors that affect their starting sports. In this context, we believe that our work can fill this gap in the literature. In the results of the study, we believe that factors such as family and friends in the sports environment that encourage athletes to play sports will be important, leading to coaches and families working in this field. This study aimed to

examine the personality characteristics of athletes and their level of excellent performance in sports in terms of various variables. For this purpose, answers to the following questions would be sought:

1. Is there a significant difference between the personality traits of athletes and their level of excellent performance in sports with the weekly training frequency?
2. Is there a significant difference between athletes' personality traits and their excellent performance in sports with the sports encouragement variable?
3. Is there a significant difference between athletes' personality traits and their excellent performance in sports with gender?
4. Is there a significant difference between athletes' personality traits and their excellent performance in sports with the sports branch?

MATERIALS AND METHODS

Research Model

Since this study aims to examine athletes' personality and excellent performance in sports in terms of various variables, the research was conducted with the relational scanning method, one of the quantitative research designs. This research method was chosen because the differences in personality traits and characteristics of excellent performance in sports according to the variables determined by the researcher are not known.

Study sample

The target population of research consists of athletes in volleyball, swimming, and basketball clubs operating in the Usak and Antalya provinces of Turkey. The sample of the study, in which the convenience sampling technique was selected from non-probability sampling methods, consists of 180 athletes determined according to a 5% margin of error at a 95% confidence level.

Data Collection Tools

In this study conducted according to the relational screening method, one of the quantitative research designs, a 5-Likert type "Five Factor Personality Scale" was used to measure the personality traits of athletes. 5-Likert type Five Factor Personality Scale was developed by John et al.,²³ and translated into Turkish by Alkan.²⁴ It consists of 44 questions and has 5 sub-dimensions. The scale, which is scored between I strongly disagree (1) and I strongly agree (5), was analyzed by taking the total score. The sub-dimensions of the scale are extraversion, responsibility, compatibility, openness to experience, and neuroticism. It is stated that the sub-dimensions of the five-factor personality scale vary between ($\alpha = .77$). In the internal consistency reliability analyzes of the scales used in our study, the extraversion sub-dimension was calculated as ($\alpha = .78$). Compliance sub-dimension was calculated as ($\alpha = .68$). The sub-dimension of responsibility was calculated as ($\alpha = .77$). The neuroticism sub-dimension was calculated as ($\alpha = .76$). Openness to experience sub-dimension was calculated as ($\alpha = .60$) and the five-factor personality scale was calculated as ($\alpha = .87$). The scale, prepared by Hill et. al.,¹⁹ and developed by Esentas et al.,²⁵ to determine excellent performance levels in sports, consists of 6 questions and scored as strongly disagree (1) and strongly agree (5), was analyzed by taking total points. The internal consistency reliability analysis of the excellent performance in the sports scale was calculated as ($\alpha = .79$). The excellent performance in the sports scale we used in the research was determined as ($\alpha = .77$). When these results are examined, it can be said that the reliability of the scales used the purpose of the research is high.

Data Analysis

Statistical analysis of the data was made with the SPSS 23.0 package program. To determine the normality distribution of the data, the median, mean, kurtosis, and skewness values were decided by looking at the Q-Q pilot chart (Table I). Statistical significance level was accepted as $p < 0.05$. Independent samples t-test was used for pair group comparisons in data analysis. One Way ANOVA analysis was used to compare the means of more than two groups.

Table I
Normality distribution analysis regarding scales

Scales	$\bar{x}/ss$	median	variance	skewness	kurtosis
Five Factor Personality Traits	145.26±10.78	145.00	116.33	-.099	.597
Extroversion	26.17±2.52	26.00	6.38	-.205	.339
Compatibility	30.06±3.02	30.00	9.14	-.120	-.072
Neuroticism	20.81±2.62	21.00	6.86	-.144	.201
Openness to Experience	35.06±4.00	35.00	16.05	-.127	-.374
Responsibility	30.60±3.18	30.00	10.17	.079	.860
Excellent Performance in Sports	18.14±6.79	17.50	46.16	.025	-.719

-1.96<skewness, kurtosis<1.96

As seen in Table I, it was determined that the mean and median values of the scales used to collect the data were close to each other, the kurtosis and skewness values were between ± 1.96 , and the data was concentrated around the linear in the Q-Q plot graph. Considering these results, it was determined that the data used in the study were suitable for normal distribution. For this reason, it was decided to use parametric analysis in data analysis.

RESULTS

Table 1
Descriptive statistics on athletes

Variables	Groups	F	%
Gender	Male	95	52.8
	Female	85	47.2
Sport branch	Swimming	63	35
	Basketball	47	26.1
	Volleyball	70	38.9
Promoter	Your mother	28	15.6
	Your father	28	15.6
	Your teacher	69	38.3
	Your friend	55	30.6
Weekly Training Frequency	1-2 hours	59	32.8
	3-4 hours	61	33.9
	5-6 hours	60	33.3

n=180

Table 2

Analysis of the differences between Athletes' weekly training frequency and personality traits and showing excellent performance

Scales and sub-dimensions	sub-training frequency	n	$\bar{x}$	ss	F	df	p	LSD Difference
Personality General	1-2	59	143.81	10.16	3.854	2 177	0.023*	1<3
	3-4	61	142.43	10.15				2<3
	5-6	60	149.57	10.84				
Compatibility	1-2	59	30.22	2.48	3.563		0.030*	2<3
	3-4	61	29.28	3.25				
	5-6	60	30.70	3.14				
Responsibility	1-2	59	30.54	2.78	3.135		0.046*	2<3
	3-4	61	29.92	3.14				
	5-6	60	31.35	3.49				
Neuroticism	1-2	59	20.39	2.80	7.409		0.001**	1<3 2<3
	3-4	61	20.21	2.28				
	5-6	60	21.83	2.49				
Openness Experience	1-2	59	34.20	3.28	4.053		0.019*	1<3
	3-4	61	34.79	4.43				
	5-6	60	36.20	4.00				
Extroversion	1-2	59	25.83	2.78	7.999		0.000**	1<3 2<3
	3-4	61	25.79	2.21				
	5-6	60	26.90	2.45				
Excellent Performance Athletes	1-2	59	18.19	5.71	0.006		0.994	
	3-4	61	18.07	7.11				
	5-6	60	18.18	7.52				

*p<0.05; **p<0.01; 1-2 hours=1; 3-4 hours=2; 5-6 hours=3; n=180

As seen in Table 3, a statistically significant difference was determined between the athletes' personality traits and their weekly training frequency at the 95% confidence level ($F_{(2-177)}=3.854; p=.023; p<0.05$). In the differences between the groups, a significant difference was found between the athletes who trained for 1-2 hours a week and those who trained for 5-6 hours a week. A significant difference was found between athletes who trained for 3-4 hours a week and those who trained for 5-6 hours a week. According to this result, the personality trait level of athletes who train for 5-6 hours a week ($\bar{x}=149.57$) were found to be higher than those who do between 3-4 hours ($\bar{x}=142.43$) and those who do between 1-2 hours ($\bar{x}=143.81$). A statistically significant difference was found between the compatibility subscale scores of the athletes and the weekly training frequency ($F_{(2-177)}=3.563; p=.030; p<0.05$). A statistical difference was determined between the athletes who trained for 3-4 hours a week and those who trained for 5-6 hours a week. Accordingly, it was determined that the compatibility levels ($\bar{x}=29.28$) of the athletes who train for 3-4 hours a week are lower than those who train for 5-6 hours a week ($\bar{x}=30.70$). A statistically significant difference was found between the responsibility sub-dimension scores of the athletes and the weekly training frequency ($F_{(2-177)}=3.135; p=.046; p<0.05$). A statistical difference was determined between the athletes who trained 3-4 hours a week and those who trained for 5-6 hours a week. Accordingly, it was determined that athletes who train for 3-4 hours a week have a lower level of responsibility ($\bar{x}=29.92$) than athletes training for 5-6 hours a week ($\bar{x}=31.35$). A statistically significant difference was determined at a 99% confidence level between the neuroticism levels of the athletes and their weekly training frequency ($F_{(2-177)}=7.409; p=.001; p<0.01$). In terms of the differences between the groups, a significant difference was found between the

athletes who trained for 1-2 hours a week and those who trained for 5-6 hours a week. A significant difference was found between athletes training for 3-4 hours a week and those who trained for 5-6 hours a week. According to this result, the neuroticism levels of athletes who train for 5-6 hours a week ($\bar{x}=21.83$) are higher than those who train between 3-4 hours ($\bar{x}=20.21$) and those who train between 1-2 hours ($\bar{x}=20.39$). A statistically significant difference was found between the athletes' level of openness to experience and their weekly training frequency at the 95% confidence level ($F_{(2,177)}=4.053$; $p=0.019$; $p<0.05$). In the differences between the groups, a significant difference was found between the athletes who trained for 1-2 hours a week and those who trained for 5-6 hours a week. According to this result, it was determined that athletes who train for 5-6 hours a week have higher levels of openness to experience ($\bar{x}=36.20$) than those who train for 1-2 hours ($\bar{x}=34.20$). A statistically significant difference was found between the extroversion levels of the athletes and their weekly training frequency at the 99% confidence level ($F_{(2,177)}=7.999$; $p=0.000$; $p<0.01$). In terms of the differences between the groups, a significant difference was found between the athletes who trained for 1-2 hours a week and those who trained for 5-6 hours a week. A significant difference was found between athletes training for 3-4 hours a week and those who trained for 5-6 hours a week. According to this result, the level of extraversion of athletes who train for 5-6 hours a week ($\bar{x}=26.90$) was found to be higher than those who train between 3-4 hours ($\bar{x}=25.79$) and those who train between 1-2 hours ($\bar{x}=25.83$).

Table 4

Analysis of the differences between the sports encouragement variable and personality traits and showing excellent performance

Scale and Sub Dimensions	Groups	n	$\bar{x}$	ss	F	df	p	LSD
Personality General	Your mother	28	144.86	9.77	1.238		0.297	
	Your father	28	148.39	14.22				
	Your teacher	69	145.46	9.13				
	Your friend	55	143.62	11.13				
Openness to Experience	Your mother	28	35.54	4.62	0.378		0.769	
	Your father	28	34.79	4.02				
	Your teacher	69	35.28	3.65				
	Your friend	55	34.71	4.16				
Extroversion	Your mother	28	25.25	1.90	2.567		0.056	
	Your father	28	26.29	3.25				
	Your teacher	69	26.71	2.15				
	Your friend	55	25.91	2.72				
Compatibility	Your mother	28	29.64	2.75	3.646	3 176	0.014*	2<3
	Your father	28	31.71	3.24				
	Your teacher	69	29.61	2.61				
	Your friend	55	30.00	3.31				
Responsibility	Your mother	28	30.32	2.61	2.324		0.077	
	Your father	28	31.61	4.44				
	Your teacher	69	30.91	2.68				
	Your friend	55	29.84	3.18				
Neuroticism	Your mother	28	21.54	2.52	1.595		0.192	
	Your father	28	21.32	3.14				
	Your teacher	69	20.61	2.43				
	Your friend	55	20.44	2.58				
Excellent Performance General	Your mother	28	14.89	7.80	3.182		0.025*	1<4
	Your father	28	18.14	8.17				
	Your teacher	69	18.25	6.06				
	Your friend	55	19.67	5.92				

* $p<0.05$; Your mother=1; Your father=2; Your teacher=3; Your friend=4; n=180

As seen in Table 4, a statistically significant difference was found between the compatibility sub-dimension scores of the athletes and the variable that encourages sports ($F_{(2,177)}=3.646$; $p=0.014$; $p<0.05$). A significant difference was observed between the athletes who were encouraged by his father to do sports and the sportsmen who were encouraged by his teacher. According to this result, it was determined that the compatibility levels ($\bar{x}=31.71$) of the athletes who were encouraged to the sport by their father were higher than the levels of the athletes encouraged by their teachers ($\bar{x}=29.61$). On the other hand, there was no statistically significant difference between the encouragement to sports variable and the personality traits of athletes ($p=0.297$; $p>0.05$), openness to experience sub-dimension ($p=0.769$; $p>0.05$), extraversion sub-dimension ($p=0.056$; $p>0.05$), responsibility sub-dimension ($p=0.077$; $p>0.05$) and neuroticism sub-dimension ($p=0.192$; $p>0.05$). A statistically significant difference was found at a 95% confidence level between the athletes' encouragement to sport variable and their level of excellent performance. When the difference between the groups was examined, it was found that the excellent performance levels ($\bar{x}=19.67$) of the athletes who were encouraged to do sports by their friends were higher than the levels of the athletes encouraged by their mothers ($\bar{x}=14.89$).

Table 5**Analysis of the differences between Athletes' gender variable and personality traits and showing excellent performance**

Scale and Sub Dimensions	Gender	n	$\bar{x}$	Ss	Levene Test			df	p
					F	p	t		
Personality General	Male	95	145.06	12.43	8.315	0.004	-0.265	178	0.792
	Female	85	145.48	8.65					
Extroversion	Male	95	26.00	2.78	2.055	0.153	-0.966		0.335
	Female	85	26.36	2.22					
Compatibility	Male	95	30.03	3.25	1.735	0.190	-0.138		0.890
	Female	85	30.09	2.77					
Responsibility	Male	95	30.28	3.57	4.01	0.047	-1.430		0.154
	Female	85	30.95	2.68					
Neuroticism	Male	95	20.78	2.77	0.774	0.380	-0.175		0.862
	Female	85	20.85	2.46					
Openness to Experience	Male	95	35.40	4.53	13.543	0.000	1.202		0.231
	Female	85	34.69	3.31					
Excellent Performance General	Male	95	19.69	6.70	0.184	0.668	3.326		0.001**
	Female	85	16.41	6.51					

****P<0.01;n=180**

As seen in Table 5, there was no statistically significant difference between gender variable of athletes and personality traits ($p=0.792; p>0.05$), extraversion sub-dimension ($p=0.335; p>0.05$), compatibility sub-dimension ($p=0.890; p>0.05$), responsibility sub-dimension ($p=0.154; p>0.05$), neuroticism sub-dimension ($p=0.862; p>0.05$), and openness to experience sub-dimension ($p=0.231; p>0.05$). A statistically significant difference at 99% confidence level was determined between the excellent performance scores of the athletes and their gender $t_{(178)}=3.326; p=0.001; p<0.01$. According to this result, it was seen that the excellent performance levels of male athletes ($\bar{x}=19.69$) were higher than the performance levels of female athletes ($\bar{x}=16.41$).

Table 6**Analysis of the differences between Athletes' sports, personality traits, and performance in sports**

Scales and Sub-Scales	Groups	n	$\bar{x}$	ss	F	df	p	LSD Difference
Personality General	Swimming	63	147.60	9.49	2.41		0.093	
	Basketball	47	144.51	12.49				
	Volleyball	70	143.66	10.43				
Compatibility	Swimming	63	30.78	2.66	3.391		0.036*	1>3
	Basketball	47	30.04	3.22				
	Volleyball	70	29.43	3.10				
Responsibility	Swimming	63	31.24	2.86	2.488		0.086	
	Basketball	47	29.89	3.60				
	Volleyball	70	30.50	3.11				
Neuroticism	Swimming	63	20.97	2.31	0.375	2 177	0.688	
	Basketball	47	20.91	3.07				
	Volleyball	70	20.60	2.58				
Openness to Experience	Swimming	63	35.65	3.38	1.135		0.324	
	Basketball	47	34.96	4.90				
	Volleyball	70	34.61	3.85				
Extroversion	Swimming	63	26.52	2.69	0.959		0.385	
	Basketball	47	26.04	2.69				
	Volleyball	70	25.94	2.26				
Excellent Performance General	Swimming	63	18.40	6.38	0.071		0.932	
	Basketball	47	17.94	7.29				
	Volleyball	70	18.06	6.90				

***p<0.05; 1=Swimming; 2=Basketball; 3=Volleyball**

As seen in Table 6, no statistically significant difference was found between sports branches and personality traits ($p=.093; p>0.05$) in terms of responsibility sub-dimension ($p=.086; p>0.05$), neuroticism sub-dimension ($p=.688; p>0.05$), and openness to experience sub-dimension ($p=.324; p>0.05$), and extraversion sub-dimension. On the other hand, a statistically significant difference was observed at 95% confidence level between athletes' sports branches and compatibility sub-dimension ($F_{(2,177)}=3.3391; p=.036; p<0.05$). When the difference between groups was examined, a significant difference was found between swimming and volleyball sports. According to this result, it was seen that the compatibility levels of the athletes whose sport was

volleyball ($\bar{x}=29.43$) were lower than those whose sport was swimming ($\bar{x}=30.78$). No statistically significant difference was found between athletes' level of excellent performance in sports and sports ($p=.932; p>0.05$).

DISCUSSION

In our study, which was conducted with the relational screening method, one of the quantitative research designs, in which it was aimed to examine athletes' personality and their excellent performance in sports in terms of various variables, no significant difference was found between the athletes' gender variable and personality traits. There are studies in the literature that do not show a significant difference between personality traits and the gender of athletes.^{17,26} Unlike the research findings, there are studies in the literature that show significant differences with the five-factor personality traits of sportsmen by gender.²⁷⁻²⁹ The reason why the results of this study differ from our study is thought to be due to the greater number and variety of samples collected for the study. Besides, a significant difference was found between athletes' level of excellent performance in sports and their gender. According to this result, it has been observed that the level of the excellent performance of men in sports is higher than that of women. The reason for this finding is thought to be that men's physical strength and muscle strength are stronger than women. The literature includes research that found significant differences between the levels of excellent performance in sports by gender.³⁰ In the study conducted by Crocker et al.,³¹ no significant difference was found between excellent performance in sports and gender. In obtaining different results from our study, it is thought that the sample used was obtained from athletes studying at different universities and collected from athletes with various sports branches. A significant difference was determined between the frequency of weekly training and the general characteristics of the personality and all its lower dimensions. According to this result, it can be said that as the frequency of weekly training of athletes increases, they are more adaptable, more responsible, more open to innovations and experiences, and more assertive, sincere, and friendly. We think that the reason for this is the development of harmony and extroversion as more presence in the sports environment and socialization increases. But there is also a significant difference between the frequency of weekly training and neuroticism. It is believed that the frequency of weekly training of athletes is caused by the stress, anxiety and excessive anxiety experienced by athletes in sports success; because individuals with neurotic personality traits may experience imbalance in emotion by staying away from positive feelings and thoughts, anxious or calm, insecure or confident, self-pity or self-satisfaction.³² In the literature, studies that are similar in some ways to our work have also been found. In their research by Kjelsås & Augestad³³ and Tazegul,¹⁴ they found a significant difference between the personality traits of athletes, extroversion and neuroticism, and weekly training frequency. In the study conducted by Guskowska & Sionek,³⁴ it was determined that the duration and frequency of training had a positive and significant effect on the personality traits of athletes. In the study conducted by Ceviker et. al.,¹⁷ it was found that there is a significant difference between the weekly training frequency of athletes and their personality traits and sub-dimensions. Studies containing different results from our study have rarely been found in the literature. In the study conducted by Courneya & Hellsten,³⁵ no significant difference was found between personality traits, neuroticism levels and regular exercise and duration. The fact that these results are not similar to the results of our study is thought to be due to the methodological difference used in the study and the sample consisted of first year undergraduate students. There was no significant difference between the athletes' excellent performance in sports and their weekly training frequency. In the study of Yanar et. al.,³⁶ no significant difference was found between the duration and frequency of exercising and the optimal performance level. No studies have been found in the literature that contains different results than our study. A significant difference was determined between the personality traits of the athletes and the sports branch. According to this result, it has been determined that the conformity and adaptability ability of those whose sports branch is swimming is higher than the sportsmen whose sports branch is volleyball. In the study conducted by Bernier et. al.,³⁷ and Ceviker et. al.,¹⁷ a significant difference was determined between basketball and volleyball sports branches and the personality traits of the athletes in favor of the basketball branch. This result is in line with the results of our study. However, in their study by Ozkurt & Alpay,³⁸ they did not find a significant difference between sports branches and the personality traits of athletes. The study conducted by Demir³⁹ compared the personality traits of physical education teachers with the types of sports they performed, and no differences were found. It is believed that the reason for finding a different result from our study was because the sample was collected from students in the Faculty of Sports Sciences and the difference in scale that analyzed personality traits. No significant differences have been determined between the levels of excellent performance in sports and the branches of sports. studies are supporting our study in the literature. sis some studies do not support the results of our study in some ways. In their study, Aktug & Iri⁴⁰ determined a significant difference between the motor performance skills of child athletes from different sports branches and the sports branches in which they deal with. The reason for the difference in the results of our study is thought to be that the sample size is higher and the sample is collected from child athletes. A significant difference was determined between the personality traits of athletes and the encouragement variable to the sport. It has been determined that athletes who are directed to sports by their father adapt to the conditions more quickly. It can be said that the strong and supportive father figure is more important for the child to progress in sports and adapt to difficulties more easily. Some studies are supporting our research in terms of results. In their study, Bayraktar & Sunay⁴¹ found that the most effective factor in the start of sports of volleyball players was the encouragement of the family. Self et. al.,⁴² found in their studies that excited, extroverted, and open-to-experience individuals with "t" type personality traits had a stimulating aspect of their personality traits and their families in starting extreme sports. There are no studies in the literature that do not support our research. A significant difference was determined between the level of the excellent performance of athletes in sport and the variable of promotion to the sport. According to this result, the level of the excellent performance of athletes initiated into sports with the encouragement of their mother was higher than that of athletes encouraged into sports by their friends. The reason for this was thought to be that the mother takes care of her children to be successful, and motivate and support her children to go to training or competitions. There are also studies in the literature that support our study in several ways. Cakmak Yıldızhan & İmamoglu⁴³ also found that the motivational behaviors of sports managers have a significant effect on the performance of athletes. No studies have been found in the literature that does not support our research.

CONCLUSION

In our study, which examined the personality characteristics of athletes and the level of excellent performance in sports in terms of various variables, it was determined that the level of the excellent performance of athletes in sports, in general, was moderate and the level of personality characteristics were high. Athletes who train between 5-6 hours a week and whose sport is swimming are more compatible as a personality, have a responsibility, are more open to innovations and new experiences, are more friendly and warm-blooded. Athletes who started Sports with the encouragement of their father were seen to be more compatible and adapt more quickly to social life. In contrast, it was found that athletes who were encouraged by their friends to play sports had higher levels of excellent performance in sports. Therefore, it has been determined that the individuals who have been in the sports environment for a longer period have increased their performance levels due to the competition with their friends and motivation. Also, it has been found that the perfect performance levels of men are higher than women. Since it has been determined based on the findings that the friend environment is effective in directing individuals to sports, we think that the presence of more athletes in the sports environment improves the sports identity. Since it is determined that the athletes directed to sports by their father are more compatible and adapt to the conditions faster, we think that the athletes who feel the father's support behind them are more likely to be successful.

REFERENCES

1. Johnson JA, Briggs SR, Hogan R. *Handbook of personality psychology*. Elsevier; 1997.
2. Burger JM. *Kisilik (Cev. Erguvan Sarioglu)*. İstanbul: Kaknüs Yayınları; 2006.
3. Colman AM. *A dictionary of psychology*. Oxford quick reference; 2015.
4. Mehta A. *Organisation development: Principles, process & performance*. Global India Publications; 2009.
5. Eysenck HJ, Eysenck MW. *Personality and individual differences*. Plenum New York, NY; 1987.
6. Costa PT, McCrae RR. Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychol Assess*. 1992;4(1):5.
7. Conner M, Abraham C. Conscientiousness and the theory of planned behavior: Toward a more complete model of the antecedents of intentions and behavior. *Personal Soc Psychol Bull*. 2001;27(11):1547-1561. doi:10.1177/01461672012711014
8. Tafti NN, Pakdaman S, Asgari A. The role of sport and personality traits in psychosocial development of students. *J Iran Psychol*. 2008;5:53-62.
9. Rhodes RE, Courneya KS, Bobick TM. Personality and exercise participation across the breast cancer experience. *Psycho-Oncology*. 2001;10(5):380-388.
10. Saklofske DH, Austin EJ, Rohr BA, Andrews JJW. Personality, emotional intelligence and exercise. *J Health Psychol*. 2007;12(6):937-948.
11. Egloff B, Gruhn AJ. Personality and endurance sports. *Pers Individ Dif*. 1996;21(2):223-229.
12. Eysenck HJ, Nias DKB, Cox DN. Sport and personality. *J Biosoc Sci*. 1981;13(57):55-68. doi:10.1017/S0021932000024548
13. Allen MS, Greenlees I, Jones M. An investigation of the five-factor model of personality and coping behaviour in sport. *J Sports Sci*. 2011;29(8):841-850.
14. Tazegül Ü. The investigation of the effect of sports on personality. *J Acad Soc Sci Stud*. 2014;(25):537-544.
15. Ghooshchy SG, Kameli S, Jahromi MK. The effect of sport activity and gender differences on self-perception in adolescents. *Procedia Comput Sci*. 2011;3:1532-1534.
16. Aygün Y, Gündoğdu C, Akyol B, Tüfekci S, İlkim M, Canpolat B. A football player's insider view: inspiring the success story of the Turkey amputee football national team. *Turkish J Sport Exerc*. 2020;22(2):311-317. doi:10.15314/tsed.736036
17. Ceviker A, Ozlu K, Deryahanoglu G, Demirdoken C, Turkay H. The examination of the personality traits and optimal performance mood of the university athletes. *Pedagog Phys Cult Sport*. 2020;24(1).
18. Dunn JGH, Gotwals JK, Dunn JC, Syrotuik DG. Examining the relationship between perfectionism and trait anger in competitive sport. *Int J Sport Exerc Psychol*. 2006;4(1):7-24. doi:10.1080/1612197x.2006.9671781
19. Hill AP, Appleton PR, Mallinson SH. Development and initial validation of the performance perfectionism scale for sport (PPS-S). *J Psychoeduc Assess*. 2016;34(7):653-669. doi:10.1177/0734282916651354
20. Harmison RJ. Peak performance in sport: Identifying ideal performance states and developing athletes' psychological skills. *Prof Psychol Res Pract*. 2006;37(3):233.
21. Laborde S, Dosseville F, Guillén F, Chávez E. Validity of the trait emotional intelligence questionnaire in sports and its links with performance satisfaction. *Psychol Sport Exerc*. 2014;15(5):481-490. doi:10.1016/j.psychsport.2014.05.001
22. Rhodes RE, Pfaeffli LA. Personality and physical activity. *Oxford Handb Exerc Psychol*. Published online 2012:195-223.
23. John OP, Donahue EM, Kentle RL. Big five inventory. *J Pers Soc Psychol*. Published online 1991.
24. Alkan N. Reliability and validity of the Turkish version of the Big Five Inventory. *Unpubl manuscript, Atılım Univ Ankara, Turkey*. Published online 2006.
25. Esentas M, Güzel P, Yavas Tez Ö. Sporda Mükemmel Performans Ölçeği'nin (PPS-S) çocuk ve yetişkin sporcular için geçerlik ve güvenirliğinin incelenmesi: Kısa Form. *Ulusal Spor Bilim Derg*. 2020;4(1):18-34. doi:10.30769/usbd.724680
26. Dennis AR, Kinney ST. Testing media richness theory in the new media: The effects of cues, feedback, and task equivocality. *Inf Syst Res*. 1998;9(3):256-274.
27. Coco M, Guerrero CS, Di Corrado D, et al. Personality traits and athletic young adults. *Sport Sci Health*. 2019;15(2):435-441. doi:10.1007/s11332-019-00551-3
28. Tok S. The Big Five personality traits and risky sport participation. *Soc Behav Pers*. 2011;39(8):1105-1112. doi:10.2224/sbp.2011.39.8.1105

29. Ulucan H, Ziya B. Haltercilerin kisilik özelliklerinin farklı degiskenlere göre incelenmesi. *Nigde Üniversitesi Beden Eğitimi Ve Spor Bilim Derg.* 2011;5(2):175-183.
30. Van Sterkenburg J, Knoppers A. Dominant discourses about race/ethnicity and gender in sport practice and performance. *Int Rev Sociol Sport.* 2004;39(3):301-321. doi:10.1177/1012690204045598
31. Crocker PRE, Pedrosa I, Mosewich AD, Sabiston CM. Examining gender invariance of the Sport-Multidimensional Perfectionism Scale-2 in intercollegiate athletes. *Psychol Sport Exerc.* 2018;34:57-60.
32. McCrae RR, Costa PT. Clinical assessment can benefit from recent advances in personality psychology. *Am Psychol.* 1986;41(9):1001-1003. doi:10.1037/0003-066X.41.9.1001
33. Kjelsås E, Augestad LB. Gender, eating behavior, and personality characteristics in physically active students. *Scand J Med Sci Sports.* 2004;14(4):258-268.
34. Guskowska M, Sionek S. Changes in mood states and selected personality traits in women participating in a 12-week exercise program. *Hum Mov.* 2009;10(2):163-169.
35. Courneya KS, Hellsten L-AM. Personality correlates of exercise behavior, motives, barriers and preferences: An application of the five-factor model. *Pers Individ Dif.* 1998;24(5):625-633.
36. Yanar S, Kirandi O, Ates O, Ehlizoglu M, Celikbilek S. Investigation of the correlation between athletes' training continuity and flow experience. *Int J Acad Res.* 2017;9(1).
37. Bernier M, Thienot E, Codron R, Fournier JF. Mindfulness and acceptance approaches in sport performance. *J Clin Sport Psychol.* 2009;3(4):320-333.
38. Ozkurt B, Alpay CB. Investigation of proactive personality characteristics of the students of high school of physical education and sports through various variables. *Asian J Educ Train.* 2018;4(3):150-155. doi:10.20448/journal.522.2018.42.150.155
39. Demir E. Evaluation of personality traits of physical education teachers working in secondary schools and high schools in canakkale according to their sports branch. *Online Submiss.* 2015;5(1):27-34.
40. Aktug ZB, Iri R. The effect of motor performance on sportive performance of children in different sports branches. *Asian J Educ Train.* 2018;4(2):75-79.
41. Bayraktar B, Sunay H. Türkiye'de elit bayan ve erkek voleybolcularin spora baslamasına etki eden unsurlar ve spordan beklentileri. *Spormetre Beden Eğitimi ve Spor Bilim Derg.* 2007;5(2):63-72.
42. Self DR, De Vries Henry E, Findley CS, Reilly E. Thrill seeking: the type T personality and extreme sports. *Int J Sport Manag Mark.* 2007;2(1-2):175-190.
43. Cakmak Yıldızhan Y, İmamoglu AF. Spor yöneticilerin yönetsel davranışlarının sporcu performansına etkisi. Published online 2018.

INVESTIGATION OF THE SPIRITUAL INTELLIGENCE FEATURES OF PHYSICALLY HANDICAPPED BADMINTON PLAYERS IN TERMS OF VARIOUS VARIABLES

Arif ÖZSARI¹ and Mehmet ILKIM²

¹Osmaniye Youth and Sports Provincial Directorate- Osmaniye, Turkey

²Associate Professor, Department of Exercise and Sport Education in Disabilities, Inonu University, Malatya, Turkey

Corresponding author: arifozsari@hotmail.com

ABSTRACT

With this research, the spiritual intelligence characteristics of physically handicapped badminton players were examined in terms of various variables. The population of the study included 57 athletes who participated in the Physically Handicapped Badminton Championship of Turkey, and the sample group consisted of 31 physically handicapped badminton players, with an average age of (30.61 ± 11.74) , who voluntarily accepted to participate in this study. The demographic form containing personal information and the Spiritual Intelligence Self-Report Inventory developed by King (2008) and adapted to Turkish by Seyfi (2016) was used in the data collection. As a result, significant changes were determined in the spiritual intelligence characteristics of physically handicapped badminton players according to gender, age, duration of sportsmanship, and marital status factors. It is possible to say that the spiritual intelligence scores were more prominent for married athletes compared to those who were not married, for older athletes compared to younger ones, and for male athletes compared to female athletes

Keywords: Badminton players Physically handicapped, Spiritual intelligence

INTRODUCTION

Intelligence is an interesting field for researchers working on human psychology. Researchers mention different types of intelligence, and one of them is the concept of spiritual intelligence.⁴ According to Zohar and Marshall⁵², two of the researchers who first referred to this concept, spiritual intelligence is a type of talent as old as human history, although science is still unprepared for situations that cannot be measured objectively, so humanity does not know much about this type of ability (Bekis¹¹). The Zohar's reference to the concept of spiritual intelligence suggested that not every ability should be added as a new type of intelligence, but the concept of intelligence should be addressed based on the way the brain works (Ustten⁴⁸).

Spiritual Intelligence Theory and the Concept of Spiritual Intelligence

Emmons (2000), Wolman (2001), Amram (2007), and King (2008) suggested that spiritual intelligence is an important competence in defining the spiritual potential of people. Gardner, one of the pioneers of the field, mentioned types of intelligence such as linguistic intelligence, musical intelligence, logical intelligence, spatial intelligence, physical intelligence, and personal intelligence in his theory of multiple intelligences, which he asserted in his book *Frames of Mind: The Theory of Multiple Intelligences*.²⁵⁻²⁶ But, later argued for "existential intelligence as the domain of human intelligence" responsible for solving problems with spiritual instincts.⁴⁰ Multiple intelligences theory pluralizes the traditional concept of intelligence.²⁵⁻²⁶ Since the 2000s, the concept of spiritual intelligence has gained importance for everyone (Rostami⁴¹), and has become increasingly important as an academic concept.⁵ Wigglesworth (2011) classified the types of intelligence in the form of layers of a pyramid and put spiritual intelligence at the top of this pyramid, emotional intelligence under it, and mental intelligence in the bottom layer. It forms a unity by combining the concepts of spiritual intelligence, spirit, and intelligence in a new concept.²³ Spiritual intelligence is the type of intelligence that a person uses in solving problems related to meaning and values.⁴⁷ Spiritual intelligence is defined as the ability to apply and embody spiritual resources and qualities to enhance daily functioning and wellbeing.²⁻³ According to Awais et al. (2015), this concept is the expression of innate spiritual qualities through one's thoughts, behaviors, and attitudes. Spiritual intelligence is also defined as the practical application of potentially existing spiritual abilities and resources.⁴³⁻⁴⁴ According to Javaheri et al., (2013), spiritual intelligence can be used to identify and understand the thought patterns, beliefs, and goals that form the foundation of our behavior.

Previous studies have revealed that spiritual intelligence is more related to features of personality.¹ This type of intelligence is about organizing, managing, and realizing the potential that the individual has.¹² This concept is a type of intelligence that deals with the metaphysical aspect as well as the cognitive and emotional aspects of thought. Humans are not just physical beings; they have spiritual needs, expectations, hopes, and dreams. In this respect, spiritual intelligence can be expressed as a type of intelligence that expresses the spiritual aspect and mental states of people.³⁴ Spiritual intelligence also provides the foundation for both mental and emotional intelligence to function effectively⁹

Physically Handicapped Badminton Players

One of the important issues that consist the society is athletes with disabilities. The position of disabled athletes in social life is considered as a phenomenon that should be appreciated in terms of being an example for other disabled people, whether they are athletes or not, as they are to hold on to life as both disabled person and an athlete.²⁴ Sports is such a phenomenon that it socializes all people, healthy ones and people with disabilities, teaches them to share all life values, even if they are good and bad

together, arouses discipline, competition and friendship feelings as well as the support it provides to the spiritual structure and plays a serious role in the formation of the self-being and the independence of the person.²² Sports support disabled individuals in overcoming their problems, minimizing their feelings of loneliness, and having the chance to continue a meaningful process in life.¹⁴ Sports also emerge as a rehabilitation and treatment method for disabled people, rather than a competition. Competition and challenge in sports of the disabled people serve the real purpose of sports on a more civilized scale than athletes without a disability. Badminton is a preferred branch as it carries almost all of the sportive features. The physical structure of athletes is not always important in badminton. All athletes with different physical structures can play badminton.¹³ The good physical capacity of an athlete does not mean that the athlete is ready to compete.¹⁰ At the same time, the athlete can only be successful as long as she/he is mentally and spiritually ready to compete. It is also thought that spiritual intelligence has an important role in the successful competition of athletes. According to Emmons (2000), there is evidence of spiritual intelligence as a set of capacities and abilities that enable individuals to solve their problems and achieve their goals in their daily lives. Hence, we can say that spiritual intelligence is unique intelligence to solve problems and issues related to the meaning of life and values are used.²⁹⁻³⁰ It is a fact that athletes have difficulties while performing in sportive competitions due to their physical disabilities; however, it may be wrong to attribute sportive success or failure only to physical competence. Because it has been observed that physical properties improve as a result of regular studies.³¹ In addition to it is thought that spiritual intelligence has an important role in showing both physical and mental strength. As a matter of fact, according to Aydin (2019), individuals' spiritual intelligence and their moods in activities affect themselves and others; therefore, this situation affects team sports and individual sports. With this research, the spiritual intelligence characteristics of physically disabled badminton players were tried to be examined in terms of various variables. When the related literature is examined, no research has been found in which the concepts of spiritual intelligence and physically disabled athletes are brought together and evaluated. This study is considered to be important in terms of its contribution to the relevant literature.

METHODS

In this study, the scanning model, one of the quantitative research patterns, was used. Researches aiming to determine individuals' attitudes, beliefs, opinions, behaviors, expectations, and characteristics with the help of surveys are called screening studies.²⁸

Population and Sample

The research population is consisting of 57 athletes who participated in Turkey Physically Disabled Badminton Championships, while the sample group who voluntarily accepted to participate in this research is composed of 31 badminton players with physical disabilities.

Table 1. Demographic Characteristics of Physically Disabled Badminton Players

Variables	N	%
Duration of being athlete	1-2 years	8
	3-5 years	9
	6 and more	14
Age	17-24	13
	25 and more	18
Marital Status	Married	10
	Single	21
Education level	Secondary education	5
	Higher Education	26
		83.9
Gender	Female	12
	Male	19
Total	51	100

Findings regarding the demographic characteristics of physically disabled badminton players participating in the study are presented in Table 1 above.

Measurement

The Spiritual Intelligence Self-Report Inventory (SISRI-24)

A questionnaire consisting of two parts was applied to the athletes through their trainers and accompanying persons. In the first section, questions are aiming to determine the demographic characteristics (duration of being an athlete, age, marital status, education level, gender) of athletes with disabilities. In the second section, "The Spiritual Intelligence Self-Report Inventory (SISRI-24) Spiritual Intelligence Self-Report Inventory" developed by King (2008) was used. The adaptation of the inventory to Turkish language (linguistic equivalence), validity, and test reliability was carried out by Seyfi (2016). Inventory is consisting of 4 sub-dimensions: "important existential thinking", "personal meaning generation", "awareness" and "conscious state expansion". The Cronbach's Alpha value of the SISRI-24 scale is .95 and it demonstrates excellent internal reliability and a good fit for the four-factor model of spiritual intelligence.⁴³⁻⁴⁴ One of the most important indicators of the quality of a scale is the reliability coefficient Cronbach's Alpha (α) coefficient.¹⁸ For this research, the Cronbach Alpha value of the scale was calculated as .88. Cronbach's Alpha (α) reliability coefficient was found to be quite above the acceptable level of reliability (0.70) and it was found to be highly reliable (Gurbuz & Sahin,²⁸).

Statistical Analysis of Data

To evaluate the internal consistency of the scales used in the study, reliability analysis was performed by using Cronbach's Alpha (α) method. First of all, missing values are examined, and then outliers are examined. Two elements of normality are kurtosis and skewness (Tabachnick and Fidell ⁴⁶). When kurtosis and skewness data of Tabachnick and Fidell (2013) are between -1.5 and +1.5, it is admitted that distribution is normal (Sevin and Kucuk ⁴², Erbay and Beydogan ²¹). In this study, it was decided to apply parametric tests by looking at kurtosis and skewness values. As well as descriptive statistics, the Independent-Samples T-test was used for paired comparisons and the One-Way ANOVA test for multiple comparisons. The significance level was determined as 0.05.

RESULTS

Table 2. Spiritual intelligence t-test based on gender factor of badminton players

Gender	N	Important Existential Thinking		Personal Meaning Generation		Awareness		Conscious Expansion		State
		X	SD	X	SD	X	SD	X	SD	
Female	12	3.01	.908	3.61	.735	3.68	.647	3.69	.758	
Male	19	3.37	1.04	4.21	.468	3.80	.505	3.87	.721	
p			.455		.011*		.240		.742	

As can be seen in Table 2, the average values of male badminton players in the "personal meaning generation" sub-dimension in the spiritual intelligence characteristics of physically disabled badminton players due to gender factor were found to be significantly higher than the average values of female badminton players ($p < 0.05$). Although there were no significant differences in other sub-dimensions, it was determined that the average values of male badminton players were higher than female badminton players.

Table 3. Spiritual intelligence t-test based on age factor of badminton players

Age group	N	Important Existential Thinking		Personal Meaning Generation		Awareness		Conscious Expansion		State
		X	SD	X	SD	X	SD	X	SD	
17-24	13	3.04	.853	3.67	.690	3.43	.577	3.38	.705	
25 and more	18	3.37	1.09	4.20	.526	3.99	.417	4.11	.594	
p			.370		.023*		.004*		.004*	

As can be seen in Table 3, significant changes were found in the spiritual intelligence characteristics of physically disabled badminton players due to the age factor in all dimensions except for the "important existential thinking" sub-dimension. In the sub-dimensions of "personal meaning generation", "awareness" and "conscious state expansion", the mean values of badminton players in the age group of 25 and over were found to be significantly higher than those of the 17-24 age group ($p < 0.05$).

Table 4. Spiritual intelligence t-test based on the duration of being athlete factor of badminton players

Duration of being athlete	N	Important Existential Thinking		Personal Meaning Generation		Awareness		Conscious Expansion		State
		X	SD	X	SD	X	SD	X	SD	
1-2	8	3.72	1.06	4.22	.618	3.67	.696	3.75	.886	
3-5	9	3.08	.781	3.48	.679	3.52	.578	3.44	.726	
6 and more	14	3.05	1.05	4.15	.484	3.95	.409	4.07	.557	
p			.286		.019*		.181		.127	

As can be seen in Table 4, there are significant differences in the spiritual intelligence characteristics of physically disabled badminton players depending on the duration of being an athlete factor in the "personal meaning generation" sub-dimension. It was determined that the average values of badminton players with 3-5 years of sports experience were significantly lower than those with 1-2 years and 6 years and more sports experience ($p < 0.05$). There are no significant differences in the other sub-dimensions ($p > 0.05$).

Table 5. Spiritual intelligence t test based on the marital status factor of badminton players

Marital Status	N	Important Existential Thinking		Personal Meaning Generation		Awareness		Conscious Expansion		State
		X	SD	X	SD	X	SD	X	SD	

Married	10	3.38	1.12	4.38	,404	4.05	,427	4.30	,597
Single	21	3.17	,953	3.79	,658	3.61	,565	3.57	,676
p		.595		.015*		.040*		.007*	

As can be seen in Table 5, significant changes were found in the spiritual intelligence characteristics of physically disabled badminton players due to the marital status factor in all dimensions except for the "important existential thinking" sub-dimension. In the sub-dimensions of "personal meaning generation", "awareness" and "conscious state expansion", it was determined that the mean values of married badminton players were significantly higher than the average values of single badminton players ($p < 0.05$). Although there were no significant differences in other sub-dimensions, it was found that the average values of married badminton players were higher than single badminton players.

Table 6. Spiritual intelligence t-test based on the education level factor of badminton players

Education level	N	Important Existential Thinking		Personal Meaning Generation		Awareness		Conscious State Expansion	
		X̄	SD	X̄	SD	X̄	SD	X̄	SD
Secondary education	5	3.52	1.253	4.28	.769	3.46	.618	4.00	.942
Higher Education	26	3.18	.961	3.92	.619	3.81	.539	3.76	.697
p		.501		.202		.265		.526	

As can be seen in Table 6, there are no significant differences in spiritual intelligence characteristics of physically disabled badminton players depending on the educational level factor ($p > 0.05$).

Table 7. Descriptive statistical results of the spiritual intelligence scale

Spiritual Intelligence Scale	N	Min.	Max.	X̄	SD
Important Existential Thinking	31	1.00	4.80	3.23	,997
Awareness	31	2.40	4.80	3.75	,557
Personal Meaning Generation	31	2.60	5.00	3.98	,645
Conscious State Expansion	31	2.33	5.00	3.80	,729
General	31	2.32	4.68	3.70	,561

While the highest mean value of the spiritual intelligence scale belongs to the "personal meaning generation" sub-dimension ($3.98 \pm .645$); the lowest mean value ($3.23 \pm .997$) belongs to the "important existential thinking" sub-dimension. The mean value of the "Conscious state expansion" sub-dimension was found to be ($3.80 \pm .997$), and the "awareness" sub-dimension mean value ($3.75 \pm .557$). The general average value of the spiritual intelligence self-report inventory scale was calculated as ($3.70 \pm .561$).

DISCUSSION

With this research, spiritual intelligence features of physically disabled badminton players participating in the Physically Disabled Badminton Championship in Turkey is evaluated in terms of some variables. It has been determined that there are significant differences in spiritual intelligence characteristics of physically disabled badminton players due to the gender factor. In the "personal meaning generation" sub-dimension, the average values of male athletes were found to be significantly higher than female athletes. Moreover, although there were no significant differences in other sub-dimensions, it was found that the average values of male athletes were higher than female athletes (Table 1). There are findings in different directions in the research in the literature. According to the research of Marghzar and Marzban (2018), it is suggested that there are significant differences in favor of women in terms of "personal meaning generation" female teachers compared to male teachers. Seyfi (2016) found in his related study that the values of women in the "conscious state expansion" sub-dimension were significantly higher than that of men. Kalantarkousheh et al. (2013) reported similar findings in the conclusion of their study. In the study of Amram and Dryer³, the mean values of women were found to be higher than men, with significant differences. It has been found that women have a significantly higher average spiritual intelligence than men 16 (Demir,¹⁶). In the research findings of Turan et al.,⁴⁷ Durmus et al. (2018), Aydın (2018), Yurttas (2018), the spiritual intelligence characteristics of the participants do not differ according to gender. It is thought that the findings in different directions arise due to the sample groups.

Another finding of the study is that there are significant changes in the spiritual intelligence characteristics of physically disabled badminton players due to the age factor in all sub-dimensions except for the "important existential thinking" sub-dimension. In the sub-dimensions of "personal meaning generation", "awareness" and "conscious state expansion", the values of the athletes in the age group of 25 and over were found to be significantly higher than those in the 17-24 age group (Table 2). When we consider the research results in the literature,²⁹⁻³⁰ reported that there was no significant difference in the spiritual intelligence characteristics of the participants according to the age variable. It is possible to see a similar finding in the related study of Soylemez (2016) and Turan et al. (2020), on the other hand, in their study called examining the spiritual intelligence levels of sports sciences students according to some variables, found that the spiritual intelligence of the participants differed according to age groups and that students between the ages of 26-29 had higher levels of consciousness than younger individuals. According to the research conclusion of Yurttas (2018), the spiritual intelligence levels of the participants vary according to age. In Demir's

(2020) study, individuals aged 20 and over were found to have higher average spiritual intelligence than individuals under 20. In our study, in all three sub-dimensions with significant differences, the average values of older athletes were found to be higher. In the light of these results, it can be concluded that the spiritual intelligence of older athletes is more prominent than younger athletes, and values such as "personal meaning generation", "awareness", "conscious state expansion" increase as the age get older. There are significant differences in the spiritual intelligence characteristics of physically disabled badminton players depending on the duration of being an athlete in the "personal meaning generation" sub-dimension. The average values of athletes with a sports history of 3-5 years were found to be significantly lower than the average values of athletes with a sports history of 1-2 years and 6 years and more (Table 3). Weiting et al. (2011) conducted a study examining the dominant intelligence type of athletes. They examined the multiple intelligences of a total of 355 people, being 202 athletes and 153 non-athletes. According to the results, it was revealed that the social and inner i.e, spiritual intelligence of the athletes as well as their physical intelligence is also dominant.¹⁵ Deol and Singh (2017) suggested in their study conducted with the participation of athletes playing basketball at inter-university, national and international levels in India, that there are significant differences between the spiritual intelligence scores of the athletes. It is a fact that the research to be examined in respect of the spiritual intelligence and sports history variable will contribute to the relevant literature. In another finding of the study, significant changes were found in the spiritual intelligence characteristics of physically disabled badminton players due to the marital status factor in all dimensions except for the "important existential thinking" sub-dimension. It was found that the mean values of married badminton players were significantly higher than the single badminton players in the sub-dimensions of "personal meaning generation", "awareness" and "conscious state expansion" (Table 4). In the related study of Cat (2014), it was found that the mean spiritual intelligence scores of married participants were higher than single participants. Heydari et al. (2015, 2017) reported that there was no significant difference in spiritual intelligence changes according to the marital status factor of the participants. When considering the results of our study, it is thought that it is possible to say that married badminton players have more prominent spiritual intelligence compared to single badminton players; the reason is that the average values of married athletes were found to be higher than singles in all dimensions. It is thought that the related finding will contribute to the literature in the field.

For this study, the overall mean value of the spiritual intelligence self-report inventory scale of the participants was calculated as 3.70. It can be said that the spiritual intelligence scores of physically disabled badminton players are slightly above the average (Table 5). In Rostami's (2015) study, the average spiritual intelligence score of sports managers was calculated as 2.18. likewise, in Alam's (2014) study, the spiritual intelligence score average of sports managers was found to be 2.18. In the related literature, it is possible to come across various research results that bring together the concept of spiritual intelligence and the sport's concepts. For example, Mirzaaghazadeh et al. (2016) worked with 212 athletes who became national athletes in basketball, cycling, wrestling, karate, rowing, fencing, and volleyball in Iran and represented their countries in world championships and the Olympics. They give the information that there is a positive correlation between their satisfaction and that as the spiritual intelligence levels of the athlete's increase, their life satisfaction will increase. Arnout et al.(2019) according to the results of the research conducted with the participation of athlete university students on athletics, basketball, baseball, football, gymnastics, judo, and swimming sports, higher self-affirmation, higher spiritual intelligence, and spiritual abilities are significantly effective in demonstrating the better psychological state of athletes, and that athletes with high intelligence have a better psychological state. Moghaddam et al. (2017) suggested that there is a significant and positive correlation between spiritual intelligence and the concepts of team culture and sports ethics in their study conducted with the participation of 182 athletes who make up sports teams. Koraei (2016) found in his study examining the relationship between spiritual intelligence and coping styles of physical education teachers and found that people with high spiritual intelligence have high flexibility to cope with stressors.

CONCLUSION

As a result of the research, significant changes were identified in the spiritual characteristics of physically disabled athletes participating Turkey Physically Disabled Badminton Championships according to gender, age, marital status, and period of being athlete factors. There are no significant differences in the spiritual intelligence characteristics of the badminton players depending on the education level factor. It is possible to say that the spiritual intelligence scores of married athletes are more prominent than single athletes, older ones than younger athletes, and male athletes compared to female athletes. Considering the general average values of the research scale spiritual intelligence self-report inventory, it can be said that physically disabled badminton players got a slightly above average score on the relevant scale.

Recommendations

Spiritual intelligence represents a set of spiritual abilities, capacities, and resources that applying in daily life can enhance one's adaptability (Ghanifar et al.,²⁷). According to Zohar and Marshall⁵², spiritual intelligence enables us to reach the deepest layer of our true selves. It is thought that the studies to be carried out on the concept of spiritual intelligence, which is so important and a guide that people need in all areas of life, will make significant contributions to the invisible aspect of science.

REFERENCES

1. Arnout, B.A., Alkhatib, A.J., Abdel Rahman, Dina E., Pavlovic, S., Al-Dabbagh, Z.S., & Latyshev, O.Y. (2019). Spiritual intelligence and self-affirmation as predictors of athletes' psychological well-being. *International Journal of Applied Psychology*, 9(4), 104-109. <http://dx.doi: 10.5923/j.i.jap.20190904.02>
2. Amram, Y. (2007). The seven dimensions of spiritual intelligence: An ecumenical, grounded theory. *115th Annual Conference of the American Psychological Association*. 17- 20 August, San Francisco.
3. Amram, Y., & Dryer, D.C. (2008). The integrated spiritual intelligence scale (ISIS): Development and preliminary validation. *Paper Presented at the 116th Annual Conference of the American Psychological Association Boston, MA*.

4. Anbugeetha, D. (2015). An analysis of the spiritual intelligence self report inventory (SISRI). *International Journal of Management*, 6(7), 25-36.
5. Antunes, R.R., Silva, A.P., & Oliveira, J. (2017). Spiritual intelligence self-assessment inventory: psychometric properties of the Portuguese version of SISRI-24. *Journal Of Religion Spirituality-Aging*, 30 (1), 12-24. <http://dx.doi.org/10.1080/15528030.2017.1324350>
6. Awais, M., Malik, M.S., & Qaisar, A. (2015). A Review: the job satisfaction act as mediator between spiritual intelligence and organizational commitment. *International Review of Management and Marketing*, 5(4), 203-210.
7. Aydin, D. (2018). Relationship between the spiritual intelligence and self-regulation skills of education faculty students. *Journal of Education and Training Studies*, 6(12), 227-234. <http://dx.doi.org/10.11114/jets.v6i12.3481>
8. Aydin, E. (2018). The effect of spiritual intelligence and optimistic on creativity in team and individual sports activities of Trabzon University students. *Asian Journal of Education and Training*, 5(3), 397-402. <http://dx.doi.org/10.20448/journal.522.2019.53.397.402>
9. Aydintan, B. (2009). A hands-on study exploring the impact of spiritual intelligence on transformative leadership. *Ataturk University Journal of economic and Administrative Sciences*, 23(2), 257-274.
10. Azimkhani, A. (2014). Analyzing the relationship among mental skills, emotional intelligence and competition anxiety in young and adult skiers [Unpublished doctora dissertation]. Healt Sciences Institute and Erzurum University.
11. Bekis, T. (2006). An applied study on spiritual intelligence in leadership [Unpublished master dissertation]. Department of Educational Sciences and Selcuk University.
12. Bickes, D.M. (2017). Spiritual intelligence impact on the nurses' work performances: Case Of Cappadocia. *International Journal of Academic Value Studies*, 3(9), 273-284. <http://dx.doi.org/10.23929/javs.169>
13. Bozdam, A. (2011). Physically handicapped badminton and athlete classification. I. *International Physical Education And Sports Congress For Disabled Persons*. 10-16 May, Konya/Turkey, congress book, 23-29
14. Caliskan, E. (2011). Sports education in children with disabilities and approaches of families. *International Physical Education And Sports Congress For Disabled Persons*. 10-16 May, Konya/Turkey, congress book, 30-33.
15. Cat, S. (2014). A study to determine the level of spiritual intelligence and burnoud syndrome staff of emergency, rescue and intervention: an example of Gumushane province [Unpublished master dissertation]. Social Sciences Institute and Gumushane University.
16. Demir, S. (2020). The relationship of online gaming addiction with two intelligence types: emotional – spiritual intelligence and the moderating effect of gaming motives [Unpublished master dissertation]. Department of Neuroscience and Uskudar University.
17. Deol, N.S., & Singh, D. (2017). Spiritual intelligence in basketball performance: identifying performance indicators. *American Journal of Sports Science and Medicine*, 5(4), 69-74. DOI: 10.12691/ajssm-5-4-2
18. DeVellis, F.R. (2017). *Scale Development Theory and Applications*. Nobel Press, p.108.
19. Durmus, M., Gercek, A., Ciftci, N., & Tasci, O. (2018). Factors affecting the mental intellegence levels of nursing students. 2nd International Congress on Multidisciplinary Studies, 4-5 May, Adana Turkey, congress book, 490.
20. Emmons, R. A. (2000). Is spirituality an intelligence? Motivation, cognition and the psychology of ultimate concern. *The International Journal for The Psychology of Religion*, 10(1), 3-26.
21. Erbay, S., & Beydogan, H.O. (2017). Attitudes of educators towards educational research. *Ahi Evran University Kirsehir Faculty Of Education Journal*, 18(3), 246-60. <http://dx.doi.org/10.29299/kefad.2017.18.3.014>
22. Ergun, N. (2011). Sports activities and classification for physically handicapped. *International Physical Education And Sports Congress For Disabled Persons*. 10-16 May, Konya/Turkey, congress book, 42-46.
23. Faribors, B., Fatemeh, A., Hamidreza, & H. (2010). The relationship between nurses' spiritual intelligence and happiness in Iran. *Procedia Social and Behavioral Sciences*, 5, 1556-1561.
24. Fisekcioglu, İ.B., & Ozsari, A. (2017). Leisure time management and the attitudes of disabled athletes. *International Journal of Science Culture and Sport*, 5(4), 302-318.
25. Gardner, H. (2004). *Frames of mind: The theory of multiple intelligences*. Alfa Publishing, p.101.
26. Gardner, H. (2013). *Multiple intelligences*. Optimist Publishing, p.17.
27. Ghanifar, M.H., Khodabakhshi, A.A., & Balideh, M. (2019). Investigating the relationship between psychological capital and spiritual intelligence with the employees' performance of an organization. *Science Arena Publications Specialty Journal of Psychology and Management*, 5(4), 51-58.
28. Gurbuz, S. & Sahin, F. (2017). *Sosyal bilimlerde araştırma yöntemleri*. Ankara, Seckin Press, p. 105.
29. Heydari, A., Meshkinyazd, A., & Soudmand, P. (2017). The effect of spiritual intelligence training on job satisfaction of psychiatric nurses. *Iranian Journal of Psychiatry*, 12(2), 128-133.
30. Heydari, F., Firuzbakht, H., Shah Safi, S.P., & Javid, N.M. (2015). Relationship between emotional intelligence and spiritual intelligence with mental health of university students Gilangharb. *Uct Journal Of Social Science And Humanities Research*, 02, 42-45. <https://doi.org/10.24200/jsshr.vol3iss02pp42-45>
31. Ilkim, M., Canpolat, B., & Akyol, B. (2018). The Effects of Eight-Week Regular Training in Amateur Amputee Football Team Athletes' Body Composition. *Turkish Journal of Sport and Exercise*, 20(3), 199-206. <https://doi.org/10.15314/tsed.466739>
32. Javaheri, H., Safarnia, H., & Mollahosseini, A. (2013). Survey relationship between spiritual intelligence and service quality. *Interdisciplinary Journal Of Contemporary Research In Business*, 4(9), 547-554.
33. Kalantarkousheh, S.M., Sharghib, N., Soleimani, M., & Ramezani, S. (2013). The role of spiritual intelligence on organizational commitment in employees of universities in Tahrn province, Iran. *Procedia - Social and Behavioral Sciences*, 140, 499-505. <https://doi.org/10.1016/j.sbspro.2014.04.460>
34. Karadeniz, A., & Aydın, D. (2016). A study of validity and reliability for the scale of spiritual intelligence characteristics. *International Journal Of Eurasia Social Sciences*, 7(23), 69-93.

35. King, D. B. (2008). Rethinking claims of spiritual intelligence: A definition, model, & measure. [Unpublished master dissertation]. Trent University, Peterborough, Canada.
36. M, Koraei. (2016). The relationship between spiritual intelligence and coping style among sport teachers. *Journal of Administrative Management, Education and Training*, 12(3), 46-49.
37. Marghzar, S.H., & Marzban, A. (2018). The relationship between spiritual intelligence and efficacy among Iranian efl teachers. *Theory and Practice in Language Studies*, 8(1), 67-73. <http://dx.doi.org/10.17507/tpls.0801.09>
38. Mirzaaghazadeh, M., Farzan, F., Amirnejad, S., & Hosseinzadeh, M. (2016). Assessing the correlation of machiavellian beliefs, spiritual intelligence and life satisfaction of Iran's national team athletes. *Pacific Science Review B: Humanities and Social Sciences*, 2, 88-93.
39. Moghaddam, J.B., Rasouli, S., & Nekufar, M. (2017). The relationship between spiritual intelligence and team culture with the sports ethics of the athletes of sports teams. *Bioethics Journal*, 7(26), 77-84.
40. Ogunsola, K.O., Fontaine, R.A.H., & Jan, MT. (2020). A cross-cultural adaptation and psychometric validation of SISRI-24 among Malaysian teachers. *International Journal of Human Potentials Management*, 2(1), 1-22.
41. Rostami, L. (2015). The relationship between spiritual intelligence and emotional intelligence with transformational leadership of athletic managers of Zanjan province. *International Interdisciplinary Journal of Scholarly Research*, 1(3), 1-9.
42. Sevin, H.D., & Kucuk, S. (2016). A study intended to determine the relationship between the recreational activity participation levels of employees and their work performances. *Journal of Recreation and Tourism Research*, 3(1), 24-31.
43. Seyfi, Y.U. (2016). The analysis on spiritual intelligence characteristics and working perception of generation x and y [Unpublished doctora dissertation]. Department of Neuroscience and Uskudar University. Social Sciences Institute and Manisa University.
44. Seyfi, Y.U., Kose, S. (2016). The analysis on spiritual intelligence and working perception. *Journal Of Management And Economic*, 23(3), 767-787.
45. Soylemez, A. (2016). The adaptation of integrated spiritual intelligence scale to Turkish, studying of the reliability and validity: studying spiritual intelligence as a presumption on the meaning of life and the life satisfaction [Unpublished master dissertation]. Department of Educational Sciences and Sakarya University.
46. Tabachnick, B.G., & Fidell, L.S. (2015). *Using multivariate statistics*. Ankara, Nobel Press, p.79.
47. Turan, M.B., Koc, K., Ulucan, H., & Yuce, M.S. (2020). Investigation of the mental intelligence levels of faculty of sport science students according to some variables. *Physical Education and Sport Sciences Journal*, 14(1), 25- 37.
48. Ustten, A.U. (2008). The application of spiritual intelligence to the education of literature under the light of new developments brought by quantum science [Unpublished doctora dissertation]. Department of Educational Sciences and Gazi University.
49. Wigglesworth, C. (2011). Spiritual intelligence and why it matters. www.innerworkspublishing.com/news/vol22/intelligence.htm [accessed on 10 April 2019].
50. Wolman, R. N. (2001). *Thinking with your soul: Spiritual intelligence and why it matters*. New York, Harmony Books, p.61.
51. Yurttas, E. (2018). The relationship between spiritual intelligence and decision-making styles: an application on managers [Unpublished master dissertation]. Social Sciences Institute and Cankaya University.
52. Zohar, D. & Marshall, I. (2000). *SQ: Spiritual intelligence, the ultimate intelligence*. London. Bloomsbury. www.alisonmorgan.co.uk/Books/Zohar%202000.pdf [accessed on 30 May 2019].

THE EFFECT ON JOB SATISFACTION OF EXECUTIVE SUPPORT PERCEPTION OF COACHES IN TURKEY

Mustafa KIZILKOCA* & Aysel KIZILKAYA NAMLI**

ORCID:0000-0003-3636-6971- mkizilkoca@munzur.edu.tr - ORCID:0000-0001-7980-421X, ayselkizilkayanamli@munzur.edu.tr

Corresponding author: mkizilkoca@munzur.edu.tr

* Dr. Lecturer, Faculty of Physical Education and Sport Sciences, Munzur University, Turkey

** Dr. Lecturer, Faculty of Physical Education and Sport Sciences, Munzur University, Turkey

ABSTRACT

This study aims to determine the effect of coaches' perception of executive support on job satisfaction. A relational screening model was used in the study for this purpose. Disproportionate sampling was used within the scope of the study, and 516 coaches working in various provinces of Turkey composed a sample of the study. The scale of executive support developed by Karasek et.al (1985) and adapted by Kula (2011) and the scale of job satisfaction made by Bilir and Keser (2019) was used in the collection of data. Pearson Correlation analysis was used to reveal the relationship between scores from scales, Linear Regression analysis was used to determine whether the scores obtained affected each other. Error level in the study was taken as $p < 0.01$. It has been determined that there is a positive and meaningful relationship between the executive support levels of coaches in Turkey and the levels of job satisfaction. It can be said that as the level of executive support increases, the levels of job satisfaction increase. According to linear regression analysis, it was determined that the level of executive support positively affected the job satisfaction levels of coaches. It was observed that the executives' support scores of coaches in Turkey were higher than average with an average of 3.53 and job satisfaction scores were high with an average of 4.08 in our study.

KEYWORDS: Sports, Coach, Executive Support, Job Satisfaction.

INTRODUCTION

Nowadays, the most important capital of organizations is human resources. Existing human resources express qualified manpower. The expectations of qualified manpower of organizations from management and managers are increasing day by day. As a result of these expectations, it can be said that if it is not met, it causes job satisfaction to decrease. Increased job dissatisfaction will produce consequences such as loss of qualified manpower and decrease in performance. It is important to encourage and appreciate and support those who work for the continuity and success of the organization for this reason. The support of the executive has a significant contribution to job satisfaction⁹. There are many definitions of job satisfaction. Job satisfaction is measured by the pleasure, happiness, and efforts of employees. This situation is related to the degree to which employees are appreciated. In another definition, job satisfaction is stated as the positive and constructive feelings acquired about the job by analyzing the characteristics of the employee¹⁸. Job satisfaction is defined as the level of satisfaction of the employee with a positive emotional point of view by evaluating the situations such as the work of the employees, supervision at the workplace, wages, development and promotion opportunities, working conditions, social relations in the working environment and the work environment⁹, job satisfaction has three dimensions. The first is "Job satisfaction is an emotional response to a business situation. As such, it can only be expressed.", secondly, "Job satisfaction represents interrelated attitudes⁷. These are the work itself, wages, promotion opportunities, management style, colleagues.", thirdly, "Job satisfaction, financial interests obtained from work come to mind the happiness of bringing together colleagues and works that the employee enjoys working with." The importance of employees' work-related attitudes began to gain importance in the 1930s with Hawthorne research. Hawthorne's research results revealed that the factor that increases efficiency is social factors rather than physical factors (lighting, heating, working time, etc.). Employee reward, motivation, and job satisfaction are the main factors that increase his productivity². It is seen that job satisfaction is a need when we examine the definitions. There are also many definitions with executive support, which is the subject of research. Executive support is how employees perceive positive behaviors shown by organization representatives, the degree to which the manager's value, encouragement, and support to the employee is felt by the employee⁴. In other definition, the manager's positive working relationship with his employee is to meet the needs of the employees to ensure that they perform higher and more positively. The attitude and behavior of the manager towards the employee will also contribute significantly to the employee's work performance and business continuity. Positive or negative reactions to the employer will affect the employee's job performance, motivation, loyalty to the institution. Managers should observe their attitudes well and make an annuum of how the result of this attitude and attitude is reflected in the employees⁵. Perceived executive support also offers activities such as providing opportunities for employees to develop new talent, ensuring that employees spend time on their career goals, and supporting training for their careers. If the manager has a high degree of executive support, this will provide high performance and efficiency in employees¹⁹. It is indicated that those who show a fair attitude to employees are proud of them, and consider their needs to perform well in their work are supportive managers. If the employee receives support from the manager, it means that the employee perceives that he or she is being considered. According to this situation, the positive behavior of the employee from the manager increases the perception of "manager support" in terms of the employee¹⁷. Some researches show that executive support is significantly and positively related to job satisfaction when the literature is examined¹². Studies usually cover educational organizations. No research has

been found involving sports organizations. It is thought that this research will contribute to the literature for this reason. In the research conducted from this point, it is aimed to determine the effect of the perception of executive support of coaches in Turkey on job satisfaction. To achieve this goal, the following questions are searched for answers.

•What is the perceived level of coaches for executive support and job satisfaction?

•Is there a relationship between the executive support levels of coaches and the levels of job satisfaction?

METHODOLOGY

The research working universe is made up of coaches working in various branches in Turkey. Within the scope of the research conducted to determine the relationship between executive support and job satisfaction of coaches, samples were taken using the disproportional element sampling method. The type of sampling in which all elements in the universe have an equal chance of being selected is defined as a disproportional element sampling method¹³. Data were collected from 516 coaches within the scope of the research. Executive support scale and job satisfaction scale were used for coaches within the scope of the research. Research data were collected online due to the ongoing pandemic process. The perception of executive support was evaluated by a 7-point scale developed by Karasek et al. (1985) and adapted by Kula (2011). Participants were asked to mark how much they agreed with the statements on the 5-point Likert Scale in the scale. (1 = Strongly disagree, 5 = Strongly agree)^{14,16,15}. Article 6 on the scale is scored in reverse. The internal consistency of the scale (Cronbach alpha) is 0.89. The Business Satisfaction Scale (An Index of Job Satisfaction) was developed by Brayfield and Rothe in 1951⁶. The original form of the scale contains 18 items. Judge, Locke, Durham and Kluger (1998) developed a 5-point short form of the scale¹¹. Adapting the short form of the Job Satisfaction Scale to Turkish and examining its psychometric characteristics were made by Bilir and Keser (2019). Participants in the scale were asked to mark how much they agree with the statements on the 5-Likert Scale (1 = Strongly disagree, 5 = Strongly agree). Article 5 on the scale is scored in reverse. The internal consistency of the scale (Cronbach alpha) is 0.70.

Analysis of Data

IBM SPSS 22 package program was used to analyze the data obtained. It was determined that the skewness and kurtosis values of the scales were between -1 and +1 (Table 1). The range of these values between -1 and +1 is interpreted as parametric of research data. It has been accepted that the data shows the normal distribution in this context. Pearson Correlation analysis was used to reveal the relationship between scores from scales, Linear Regression analysis was used to determine whether the scores obtained affected each other. Error level in the study was taken as $p < 0.01$.

Table 1: Skewness and kurtosis values of the scale scores

Scales	N	Skewness	Kurtosis
Executive Support Scale	516	-,800	,443
Job Satisfaction Scale	516	-,741	,357

RESULTS

The demographic characteristics of the participants who participated in the study were determined and the descriptive statistics of executive support and job satisfaction levels were determined in this part of our study. Besides, the relationship between executive support on job satisfaction has been determined by the necessary analysis.

Table 2: Distribution Table of Demographics

Variable	Groups	N	%
Age	Under 30 years	138	26,7
	31-40 Years	201	39,0
	41 Years and Older	177	34,3
	Total	516	100,0
Marital Status	Married	288	55,8
	Single	228	44,2
	Total	516	100,0
Education Status	License	387	75,0
	Graduate	129	25,0
	Total	516	100,0
Gender	Female	75	14,5
	Male	441	85,5
	Total	516	100,0
Coaching Level	1st Level	249	48,3
	2ndLevel	111	21,5
	3rd Level and above	156	30,2
	Total	516	100,0

Coach's Branch	Team Sports	294	57,0
	Individual Sports	222	43,0
	Total	516	100,0
Year of Service	1-10 years	315	61,0
	11-20 years	144	27,9
	21 years and above	57	11,0
	Total	516	100,0
Service status	Permanent Staff	171	33,1
	Contracted	177	34,3
	Honorary	168	32,6
	Total	516	100,0
Club Affiliated Institution	Public	333	64,5
	Private	183	35,5
	Total	516	100,0

It is seen that 39% of the participants in our study were between the ages of 31 and 40, 34.4% were 41 years of age or older, and 26.7% were 30 years of age or younger when Table 2 is examined. When we looked at the marital status of the participants, it was determined that 55.8% were married and 44.2% were single. It is seen that 3/4 of the participants graduated with undergraduate degrees and 1/4 had graduate-level education when we look at the distribution for educational situations. It is seen that 48.3% of the participants have 1st stage coaching certificates, 21.5% of them have 2nd stage coaching certificates and 30.2% of the participants have 3rd stage and higher coaching certificates when we look at the distribution of the participants according to the ranks of the coaching documents. Considering the distribution of the trainers according to the sports branch, it was determined that 57% were coaching in team sports and 43% in individual sports branches. When we look at the working years in the institutions to which the coaches are affiliated, it is seen that 61% serve 1-10 years, 27.9% serve 11-20 years and 11% serve their institutions for 21 years and more. When we look at the way participants worked in the institutions they served in, it was determined that 33.1% worked as permanent staff, 34.3% as contracts, and 32.6% as honorary coaches. Considering the institutions that the coaches work with, it has been determined that 64.5% work in public clubs and 35.5% in private clubs.

Table 3: Identifying statistics of the scores from the executive support and job satisfaction scales of the coaches participating in the research

Scales	N	Min	Max	X $\pm$ SD
Executive Support Scale	516	1,005,00	3,53 $\pm$,847	
Job Satisfaction Scale	516	1,805,00	4,08 $\pm$,726	

It was determined that the average score of executive support was 3.53 $\pm$,847 and the job satisfaction scale score average was 4 $\pm$ 08.726 when table 3 was examined.

Table 4: Pearson Correlation analysis results based on executive support and job satisfaction scores of coaches participating in the study

	(A)	(B)
Executive Support Scale^(A)	r	1
	p	
Job Satisfaction Scale^(B)	r	,583**
	p	,000
N=516 **p<0.01		

When we look at Table 4, it is seen that there is a positive and meaningful relationship between the executive support levels of the research group and the levels of job satisfaction ($r=,583$; $p<0.01$). Accordingly, it can be said that the level of job satisfaction increases as the level of executive support increases.

Table 5: Linear Regression analysis results based on executive support and job satisfaction scores of coaches participating in the study

Dependent variable: Job Satisfaction					
	B	Std. Error	β	t	p
(Constant)	2,319	,112		20,729	,000
Executive Support Scale	,500	,031	,583	16,272	,000
$R=,58$; $R^2=,34$					
$F=264,78$; $p<0,01$					

When Table 5 was examined, it was determined that the level of executive support was a significant relationship with the level of job satisfaction ($R=,58$, $R^2=,34$). The level of executive support was found to positively affect the job satisfaction levels of coaches ($\beta=,583$, $p<0.01$).

DISCUSSION

In this section, findings of the effect of the perception of executive support of the coaches participating in the research on job satisfaction are discussed and interpreted. It is seen that 39% of the participants in our study were between the ages of 31 and 40, 34.4% were 41 years of age or older, and 26.7% were 30 years of age or younger when the distribution table of demographic characteristics is examined. When we looked at the marital status of the participants, it was determined that 55.8% were married and 44.2% were single. It is seen that 3/4 of the participants graduated with undergraduate degrees and 1/4 had graduate-level education when we look at the distribution for educational situations. It is seen that 48.3% of the participants have 1st stage coaching certificates, 21.5% of them have 2nd stage coaching certificates and 30.2% of the participants have 3rd stage and higher coaching certificates when we look at the distribution of the participants according to the ranks of the coaching documents. Considering the distribution of the trainers according to the sports branch, it was determined that 57% were coaching in team sports and 43% in individual sports branches. When we look at the working years in the institutions to which the coaches are affiliated, it is seen that 61% serve 1-10 years, 27.9% serve 11-20 years and 11% serve their institutions for 21 years and more. When we look at the way participants worked in the institutions they served in, it was determined that 33.1% worked as permanent staff, 34.3% as contracts, and 32.6% as honorary coaches. Considering the institutions that the coaches work with, it has been determined that 64.5% work in public clubs and 35.5% in private clubs. It is seen that the levels of executive support are higher than average with 3.53 points and the levels of job satisfaction are higher with an average of 4.08 when we look at the defining statistics scores of the coaches participating in the study according to the executive support, and job satisfaction scales. Ergün and Celik, stated that the level of job satisfaction was low with an average of 2.82 in their study in which executives examined job satisfaction levels according to their behavior⁸. Baslar, found that the level of executive support of employees was higher than average with an average of 3.56 in the master's thesis on perceived executive support³. In our study, it can be said that the reason for the high levels of executive support and job satisfaction of coaches working in sports branches in Turkey is due to the adapter and relaxing feature of sports. When the Pearson correlation analysis results of the participants in the study are examined, it is seen that there is a positive and significant relationship between the executive support levels of the research group and their job satisfaction levels. Executive support is found to have a positive effect on job satisfaction by 58%. Paralleling our study, Akkoç et al. found a positive and significant relationship between organizational support and job satisfaction in their study titled "Development Culture in Organizations and the Effect of Perceived Organizational Support on Job Satisfaction and Job Performance"¹. Zincirkiran et al., in their study titled "Examining the Relationship Between Executive Support and Job Satisfaction", found positive relationships between the age of healthcare workers and their perceptions of executive support and job satisfaction levels²⁰. It was determined that the level of executive support was a significant relationship with the level of job satisfaction when we looked at the results of linear regression analysis of the participants in the study. It has been determined that the level of executive support positively affects the job satisfaction levels of coaches. Ince found that organizational support is an influential factor on dedication to work in his study "The Role of Executive Support in the Effect of Perceived Organizational Support on Dedication to Work"¹⁰. As a result; It has been determined that there is a positive and meaningful relationship between the executive support levels of coaches in Turkey and the levels of job satisfaction. It can be said that as the level of executive support increases, the levels of job satisfaction increase. According to linear regression analysis, it was determined that the level of executive support positively affected the job satisfaction levels of coaches. It was observed that the executive support scores of coaches in Turkey were higher than average with an average of 3.53 and job satisfaction scores were high with an average of 4.08 in our study. We have dealt with a number of challenges easily thanks to the support of those around us in every period of our lives. The support of colleagues is very important in dealing with difficulties in working life.

CONCLUSION

The presence of executive support is very important as it is considered that business efficiency and job satisfaction will be at the highest level in the fields of work where organizational culture and organizational commitment are at a high level. It was considered necessary to examine the effect of the perception of executive support of coaches in Turkey on job satisfaction and as a result of this study, it is thought that it will contribute to the relevant sports ministry, sports scientists, management scientists, and academicians working on this issue.

REFERENCES

1. Akkoc, İ., Caliskan, A., and Turunc, O. (2012). Development culture in organizations and the effect of perceived organizational support on job satisfaction and job performance: The mediating role of trust. *Journal of Management & Economics*, 19 (1).
2. Akyol, B., and Ilkim, M. (2018). Socialization of disabled people with sports activities and their problem encountered in participating in sports activities. *Türk Spor ve Egzersiz Dergisi*, 20(2), 100-104.
3. Baslar, Y. (2020). Determining the Effect of Employees' Perceived Executive Support on Emotional Labor: A Research. Istanbul Arel University. Graduate Education Institute. Human Resources Management Graduate Program. Master Thesis. Istanbul.

4. Bayraktar, E. (2019). Materialist disposition, job stress, executive support, and the impact of work-family life conflict on job and life satisfaction. Düzce University, Institute of Social Sciences, Department of Business Administration, Master's Thesis.
5. Bhanthumnavin, D. (2003). Perceived social support from Supervisor and group members' psychological and situational characteristics as predictors of subordinate performance in Thai work units, *Human Resource Development Quarterly*, 14, 74-97.
6. Brayfield, A. H and Rothe, H. F. (1951). "An Index of Job Satisfaction." *Journal of Applied Psychology*, 35.5, 307.
7. Eren, E. (2000). *Organizational Behavior and Management Psychology* (2nd Edition), Beta Publishing House, Istanbul.
8. Ergün, E., and Celik, S. (2015). The relationship between task- and employee-oriented leadership behaviors of managers and nurses' job satisfaction, organizational commitment and job stress. *Florence Nightingale Magazine*, 23 (3), 203-214.
9. Ilkim, M., Tanir, H., and Ozdemir, M. (2018). Socialization Effect of Physical Activity in Students Who Need Special Education. *Asian Journal of Education and Training*, 4(2), 128-131.
10. Ince, A. R. (2016). The Mediating Role of Executive Support in the Effect of Perceived Organizational Support on Commitment to Work. *Electronic Journal of Social Sciences*, 15 (57).
11. Judge, T. A., Locke, E. A., Durham, C. C and Kluger, A. N. (1998). Dispositional Effects on Job and Life satisfaction: The Role of Core Evaluations. *Journal of Applied Psychology*, 83(1), 17.
12. Kale, E. (2015). The Effects of Leader Support and Colleague Support on Job Performance: The Mediating Role of Job Satisfaction and Life Satisfaction. *International Journal of Economic and Administrative Studies*, 7 (14), 103-119, 1307-9832.
13. Karasar, N. (2008). *Scientific research method: concepts, principles, techniques* (Eighteenth edition). Ankara: Nobel Yayın Dağıtım.
14. Karasek, R.A. (1985) *Job Content Questionnaire and User's Guide*, Lowell: University of Massachusetts at Lowell.
15. Keser, A. and Bilir, K. B. Ö. (2019). Turkish Reliability and Validity Study of Job Satisfaction Scale. *Kırklareli University Journal of Social Sciences*, 3 (3), 229-239.
16. Kula, S. (2011) *Occupational Stress and Work-Related Wellbeing of Turkish National Police (TNP) Members*, (unpublished dissertation), Orlando: University of Central Florida
17. Rhoades, L., Armeli, S., and Eisenberger, R., (2001), "Affective Commitment to the Organization: The Contribution of Perceived Organizational Support", *Journal of Applied Psychology*, Vol. 86, No.5, ss. 825- 836.
18. Robbins, S. P., and Judge, T. A. (2012). *Organizational Behavior*. I. Erdem (trans.). Istanbul: Nobel Publishing (Original Edition 2001), 14th Edition.
19. Yaşar, M. F., Emhan, A., and Eber, P., (2014). Analysis of Organizational Justice, Supervisor Support, and Organizational Commitment: A Case Study of Energy Sector in Nigeria. *Journal of Business Studies Quarterly*, 5(3), 37-46.
20. Zincirkıran, M., Yalcınsoy, A., and Isık, M. (2016). Examining the Relationship Between Executive Support and Job Satisfaction. In 2nd International Congress On Economics And Business (Pp.976-983).

THE EXPERIENCES OF THE LIFEGUARDS WORKING ON THE COASTALS: A QUALITATIVE STUDY ON THE STUDENTS OF THE FACULTIES OF SPORTS SCIENCES

HÜLYA BİNGÖL* & TALİP ÇELİK**

ORCID:0000-0002-6686-2821- ORCID:0000-0003-3197-4732

hulya.bingöl@inonu.edu.tr- talip.celik@inonu.edu.tr

* Doctor Lecturer, Department of Sports Management, Faculty of Sport Science, Inonu University, Malatya, Turkey

** Research assistant, Department of Sports Management, Faculty of Sport Science, Inonu University, Malatya, Turkey
Corresponding author. hulya.bingöl@inonu.edu.tr

ABSTRACT

Lifeguards are individuals who have received special training to prevent accidents in the aquatic environment and to respond to life-threatening emergencies. Although drowning is preventable in the world, it is one of the leading causes of accidental deaths. According to the global report of drowning prepared by the World Health Organization, 372 thousand people die by drowning in the world every year. More than 90% of these deaths occur in low and middle-income countries. Among these provinces, Antalya and Muğla are the scene of more accidents as tourism centers where coastal tourism is developed. There is a need for lifeguards with proper physical preparation and controlled to increase safety on this shoreline. The qualitative research method was used in the research. The study is designed as a phenomenology study. The study group of the research consists of 8 lifeguards studying at the Faculty of Sport Sciences of İnönü University and working on the coastlines. Since the meta-thematic analysis is carried out directly based on participant opinions, it can be stated that it is based on solid foundations in terms of validity and reliability. The texts conveyed by the interviews during the data resolution phase were subjected to thematic analysis by the researcher. As a result of the analysis of qualitative data, 4 main themes were formed. According to the frequency of expression of these themes; Experience, role model influence, career planning and work environment. As a result of these themes, it can be said that the lifeguard profession has an important place in the career orientation of the participants.

KEYWORDS: *Experience, Lifeguard, Thematic analysis*

INTRODUCTION

Lifeguards are individuals who have received special training to prevent accidents in the aquatic environment and to respond to life-threatening emergencies. They provide control and security in open water environments (coastlines, surf beaches), lakes, lagoons, rivers, swimming pools.^{1,2} Also, preventing water incidents by predicting potential accidents and applying rules proactively is an important part of a lifeguard's job.³ Studies show that lifeguards on duty in the United States save an estimated 100,000 people from drowning each year.⁴ Although drowning is preventable in the world, it is one of the leading causes of accidental deaths. According to the global report of drowning prepared by the World Health Organization, 372 thousand people die by drowning in the world every year. More than 90% of these deaths occur in low and middle-income countries. More than half of the drowned people are under the age of 25. Approximately 42 people die every hour by drowning. The number of women drowning is half of that of men. Drowning is among the top ten causes of death for people aged 1-24 years in every region of the world. Alcohol use around water, especially in adults and adolescents, is an important risk factor for drowning in many countries. Drowning emerges as a major public health problem that has a profound impact on children and adolescents. Turgut and Turgut's five years in Turkey (2007-2011), covering all age groups for online search engines online and died from drowning 3216 people in their study that examined the number of deaths as a result of drowning incidents using newspaper reports. Of these, 84.0% (2703 people) are men and 16.0% (513 people) are women. It was determined that 75.7% of all deaths occurred in natural water environments such as fresh / still water and sea.⁵ This is according to those who know the rules both swimming in Turkey were found to be inadequate in and the number of elite athletes.

Thus in Turkey is at the forefront of coastal tourism (Antalya, Fethiye, Bodrum, Marmaris, Cesme, etc.) made water sports (surfing, scuba or snorkeling, sailing, water skiing and various water sports are made with marine vehicles) activities are important recreational activities. However, it shows that the water sports accidents that occurred between 1997 and 2019 were mostly in Muğla, Antalya and Istanbul, respectively. Among these provinces, Antalya and Muğla are the scene of more accidents as tourism centers where coastal tourism is developed.⁶ There is a need for lifeguards with proper physical preparation and controlled to increase safety on these shorelines. Studies show that lifeguard services benefit public safety by saving lives, reducing drowning rates, and preventing injuries in water recreational environments.^{4,7}

However, studies on lifeguards are generally limited to ^{2,8} and no studies were found on lifeguards working on the coastlines of our country. Physical properties are among the factors that affect performance. In literature studies, it is seen that physical properties affect physiological capacity.⁹ Therefore, to clarify this limited issue and to contribute to the literature, this study focused on sports sciences undergraduate students working as lifeguards on the coastal beaches, and in this context, students' experiences were used to clarify the problems they encountered on the coastlines.

METHODS

Research Model

The qualitative research method was used in the research. The research method depends on the purpose of the researcher and the questions asked.¹⁰ The current research aims to determine the experiences of lifeguards working on the coastlines and to determine what these experiences can add to the lifeguards. The examination of the lifeguards' experiences is expected to serve as an example for other literature studies. The study is designed as a phenomenology study. Phenomenology appears to be the most appropriate research design for this study, in which the experiences of lifeguards are at the forefront. One of the aims of phenomenology studies is to describe the experiences of the participants regarding the phenomenon in question and how they experienced it as a result of collecting data from the participants who experienced the phenomenon in their own lives.¹¹ Participants in the study are asked to convey their "personal experiences regarding the phenomenon" and "in what context and under what conditions this experience occurred".¹² The aim is to reveal and describe common points and similarities in experiences.¹³ It is possible to examine phenomenology research in two categories: descriptive and interpretative. The main concern in descriptive phenomenological research is to draw a realistic picture of the phenomenon in question by examining, analyzing and describing it with all its richness, breadth and depth. For this, the researcher tries to describe the experience of the participants regarding the phenomenon, leaving aside all prior knowledge, judgments and assumptions.^{14,15} The researcher aims that the readers can see and feel this experience without referring to the social, cultural and political contexts of the participants.¹¹ In interpretive phenomenological research, the main concern is to reveal the hidden meaning of the experience and to provide a more in-depth understanding.

Group of Study

In phenomenology studies, samples of 5-25 people are preferred, consisting of people who personally experience the studied phenomenon in their own lives.¹⁶ The study group of the research consists of 8 lifeguards studying at the Faculty of Sport Sciences of İnönü University and working on the coastlines. The researcher knows some of the participants personally; and some of them reached through lifeguards they knew. The demographic characteristics of the participants are shown in Table 1. Since the meta-thematic analysis is carried out directly based on participant opinions, it can be stated that it is based on solid foundations in terms of validity and reliability.

Table 1. Demographic Characteristics of the Participants

Variable	1	2	3	4	Total
Gender					
1. Female	1	7			8
2. Male					
Lifeguard Certificate					
1. Bronze		8			8
2. Silver					
Province of Work					
1. Muğla	3	3	2		8
2. Antalya					
3. İzmir					

7 (87.5%) of the lifeguards participating in the research are male and 1 (12.5) female. All (100%) of the lifeguards participating in the research have a silver lifeguard certificate. 3 (37.5) of the participants in the research worked in Muğla, 3 (37.5) in Antalya and 2 (25%) in İzmir. At the same time, our age range is between 18-25 years since all participants are students of sports sciences faculties.

Collection of Data

The data of the research were collected with a semi-structured interview form. Before the meeting, pre-interviews were made with the designated lifeguards, either face to face or by phone, and they were briefly informed about the research and asked for their permission to participate. Semi-structured face-to-face interviews were held with lifeguards. The meetings were held face to face between June and August. Each interview lasted 25-40 minutes and notes were taken by the researcher during the interview. The researcher transferred the interview to the text with the help of the notes he took.

Data Analysis and Interpretation

The texts conveyed by the interviews during the data resolution phase were subjected to thematic analysis by the researcher. Each interview text was analyzed separately. In the next step, the transcript texts were read a second time and the similarities, in other words, the patterns in the texts were determined. In this way, it is aimed to find themes that can define the interview texts and categories that cover similar themes. In the analysis of the data, the inductive method was used. Instead of grouping the themes in the texts under predetermined categories, themes and categories were removed from the text. The findings of the research were examined within the framework of the themes formed in the research.

RESULTS

As a result of the analysis of qualitative data, 4 main themes were formed. According to the frequency of expression of these themes; Experience, role model influence, career planning and work environment. The themes are explained separately below.

Experience

Participants stated that they mostly encountered systemic problems during their life-saving experiences. Most of the participants mentioned the problems they had with the customers they communicate with rather than the administrative problems. The statements of the participants about a subject are given below:

"I had difficulties mostly because of young children doing dangerous movements. While they were supposed to slide from the slides, they were walking on the slides with the water. And the child could injure her head as a result of a sudden slipping. Therefore, I was having difficulty in warning the children." "There is no negative experience, but when we warned people in the pool, it was a nuisance. Here we were hearing words as we came to the pool to have fun. We were restricting it a little bit because I had problems in the pool related to this, but there was no problem before." "For example, the days of the women were different in the pool where I worked, the days of the men were different. For example, many people wanted to come and enter the men's day. Can I enter as if I own the pool? There are such problems. For this, of course, the people who come need to respect us, after all, we are an officer there." "There were people who wanted to come and watch on Miss Day. For example, the lady brings her daughter but wants to watch the day. After all, there are women over the age of 18, they will be uncomfortable. I have not had a problem with the managers so far, so I did not contradict it because I tried to do my profession in the best way, but there are usually problems with guests and people, and they can be solved."

At the same time, the participants were asked to describe the lifeguard based on their experiences. The expressions resulting from this description are given below. "I compare it to a doctor. A lifeguard is just like a doctor in my eyes. He needs to observe where the problem is and who has the problem like a doctor. And it needs to know well how to intervene. He should know how to control himself, keep himself calm, know how to give life to a person like a doctor." "I would compare it to the last bullet left in the war. Either you save it, squeeze it into the enemy, or you squeeze yourself as soon as you save it."

"I would compare it to an oxygen mask. Because at the point where life ends, you get caught in your mouth and come back to life when you take that breath. It is such a thing that when the lifeguard takes it out of that water, you hold on to life again." "Let me think what I can compare. Like, it might be a little bit humorous, but it's an electroshock device. The reason I say this is, for example, the patient stops his heart in the surgery, but you react to him, you give an effect and you bring him back to life. It looks like this in the lifeguard, for example, the case enters the casualty and is in danger of drowning. While caught between life and death, you intervene and bring him back to life." "This is a good question. What would I compare? I suppose I would compare it to a boat, either the lifeboats or you know, we see the same function in a way." "I can say that lifeguarding is a superhero job. For example, we can say Spider-Man, after all, they both save lives. I can compare it to this." "I compare it to a tree. Either way, once the lifeguard should be as strong as the tree, I expect the tree to produce oxygen that gives life to people, as well as to the tourists swimming in the sea in the lifeguard or to the people in the case." As a result of these descriptions, it is seen that the lifeguard profession has vital importance. It can be said that lifeguards play a decisive role between life and death.

Affected by the Role Model

It is seen that the most important theme emerging among the reasons for the participants to start lifeguarding is being influenced by the role model. 50% of the participants mentioned the importance of being influenced by the role model in choosing the lifeguard profession. Participants stated that their interest in the lifeguarding profession was the result of this influence. Statements of the participants on the subject are as follows:

"I started thanks to my teacher in the department I studied. Thanks to him, I got enthusiastic afterward because of the high financial income."

"My inspiration is that I love water very much and of course my sister supported me a lot. It became a source of inspiration."

"First of all, I am a person who loves swimming very much. So I loved swimming, dealing with swimming. Also, there was a sports education expert at the university and I decided to be a lifeguard as a source of inspiration. My inspiration is because of my love to swim and my teacher."

"I had one professor at the university. A teacher that I love very much. We started this profession with his request, that is, with his guidance."

Career Planning

Participants talked about the effects of their experiences of genocide on their careers. Statements of the participants on the subject are as follows:

"I am thinking of dealing with lifeguard training in the future, thinking about raising students, thinking about raising lifeguards on this issue. I hope so"

"I want to progress in this branch, and even my goal is to be a Lifeguard instructor."

"I am a person who always wants to go forward throughout my life, whether it be for my lifeguard or my school life, I am a silver lifeguard in the future, I want to give training and advance my profession in the best way possible."

"I could open a course for myself in the future, now I'm a silver-level lifeguard. I think to raise gold first, then maybe I can open a course in this area in the future."

"For now, I haven't set up such a plan yet but if I continue, I want to take the diving documents to this profession, continue as a golden lifeguard and take the chat of chieftain a little further, so it can be a club like this, it can be a lifeguard instructor. I am planning these kinds of things, but this is not the case right now."

Working Environment

One of the themes formed as a result of the opinions of the participants is financial gain. The remarkable views of the participants about the working environment are given below:

"I think that the lifeguard tower should be at a height that can easily see everyone, and at the same time, it should be possible to easily interfere with a drowning person. The sunshade should be good so that the lifeguard should turn himself into his work psychologically regardless of the sun and the environment."

"It should be a comfortable and peaceful environment. The lifeguard should focus on her job and not think of anything else."

"It is my ideal environment to have all the equipment complete, to have everything including first aid tools and equipment, to have our pool safely clean."

"There should be an appropriate number of lifeguards in the pool. Tools should be in the proper shape. Pool water cleaning should be suitable for everything."

"First of all, nobody should interfere with the working environment of the lifeguard. For example, it may be a case, it may be a problem, and it must intervene there. The people around them should only be able to help him in line with the wishes of the lifeguard. Because after all, he has his responsibility, so you will go and watch the case, and absolutely nobody should interfere. Since the lifeguard is given a responsibility, it should be allowed to fulfill that responsibility."

"Generally, I would like to work in an environment where there is no excessive noise. If you ask why, my warnings will sometimes be the effect of the sea, wave sound and so on, but sometimes our warnings do not reach the person. Other than that, it would be less risky if I would say on a flat ground, that is, a floor without a hole."

"In an ideal working environment, materials should be complete. You should have nothing on your mind about salary so you have to commit yourself to work."

RESULTS

Four main themes were found as a result of the data obtained in the study named the experiences of lifeguards working on coastal lines. These themes are Experience, role model influence, career planning, and work environment, respectively. As a result of these themes, it can be said that the lifeguard profession has an important place in the career orientation of the participants. It can be said that the participants, who described how vital lifeguarding is a profession, started this profession as a result of being influenced by the role model. It is seen that the most important problems of the participants are that the customers who go to the holiday resort try to bend the rules and do not listen to the warnings. The adoption of occupational health and safety culture as a life philosophy in swimming facilities can be given as a suggestion. Therefore, promotion activities of occupational health and safety culture in swimming facilities throughout the country should be spread and people who take a vacation should be informed about the behaviors they should do in the pool and sea.

DISCUSSION

Many studies were not found in our country when the literature was examined. Therefore, it can be said that the study will contribute to the literature. Gundogdu, in his work lifeguard certificate in Turkey and a variety of people with experience pool, water park and beach work in concluding that despite having adequate experience.¹⁷ Fenner et al. concluded in their study that fatigue may cause impairment of lifeguards' screening skills. In our study, they stated that lifeguards' calmer and more peaceful working environments are very important for the lifeguards.¹⁸ It can be said that the lifeguard's attention and attention to his work will increase his reaction speed in the face of events that may develop instantly. Studies show that lifeguards with more experience are more likely to detect a drowning person than those with less experience.¹⁹ Research has revealed that the decision-making process for lifeguards has evolved from overtime, the mentally intense rational process to a more subconscious intuitive process.²⁰

CONCLUSION

There are studies in the literature suggesting that the ability to improve preventive lifeguard instructions and successfully identify interventions can provide a safer recreational experience for beach visitors by causing fewer water incidents on the beach.²¹

The Relationship between Lifeguards' Needs and Their Job Satisfaction Based on Maslow's Hierarchy of Needs study a significant relationship was found between the basic need for shelter and job satisfaction.²² Also, it is seen that women's job satisfaction is higher than male job satisfaction ($p \leq 0.05$).

REFERENCES

1. Wilks, J. (2017). Tourism and aquatic safety: No lifeguard on duty-swim at your own risk. *Tourism in Marine Environments*, 12(3-4), 211-219. <https://doi.org/10.3727/154427317X15016348972677>
2. Barcala-Furelos, R., Abelairas-Gomez, C., Romo-Perez, V., & Palacios-Aguilar, J. (2013). Effect of physical fatigue on the quality CPR: A water rescue study of lifeguards: Physical fatigue and quality CPR in a water rescue. *American Journal of Emergency Medicine*, 31(3), 473-477. <https://doi.org/10.1016/j.ajem.2012.09.012>
3. MacMillan, B. (2008). Overcoming Lifeguard Shortages: Strategies to Effectively Recruit and Retain Lifeguard Candidates. *International Journal of Aquatic Research and Education*, 2(4). <https://doi.org/10.25035/ijare.02.04.09>
4. Branche, M. Stewart, S. (2001). *LifeguardReport-a*. <https://doi.org/390> [pii]
5. Turgut, A., & Turgut, T. (2014). A population-based study on deaths by drowning incidents in Turkey: *International Journal of Injury Control and Safety Promotion*, 21(1), 61-67. <https://doi.org/10.1080/17457300.2012.759238>
6. Uyanık, B.; Türker, N.; Barlas, B. (2019). Examination of water sports accidents in Turkey). *Karabük University Journal of Social Sciences Institute*, 9(2), 457-471.
7. A framework to reduce drowning deaths in the aquatic environment for nations/regions engaged in lifesaving. Drowning prevention strategies. International Life Saving Federation.27 July 2015. https://www.ilsf.org/sites/ilsf.org/files/filefield/20151028_FINAL_Drowning_Prevention_Strategies_ILS_Board_V01_0.pdf

8. Karahuseyinoglu, M , Gundogdu, C . (2008). The factor of gender directed towards traditional sport . *Sport Sciences* , 3 (4) , 159-167.
9. Ilkim, M., Canpolat, B., & Akyol, B. (2018). The effects of eight-week regular training in amateur amputee football team athletes' body composition. *Turkish Journal of Sport and Exercise*.
10. Seidman, I. (2006). Interviewing as Qualitative Research. A Guide for Researchers in Education and the Social Sciences. Third Edition. Teachers College Press. Newyork.
11. Van Manen, M., 1990. Researching Lived Experience: Human Science for an Action Sensitive Pedagogy. Althouse Press, Ontario.
12. Moustakas, C. E. (1994). *Phenomenological research methods*. Sage Publications, Inc.
13. Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Sage Publications, Inc.
14. Matua GA, Van Der Wal DM. Differentiating between descriptive and interpretive phenomenological research approaches. *Nurse researcher*. 2015; 22: 22-27.
15. Van der Zalm JE, Bergum V. Hermeneutic-phenomenology: providing living knowledge for nursing practice. *J Adv Nurs*. 2000 Jan;31(1):211-8. doi: 10.1046/j.1365-2648.2000.01244.x. PMID: 10632811.
16. Glesne, C. (2012). Introduction to Qualitative Research. (A. Ersoy ve P. Yalcinoğlu, Cev.). Ankara: Anı Yayıncılık.
17. Gundogdu, C., Ekenci, G., & Colakoglu, T. (2008). Safety and management in swimming pools. *Nigde University Journal of Physical Education and Sport Sciences*, 2(1), 9-22.
18. Fenner P, Leahy S, Buhk A, Dawes P. Prevention of drowning: Visual scanning and attention span in lifeguards. *The Journal of occupational Health and Safety-Australia and New Zeland* 1999; 15(1), s.61-66.
19. Page, J., Bates, V., Long, G., Dawes, P., & Tipton, M. (2011). Beach lifeguards: visual search patterns, detection rates and the influence of experience. *Ophthalmic and Physiological Optics*, 31(3), 216-224.
20. Szpilman, D., Doyle, B., Smith, J., Griffiths, R., & Tipton, M. (2018). Challenges and feasibility of applying reasoning and decision making for a lifeguard undertaking a rescue. *International Journal of Emergency Mental Health and Human Resilience*, 19(4), 1-9.
21. Koon, W. A., Gates, R. M., & Futoran, J. (2020). Training evaluation for introductory ocean lifeguard instruction: a practical example from california, *International Journal of Aquatic Research and Education* 12(2): 1 - 69.
22. Rahimi, I., Divsalar, K., Rezvani, M., Aramoon, S.S., & Pourranjbar, M. (2016). The relationship between lifeguards' needs and their job satisfaction based on Maslow's hierarchy of needs. *Report of Health Care*. 2(2), 23- 30.

ANALYZING OF ATTITUDE LEVELS OF STUDENTS AT ELAZIG TOURISM VOCATIONAL HIGH SCHOOL TOWARDS PHYSICAL EDUCATION COURSE

Mustafa KIZILKOCA¹, Akif BOZKIR^{*2}, Hülya BİNGÖL³

ORCID:0000-0003-3636-6971-ORCID:0000-0001-9169-8333-ORCID:0000-0002-6686-2821

Corresponding author: mkizilkoca@munzur.edu.tr

1. Dr. Lecturer, Faculty of Physical Education and Sport Sciences, Munzur University, Turkey

2.Dr. Lecturer, Faculty of Physical Education and Sport Sciences, Munzur University, Turkey

3. Dr. Lecturer, Faculty of Physical Education and Sport Sciences, Inonu University, Turkey

ABSTRACT

Our study aimed to examine the attitude levels of students studying in Elazig Tourism Vocational High School towards Physical education course in terms of some variables. The target population of the study of the research consists of high school students studying in Elazig Tourism Vocational High School in 2019-2020. The sample of the research is 135 randomly selected high school students who studied at The Tourism Vocational High School in Elazig. To determine the demographic information of the subjects participating in the study, a personal information form (class, gender, education status of parents) and "Physical Education Course Attitude Scale" developed by Gullu and Güclü (2009) were used. Skewness and kurtosis tests were used to determine whether the data were normally distributed. As a result of these tests and controls, it was determined that the data of the research were parametric. Attitude levels for physical education courses are not statistically significant for the students studying at Elazig Tourism Vocational High School according to the gender and education status of parents variables. According to the class variable, attitude levels towards physical education courses were found to be statistically significant. According to the study findings, it is observed that the attitude level scores of students studying at Elazig Tourism Vocational High School for physical education are higher than the average with an average of 113.82.

KEYWORDS: Sports, Physical Education, Tourism, Student.

INTRODUCTION

The sport has gone through intense stages to become what it is today. The sport has been with us in almost every part of our lives since the existence of humans. However, the first people could not name it. The sport has gained differences in difficult-to-explain dimensions from the past to the present when we look at it. The primitive people were not in the process of staying in the mind or playing a sport in the sense of competition. The purpose of the first primitive people was to fulfill the requirements of vital functions⁹. Physical education is called regular and theoretical studies to ensure one's physical and physical development, to be prepared for the conditions of daily life and work-life, and to strengthen the sense of national consciousness and citizenship⁷. Physical education and sports, which are of great importance in general education, are the purpose of children's physical activities, helping to maximize their capacity to move by providing education to each student, while at the same time contributing to maximizing their physical, mental, social and emotional development. In this context, physical education; The school was made for fun participation in physical activities and student development, knowledge, attitudes, motor, and behavioral skills in physical education programs and is an active lifestyle that includes physical continuity⁴. For physical education to take place, three main learns to need to come together. These are teachers, students and the program can be run in order. The teacher's selfless approach will trigger the student, and the education plan, which is processed in a certain order, will have an impact on the students. Attitude is defined as the attitude of the individual towards the object, person, or events in which he or she is involved. It can be said that the attitudes of the students towards physical education and sports course are directly related to the teacher and the order of the course from this definition¹. In today's education system, recreation departments in physical education and sports colleges and sports science faculties are seen to have more job opportunities in the provinces where tourism activities are intense. This suggests that the tourism sector is linked to the sports sector. Our study aimed to examine the attitudes of students studying at Elazig tourism vocational high school for physical education since it is thought that the students discovered in physical education and sports courses will be future sports scientists, athletes, and instructors.

METHODOLOGY

The target population of the study of the research consists of high school students studying in Elazig Tourism Vocational High School in 2019-2020. The sample of the research is 135 randomly selected high school students who studied at The Tourism Vocational High School in Elazig. To determine the demographic information of the subjects participating in the study, a personal information form (class, gender, education status of parents) and "Physical Education Course Attitude Scale" developed by Gullu and Güclü (2009) were used³. Physical Education Course Attitude Scale is made up of a total of 35 questions, including 11 negative and 24 positives. The scale is one-dimensional and the Cronbach Alpha value is 0.94 and the reliability coefficient is 0.80. The scale is in the 5-point Likert type, and the rating is "Totally Agree (5), Agree (4), Undecided (3), Disagree (2), Absolutely Disagree (1)". The lowest score is 35 and the highest score is 175 from a scale of 35 items, including 11 negative articles (articles 3, 17, 19, 20, 24, 25, 26, 29, 30, 34, 35) and 24 positive articles.

Analysis of Data

SPSS 22.0 statistical program was used to analyze the data in the research and calculate the results found. Frequency (f) and percentage (%) of variables distributions are calculated. Skewness and kurtosis tests were used to determine whether the data were normally distributed. As a result of these tests and controls, it was determined that the data of the research were parametric. Therefore, t-test and variance analysis (ANOVA) test were used. Tukey test results were used to determine which groups the difference was between in the results that differed significantly. The error level in the study was taken as $p < 0.05$.

RESULTS

In this section, the findings of the variables of the study are included. The findings showing the distribution of high school students who studied at Tourism Vocational High School in Elazığ, which participated in our research, were examined and interpreted.

Table 1: Distribution Table of Demographics

Variables		Groups	N	%
Class		9th grade	61	45,2
		11th grade	30	22,2
		12th grade	44	32,6
		Total	135	100,0
Gender		Female	58	43,0
		Male	77	57,0
		Total	135	100,0
Mother Status	Education	Primary school	79	58,5
		Secondary school	38	28,1
		High school	18	13,3
		Total	135	100,0
Father Status	Education	Primary school	45	33,3
		Secondary school	37	27,4
		High school	53	39,3
		Total	135	100,0

When the demographic distribution table of the students was examined in Table 1, the distribution of the subjects participating in the study towards class variables was examined and it was observed that 9th graders participated with 45.2% ($n=61$), 11th graders 22.2% ($n=30$) and 12th graders with 32.6% ($n=44$). It was observed that 57% ($n=77$) were male and 43% ($n=58$) were female students when the gender distributions of the participants in the study were examined. When the distribution of the educational status of the mothers of the participants was examined, it was determined that those at primary school level were 58.5% ($n=79$), those at secondary school level were 28.1% ($n=38$) and those at high school level were 13.3% ($n=18$). When the distribution of the educational status of the fathers of the participants was examined, it was found that those at primary school level were 33.3% ($n=45$), those at secondary school level were 27.4% ($n=37$) and those at high school level were 39.3% ($n=53$).

Table 2: Anova test results based on class groups variable of subjects participating in the study

	Class	N	X	Ss	F	p	Tukey
Physical Education Course	9th Grade ^A	61	118,6557	21,77758	4,910	,009	A-B
	11th Grade ^B	30	102,7667	25,53386			
	12th Grade ^C	44	114,6591	22,35854			
Total		135	113,8222	23,49686			

It was determined that there was a statistically significant difference between 9th graders and 11th graders when the physical education course attitude levels and class groups of the participants were examined ($p < 0.05$) when table 2 was examined.

Table 3: T test results based on gender groups variable of subjects participating in the study

	Gender	N	X	Ss	t	p
Physical Education Course Attitude Scale	Female	58	111,5345	22,33651	-,982	,328
	Male	77	115,5455	24,33621		

It was determined that there was no statistically significant difference between the attitude levels of the participants and the gender groups variable ($p > 0.05$) when table 3 was examined.

Table 4: T test results according to the Mother education status groups variable of the subjects participating in the study

	Mother Education	N	X	Ss	F	p
Physical Education	Primary school	79	115,3924	23,99595	,468	,627
Course	Secondary school	38	110,9474	19,93225		
Attitude Scale	High school	18	113,0000	28,54099		
	Total	135	113,8222	23,49686		

It was determined that there was no statistically significant difference between the attitude levels of the participants and the Mother education status variable ($p>0.05$) when table 4 was examined.

Table 5: T test results according to the father education status groups variable of the subjects participating in the study

	Father Education	N	X	Ss	F	p
Physical Education	Primary school	45	109,4667	26,00140	1,230	,296
Course	Secondary school	37	114,9189	17,72847		
Attitude Scale	High school	53	116,7547	24,63808		
	Total	135	113,8222	23,49686		

It was determined that there was no statistically significant difference between the attitude levels of the physical education course and the father education status variable ($p>0.05$) when table 5 was examined.

DISCUSSION

The findings of the students who studied at Elazığ Tourism Vocational High School and participated in the study were discussed and interpreted as to if their attitude level towards physical education and sports course varied according to some variables in this part of our study. When the demographic distribution table of the students was examined in Table 1, the distribution of the subjects participating in the study towards class variables was examined and it was observed that 9th graders participated with 45.2% ($n=61$), 11th graders 22.2% ($n=30$) and 12th graders with 32.6% ($n=44$). It was observed that 57% ($n=77$) were male and 43% ($n=58$) were female students when the gender distributions of the participants in the study were examined. When the distribution of the educational status of the mothers of the participants was examined, it was determined that those at primary school level were 58.5% ($n=79$), those at secondary school level were 28.1% ($n=38$) and those at high school level were 13.3% ($n=18$). When the distribution of the educational status of the fathers of the participants was examined, it was found that those at primary school level were 33.3% ($n=45$), those at secondary school level were 27.4% ($n=37$) and those at high school level were 39.3% ($n=53$). It was determined that there was a statistically significant difference between 9th graders and 11th graders when the physical education course attitude levels and class groups of the participants in the study were examined. The difference between other groups is not statistically significant. Yıldız said that there was a statistical difference between class levels in his study¹². Tasdemir mentioned that attitude levels also make a statistically significant difference as the class level increases in graduate studies⁸. It is seen that as the grade level increases, the attitude score towards physical education and sports lessons decreases when the attitude scores in our study are examined. It can be said that the attitude levels towards physical education and sports class are therefore low as students in the upper classes approach the exam period and their exam motivation levels are high. It was determined that there was no statistically significant difference between the attitude levels of the physical education course and the gender groups variable of the participants who participated in the study. It is seen that male students have higher attitude levels than female students when looking at physical education course attitude scores. Keskin, Yanık and Camlıyer did not find any statistically significant difference between male students and female students in their studies on student attitude towards physical education course^{6,10}. It can be said that such an outcome is because people's view of sports is equal because of the equality of men and women in our country. It was determined that there was no statistically significant difference between the attitude levels of the physical education course and the Mother education status variable of the participants in the study. Filiz stated that there is a statistically significant difference between the education status of the mother and the attitude towards physical education lesson in her study². Kaya Saridere found that there is no statistically significant difference between Mother education level and physical education course attitude levels in his study⁵. It was determined that there was no statistically significant difference between the attitude levels of the physical education course and the father education status variable of the participants who participated in the study. It is observed that as the educational level of the father increases, his attitude scores towards physical education lessons also increase. Yıldız has achieved results that support our work in the study¹¹. It can be said that as the education level of the family increases, the importance and perspective of sports are also positive. As a result; Students studying at Elazığ Tourism Vocational High School; attitude levels for physical education courses are not statistically significant according to gender and, education status of parents variables. It was determined that the attitude levels towards physical education lessons were statistically significant according to the class variable.

CONCLUSION

According to the study findings, it is observed that the attitude level scores of students studying at Elazığ Tourism Vocational High School for physical education are higher than the average with an average of 113.82. It is said that the participation of our children and youth in physical education and physical activities is very important in terms of health and development. Physical

education and sports lessons, which are compulsory courses in the curriculum of education, are undoubtedly known as the place where physical activity begins. Since it is considered important to have a more efficient and healthier generation, it was considered that the attitudes of the students towards physical education course should be examined and as a result of the study, it is thought that it will contribute to the relevant ministry, sports scientists, psychologists, and instructors.

REFERENCES

1. Cengiz, O., Kılıç, M. A., and Soylu, Y. (2018). Examining The Attitudes of Secondary School Students towards Physical Education Course. *Journal of the Academy of Social Sciences*, 1(2), 141-149.
2. Filiz, M. A. (2018). Examining the Relationship Between Attitudes of Middle School-Aged Children towards Physical Education and Sports Course and School Connection Levels. Unpublished master's thesis. Marmara University, Institute of Educational Sciences, Istanbul.
3. Gullu, M., and Guclu, M. (2009). Ortaöğretim öğrencileri için beden eğitimi dersi tutum ölçeği geliştirilmesi. *Beden Eğitimi ve Spor Bilimleri Dergisi*, 3(2), 138-151.
4. Kangalgil, M., Hunuk, D., and Demirhan, G. (2006). Comparison of Attitudes of Primary, High School and University Students on Physical Education and Sports. *Journal of Sports Science*, 17(2), 48-57.
5. Kaya Sarıdede, S. (2018). Examining The Attitudes of Secondary School Students to Physical Education Course. Unpublished master's thesis. Istanbul Development University, Institute of Health Sciences, Istanbul.
6. Keskin, O. (2015). Examining Secondary School Students' Attitudes towards Physical Education Course according to Some Variables (Sakarya province example. Unpublished Master's Thesis. Sakarya University, Institute of Educational Sciences, Sakarya.
7. Özdemir, M., Tanır, H., İlkin, M., and Seker, T. (2018). Sports injuries in 15-17 year-old male athlete students participating on school teams. *Türk Spor ve Egzersiz Dergisi*, 20(2), 44-48.
8. Tasdemir, N. (2019). Examining Students' Attitudes towards Physical Education and Sports Course in Terms of Various Variables (Example of Agri, Hamur). Master's Thesis. Agri Ibrahim Cecen University/ Agri, TURKEY.
9. Tutar, O.F., Nacar, E., and Gacar, A. (2020). Examining The Levels of Alienation of Execution Protection Officers in Sport. *Munzur University Journal of Social Sciences (MÜSBİD)*, 9(1), 68-78.
10. Yanık, M. and Camlıyer, H. (2015). Determination of the relationship between the attitudes of secondary 9th graders regarding physical education and sports and the levels of alienation to school. *International Journal of Sports, Exercise and Training Science*, 1 (1), 9-19.
11. Yıldız, E. (2018). Examining The Attitudes of Secondary School Students towards Physical Education and Sports Course (Bala County Example). Unpublished master's thesis. Gazi University, Institute of Educational Sciences, Ankara.
12. Yıldız, O. (2010). Attitudes of Classroom Teachers towards Physical Education Course and The Problems They Face. Ph.D. Thesis. Gazi University, Ankara.

MINDFULNESS AND PHYSICAL ACTIVITY: PSYCHOMETRIC PROPERTIES OF THE STATE MINDFULNESS SCALE FOR PHYSICAL ACTIVITY

NAZMI BAYKOSE^{*1}, CAGRI ARI², GIZEM CEYLAN²

1. Faculty of Sport Science , Akdeniz University, Antalya, Konyaaltı – 07070, Turkey.
 2. Faculty of Sport Science , Mus Alparslan University, Mus, Center – 49250, Turkey
- Corresponding author : nazmibaykose@gmail.com

ABSTRACT

This study aims to test the validity and reliability of the Turkish version of the "State Mindfulness Scale for Physical Activity" developed by Cox, Ullrich-French, and French¹. The research group consists of individuals who study in dance courses in the Çankaya district of Ankara. A total of 217 individuals, 53.5% female (n=116), 46.5% male (n=101), participated in the study voluntarily. The average age of the individuals participating in the study was determined as 31.42±8.93. In addition, the participants stated that they had continued their dance activities for an average of 4.60±5.14 years. Data obtained from the research; a) "Personal Information Form" prepared by the researchers, b) "State Mindfulness Scale for Physical Activity" developed by Cox, Ullrich-French and French¹, and c) Lau et al.² and adapted to Turkish by Sahin and Kokdemir³ using the "Toronto Mindfulness Scale." The validity of the mindfulness scale for physical activity was examined by confirmatory factor analysis and concurrent validity. The findings showed that the Turkish adaptation of the state mindfulness scale for physical activity had good psychometric properties to determine physical activity participants' state mindfulness.

KEYWORDS: Mindfulness, Physical activity, State mindfulness

INTRODUCTION

Participation in regular physical activity contributes significantly to individuals' mental and physical health⁴. Studies indicate that regular participation in physical activity is beneficial for health and obesity prevention^{5,6}. PA refers to any body movement produced by body muscles that cause energy expenditure⁷. For this reason, PA includes exercise, sports, and physical activities performed as a part of daily life, occupation, leisure time, and active transportation⁸. When individuals choose to be active for autonomous reasons or of their own will, they tend to participate in physical activity much more intensively, for a much more extended period and frequency^{9, 10, 11}. In self-determination theory, autonomous forms of motivation are defined (intrinsic and extrinsic). Accordingly, it is stated that the best indicator of a long-term commitment to physical activity behavior is intrinsic motivation¹². Self-determination is defined as the determination of behaviors by the individual's personal beliefs and value judgments rather than external factors (society norms, group pressure, etc.), and making decisions on his own¹³. In other words, individuals experience the feeling of choice in initiating and regulating their behavior¹⁴. When examined within the scope of physical activity, it can be said that intrinsic motivation stands out¹⁵. Self-determination theory represents the basis of intrinsic motivation and internalization¹⁶. To put it more clearly, the theory; explain the relationship between personality, human motivation and optimal functioning. The theory that constitutes two basic types of motivation, intrinsic and extrinsic, reveals how our behavior is shaped and who we are¹⁰. Extrinsic motivation according to theorists; is a force that promotes behavior through external sources, these resources are the respect and appreciation of others, rewards and praise. Internal motivation is; It is the inner impulses (innate-impulses) that make our behavior arise, such as our core values, interests, and personal morals. These pushers relate to feelings of satisfaction, pleasure, competence, and persistent desire for activity¹⁷. Internally motivated people regulate their behavior, participate in activities that are uninteresting to others, and act with a sense of volunteering without external rewards or constraints¹⁷. To be more clear, people who are intrinsically motivated participate in activities for their well-being, and this behavior is inherently rewarding for them¹⁸. When an individual is intrinsically motivated, he or she has positive feelings associated with physical activity. This experience drives them to be active internally. All sources of inner pleasure that arise in the process of physical activity include internal processes that have rewarding properties due to the nature of the physical activity. Dealing with negative emotions, fat or weight loss, image change or similar exercise to increase psychological and mental fitness. Although these are common motivational processes, they are weak determinants of long-term life^{10, 15}. Mindfulness is one of the most studied concepts in recent years^{19, 20, 21, 22, 23}. Mindfulness has been frequently studied by researchers working in the field of sports psychology because it attracts attention and is the subject of research in many areas of psychology^{24, 25, 26, 27, 28, 29, 30, 31}. Mindfulness is defined as "carelessness, curiosity, acceptance, neutrality elements and awareness of the current situation"^{32, 33}. A normal person spends 90% of his day on autopilot. What does that mean? This means: We do 90% of our behaviors without thinking. For example, what do we think while buttoning your shirt button in the morning? we probably wouldn't think about how to button it. Or maybe we don't think at what angle we should bring the fork to our mouth. This is consciousness that we are not aware of. This state of consciousness is the state of all of us when we are awake which is normal³⁴. Accordingly, mindfulness reflects the awareness of various stimuli, including mental states (thoughts and emotions, etc.), physical excitement in the body, and the environment. However, it differs from the focus of attention due to a lack of judgment and openness. Therefore, if attention directs a stimulus to judgment and criticism, it cannot be said to represent mindfulness³⁵. Conscious awareness is a natural feature found in everyone. However, our living conditions, the hustle and bustle of the day and our high-stress level have dulled this ability. This state of consciousness that we are not aware of is called Mindlessness. And this state of consciousness, so to speak, is like looking out through a dirty window. In mindfulness, your

consciousness is clear as a cloudless sky. For example; We can say that the inspiration for an artist comes during conscious awareness. There is no need for inspiration either while listening to music or playing an instrument, abstracting from the concept of time and space and just experiencing the song is also conscious awareness. The state of wakefulness in meditation is also the state of consciousness in which the right side of the brain that does not think analytically, perceives the whole, generally emotional and makes us work more actively³⁴. Over the years, it has been observed that mindfulness has been treated and measured as an instant experiential state (state) that occurs during mental exercises or as an even more established personality trait (trait)³⁶. When the literature is examined, it is seen that there are many studies on state mindfulness, but little study of state mindfulness has been done in the context of physical activity^{37, 38, 39, 40}. State mindfulness of physical and mental events is an important mechanism that supports positive psychological experiences during physical activity and contributes to long-term behavioral change by developing the internal causes necessary for physical activity. Accordingly, a measurement tool is needed to test this structure in the context of physical activity. Despite the increase in the number of measurement tools introduced into the Turkish literature in the field of sports psychology in recent years very few awareness measurement tools have been developed/adapted^{41, 42, 43, 44}. In this context, the adaptation of the "State Mindfulness Scale for Physical Activity," which assessed state mindfulness, into Turkish culture constitutes this study's primary purpose.

MATERIALS AND METHODS

Research group

The research group consists of individuals studying dance courses in the Çankaya district of Ankara. A total of 217 individuals, 53.5% female (n = 116) and 46.5% male (n = 101), participated in the study voluntarily. The average age of the individuals participating in the study was determined as 31.42 ± 8.93 . The participants also stated that they had continued their dance activities for an average of 4.60 ± 5.14 years. In determining the research group, the easily accessible situation sampling method, which is one of the purposeful sampling methods, was used⁴⁵.

Data collection

All participants voluntarily filled in the scales in a physical activity environment. After completing the given scales, the participants were given a short explanation about the research they participated in and were directed to the researcher for detailed information. The same scale was applied to some participants (n = 72) participating in the study after 21 days for test-retest reliability.

Data collection tools

Data obtained by using a) "Personal Information Form" b) "State Mindfulness Scale for Physical Activity" c) "Toronto Mindfulness Scale." *Demographic Information Form*: The "Demographic Information Form" prepared by the researchers was created to provide data about the demographic characteristics (age, gender, exercise type, and exercise experience) of the individuals participating in the study. *State Mindfulness Scale for Physical Activity*: State Mindfulness Scale for Physical Activity, developed by Cox, Ullrich-French and French¹ consists of a total of 12 items: the mind sub-dimension (6 items) and the body sub-dimension (6 items). The measuring tool is graded in a 4-point Likert type ranging from 0 (none) to 4 (many). When the results regarding the internal consistency reliability of the scale were examined, it was seen that the mind sub-dimension was .90 and the body sub-dimension was .93. The total internal consistency coefficient of the scale is .90. It can be said that the scale has good fit indices for the two-factor model ($\chi^2(42)=185,35$, $p < .05$, SRMR=.05, CFI=.96, TLI=.94, WRMR=1.15). *Toronto Mindfulness Inventory*: Toronto Mindfulness Inventory was developed by Lau et al.² to determine the level of individuals' ability to concentrate without being affected by the thoughts in their minds. Its Turkish adaptation study was conducted by Şahin and Yeniceri³ Toronto Mindfulness Scale is a 5-point Likert-type scale. Consisting of 13 items, the scale is seen to have a 2-dimensional structure, namely "Monitoring without Affection" and "Approach with Curiosity." The Cronbach's Alpha internal consistency coefficient of the scale was 0,85 in the "Approach with Curiosity" sub-dimension and 91 in the "Monitoring Without Affection" sub-dimension.

Translation study

To adapt the Physical Activity Mindfulness Scale into Turkish, permission was asked from the responsible authors. The items in the original of the scale were first translated into Turkish by the researchers, then by experts trained in Physical Education and Sports (3) and English Language (3) by the translation-back translation method⁴⁶. Experts performed their translations independently from each other. The form obtained after the translation was made ready to be applied in line with the opinions of experts trained in the field of Turkish Education (2).

Data analysis

The validity of the mindfulness scale for state physical activity was examined by confirmatory factor analysis and concurrent validity. Pearson Correlation analysis was conducted to examine the relationships between the sub-dimensions of the other scales (Mindfulness Scale, Toronto Mindfulness Scale) and the sub-dimensions of the mindfulness scale for state physical activity to test the validity of the mindfulness scale for state physical activity. The Cronbach alpha coefficient was calculated to obtain information about the reliability of the scale. Firstly, to determine the appropriate analysis method, it was estimated whether the data set conformed to the multivariate normality assumption. In line with this information, two different analysis programs, SPSS and AMOS package programs, were used to analyze the data.

FINDINGS

Findings Related to the validity of the scale

Construct validity**Exploratory factor analysis (EFA)**

EFA and CFA were performed to ensure the scale's construct validity. The results of Kaiser-Meyer-Olkin (KMO = 0.828) and Bartlett's test of sphericity ($p < 0.000$) were examined to test the suitability of the data set for factor analysis before exploratory and confirmatory factor analysis, and it was found that the sample was large enough and suitable for factor analysis. For factor analysis, KMO coefficient is expected to be higher than 80; However, the KMO value above 60 is considered sufficient⁴⁶. According to the EFA results, it was determined that the scale has a two-factor structure, explaining 58.33% of the total variance. While the factor loading values of the items in the first factor varied between .512 and .856, the load values for the items in the second factor were between 0,583 and 0,813 (Table 1).

Table 1: Factor loading values of the physical activity mindfulness scale

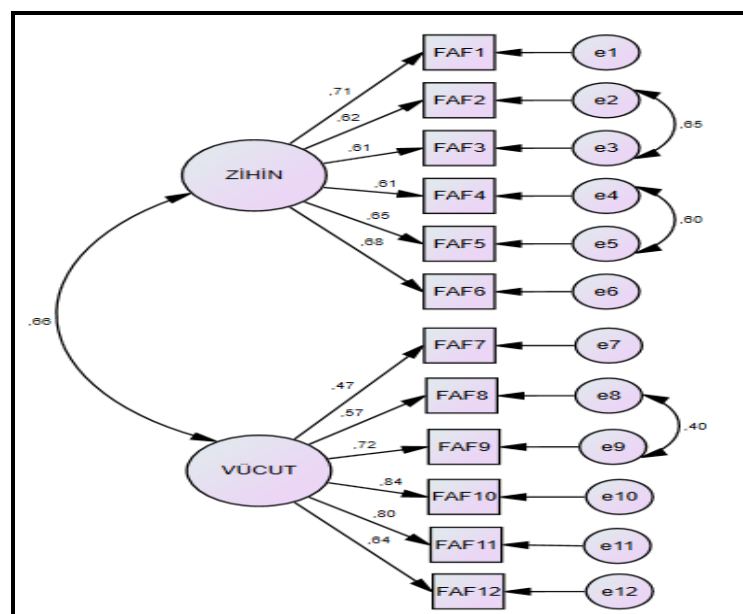
Items	Factor Loading
Mind Factor	
Item 1	.512
Item 2	.754
Item 3	.749
Item 4	.811
Item 5	.856
Item 6	.626
Body Factor	
Item 7	.583
Item 8	.706
Item 9	.778
Item 10	.813
Item 11	.726
Item 12	.744
Total Variance (%)	58.33

Confirmatory factor analysis (CFA)

The compatibility of the scale's factor structure with the original form was tested using CFA. For this, χ^2 , χ^2 / df , NFI, NNFI, CFI, AGFI, GFI and RMSEA fit indices were examined. Since the first findings of the confirmatory factor analysis of the scale ($\chi^2 = 110.358$; $\chi^2 / df = 2.207$; NFI = .915; NNFI = .935; CFI = .951; AGFI = .729; GFI = .816; RMSEA = .146) were not found valid. Therefore, the items' modification indexes (e2-e3; e4-e5; e8-e9) with high error covariances of the model were made, and the model was tested again. Values after correction; $\chi^2 = 110.358$; $\chi^2 / df = 2.207$; NFI = .915; NNFI = .935; CFI = .951; AGFI = .729; GFI = .816; RMSEA = .146 (Table 2). According to the results of the confirmatory factor analysis, it can be said that the model has a good fit in the two-factor structure.

Table 2: Fit indexes for confirmatory factor analysis

	χ^2	χ^2/df	NFI	NNFI	CFI	AGFI	GFI	RMSEA
Before modification	297.012	5.604	.771	.753	.801	.729	.816	.146
After modification	110.358	2.207	.915	.935	.951	.877	.921	.075

**Figure 1: Physical Activity Mindfulness Scale Measurement Model**

Concurrent validity

Concurrent validity is based on the principle of examining the relationship between the total scores obtained from the measuring tool and the total scores obtained from another measuring tool that measures the same feature or features that have been previously developed and proven to be valid^{48, 49}. In this context, correlation values between the sub-dimensions of the State Mindfulness Scale for Physical Activity and the Toronto Mindfulness Scale were examined.

Table 3: Correlations between the study variables

Toronto Mindfulness Scale		Monitoring without affection (Şahin and Yeniçeri, 2015) 2	Approach with Curiosity (Şahin and Yeniçeri, 2015)
Mindfulness Scale for Mind	physical activity	r: ,211** p: ,002	r: ,191** p: ,002
	Body	r: ,197** p: ,004	r: ,197** p: ,004

Subscales are correlated at the level of significance by 0,01 (Table 3).

Findings related to the reliability of the scale

Reliability is expressed as "the degree to which a test or scale measures what it wants to measure consistently and consistently." Similar results are expected when a reliable measuring tool is reapplied under similar conditions. The more reliable the measurement tool is, the more reliable it is in the data obtained⁵⁰. In this study, item-total test correlation and Cronbach's alpha internal consistency coefficient were calculated to determine the scale's reliability. According to the internal consistency analysis results about the reliability of the Physical Activity Mindfulness Scale, the internal consistency coefficient of the whole scale was found to be 0,87, 0,84 for the mind sub-dimension, and 0,84 for the Physical sub-dimension (Table 3). The item-total score correlation in the mind sub-dimension of the Physical Activity Mindfulness Scale was between .53 and .71, while it was between .46 and .72 in the body sub-dimension (Table 4-5).

Table 4: Internal consistency coefficient for SMS-PA
Cronbach's α

Mind Subdimension	,84
Body Subdimension	,84
Total	,87

Table 5: Item Analysis of mind subdimension

Items	a	b	c	d
S1	13,53	24,389	,535	,842
S2	14,08	21,580	,669	,817
S3	14,26	21,141	,653	,820
S4	14,13	20,907	,666	,817
S5	14,20	20,477	,718	,807
S6	14,17	22,247	,559	,838

*a= Mean If item deleted, b= Variance if item deleted, c= Item-total correlations, d=Cronbach's Alpha if item deleted

Table 6. Item Analysis of Body Subdimension

Items	a*	b	c	d
S7	15,84	17,861	,462	,848
S8	16,18	14,922	,600	,826
S9	16,29	14,209	,719	,801
S10	16,14	14,595	,725	,800
S11	16,28	14,481	,664	,812
S12	16,22	15,527	,595	,826

*a= Mean If item deleted, b= Variance if item deleted, c= Item-total correlations, d=Cronbach's Alpha if item deleted

Table 7. Test-Retest Analysis

State Mindfulness Scale for Physical Activity	
Test-retest analysis	r: 0,86 p: ,000 n:72

As a result of the correlation analysis conducted in the context of test-retest reliability, the state mindfulness scale scores for physical activity did not change in time (Table 7).

DISCUSSION

In this study, it was aimed to test the Turkish validity and reliability of the "State Mindfulness Scale for Physical Activity" developed by Cox, Ullrich-French and French¹. Accordingly, a total of 217 individuals, 116 female (53.5%) and 101 male (46.5%), voluntarily participated in the study. The average age of the individuals included in the study was found to be 31.42 ± 8.93 . Also, it has been determined that the individuals participating in the research have continued their dance activities for a mean of 4.60 ± 5.14 years. For factor analysis, KMO coefficient is expected to be higher than .80; however, the KMO value above .60 is considered sufficient⁴⁶. Accordingly, it can be said that the KMO value of 0.828 obtained within the scope of our research is within acceptable limits. According to the EFA results, it was determined that the scale has a two-factor structure, explaining 58.33% of the total variance. While the factor loading values of the items in the first factor varied between .512- .856, the load values for the items in the second factor ranged between .583 and .813. In fit indices, 0-0.05 range of RMSEA and SRMR values are a good fit, 0.05-0.10 acceptable fit; NNFI and CFI values 0.97-1.00 good fit, 0.95-0.97 acceptable fits; The range of 0.95-1.00 for NFI and GFI values indicates a good fit and 0.90-0.95 an acceptable fit⁵¹. Based on this information, it can be said that fit indices fit well^{52, 53, 54}. When the correlation values between the sub-dimensions of the State Mindfulness Scale for Physical Activity and the sub-dimensions of the Toronto Mindfulness Scale are examined, it is seen that the relationships are significant at the .01 level. The correlational results obtained in the studies conducted by Tanay and Bernstein⁵⁵ and Cox, Ullrich-French, and French¹ are in line with the findings obtained in our study. The findings showed that the Turkish culture adaptation of the state mindfulness scale for physical activity had sufficient psychometric properties to determine the state conscious awareness of physical activity participants. The findings obtained in the study showed that the state mindfulness scale for physical activity is valid and reliable in Turkish individuals who are participating in physical activity. In future research, the examination of measurement invariance will provide additional information on Turkish culture use.

CONCLUSION

Based on the research results, it is concluded that mindfulness techniques are suitable for improving performance

Note

This research was presented at the 16th international sports science congress. We thought to add this when it will be published.

References

1. Cox, A. E., Ullrich-French, S., & French, B. F. (2016). Validity evidence for the state mindfulness scale for physical activity. *Measurement in Physical Education and Exercise Science*, 20(1), 38-49. DOI: <https://doi.org/10.1080/1091367X.2015.1089404>
2. Lau, M., Bishop, S., Segal, Z., Buis, T., Anderson, N., Carlson, L., Shapiro, S.L., Carmody, J., Abbey, S. & Gerald, D. (2006). The Toronto Mindfulness Scale: development and validation. *Journal of Clinical Psychology*, 62(12): 1445-1467. DOI: <https://doi.org/10.1002/jclp.20326>
3. Sahin, N. H. & Yeniceri, Z. (2015) Three tools on "Awareness": Psychological Consciousness Scale, Integrative Self Awareness Scale and Toronto Wisdom Awareness Scale ", *Turkish Journal of Psychology*, 30(76): 48-64.
4. Paluska, S. A., & Schwenk, T. L. (2000). Physical activity and mental health: current concepts. *Sports medicine*, 29(3), 167-180. DOI: <https://doi.org/10.2165/00007256-200029030-00003>
5. Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current opinion in psychiatry*, 18(2), 189-193. DOI: <https://doi.org/10.1097/00001504-200503000-00013>
6. Zschucke, E., Gaudlitz, K., & Ströhle, A. (2013). Exercise and physical activity in mental disorders: clinical and experimental evidence. *Journal of Preventive Medicine and Public Health*, 46(Suppl 1), 12-21. DOI: <https://doi.org/10.3961/jpmph.2013.46.s.s12>
7. Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public health rep*, 100(2), 126-131.
8. Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I. M., ... & Swain, D. P. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc*, 43, 1334-1359. DOI: <https://doi.org/10.1249 / MSS.0b013e318213fefb>
9. Duncan, L. R., Hall, C. R., Wilson, P. M., & Jemmy, O. (2010). Exercise motivation: a cross-sectional analysis examining its relationships with frequency, intensity, and duration of exercise. *International Journal of Behavioral Nutrition and Physical Activity*, 7(1), 7. <https://doi.org/10.1186/1479-5868-7-7>
10. Ryan, R. M., & Deci, E. L. (2008). A self-determination theory approach to psychotherapy: The motivational basis for effective change. *Canadian Psychology/Psychologie canadienne*, 49(3), 186. <https://doi.org/10.1037/a0012753>
11. Wilson, P. M., Rodgers, W. M., Fraser, S. N., & Murray, T. C. (2004). Relationships between exercise regulations and motivational consequences in university students. *Research quarterly for exercise and sport*, 75(1), 81-91. <https://doi.org/10.1080/02701367.2004.10609136>
12. Deci, E. & Ryan, R. (2000). The "what" and "why" of goal pursuits: human needs and the self determination of behaviour. *Psychological Inquiry*, 11(4), 227-269. DOI: https://doi.org/10.1207/S15327965PLI1104_01
13. Budak, S. (2000). Psikoloji Sözlüğü. Ankara: Bilim ve Sanat Yayınları
14. Deci, E., Connell, J. & Ryan, R. (1989). Selfdetermination in a work organization. *Journal of Applied Psychology*, 74 (4), 580-590. DOI: <https://psycnet.apa.org/doi/10.1037/0021-9010.74.4.580>

15. Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: a systematic review. *International journal of behavioral nutrition and physical activity*, 9(1), 78. <https://doi.org/10.1186/1479-5868-9-78>
16. Ryan, R. M., & Deci, E. L. (2019). Brick by brick: The origins, development, and future of self-determination theory. In *Advances in motivation science* (Vol. 6, pp. 111-156). Elsevier.
17. Deci, E. L., & Ryan, R. M. (1985). Conceptualizations of intrinsic motivation and self-determination. In *Intrinsic motivation and self-determination in human behavior* (pp. 11-40). Springer, Boston, MA.
18. Deci E. L. & Ryan R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation*. Vol. 38 Perspectives on motivation (pp. 237-288). Lincoln: university of Nebraska Press
19. Guendelman, S., Medeiros, S., & Rampes, H. (2017). Mindfulness and emotion regulation: Insights from neurobiological, psychological, and clinical studies. *Frontiers in Psychology*, 8, 220. DOI: <https://doi.org/10.3389/fpsyg.2017.00220>
20. Li, W., Howard, M. O., Garland, E. L., McGovern, P., & Lazar, M. (2017). Mindfulness treatment for substance misuse: A systematic review and meta-analysis. *Journal of Substance Abuse Treatment*, 75, 62-96. DOI: <https://doi.org/10.1016/j.jsat.2017.01.008>
21. Lindsay, E. K., & Creswell, J. D. (2017). Mechanisms of mindfulness training: Monitor and Acceptance Theory (MAT). *Clinical Psychology Review*, 51, 48-59. DOI: <https://doi.org/10.1016/j.cpr.2016.10.011>
22. Goldberg, S. B., Tucker, R. P., Greene, P. A., Davidson, R. J., Wampold, B. E., Kearney, D. J., & Simpson, T. L. (2018). Mindfulness-based interventions for psychiatric disorders: A systematic review and meta-analysis. *Clinical psychology review*, 59, 52-60. DOI: <https://doi.org/10.1016/j.cpr.2017.10.011>
23. Bostock, S., Crosswell, A. D., Prather, A. A., & Steptoe, A. (2019). Mindfulness on-the-go: Effects of a mindfulness meditation app on work stress and well-being. *Journal of occupational health psychology*, 24(1), 127-138. DOI: <https://doi.org/10.1037/ocp0000118>
24. Bernier, M., Thienot, E., Codron, R., & Fournier, J. F. (2009). Mindfulness and acceptance approaches in sport performance. *Journal of clinical sport psychology*, 3(4), 320-333. DOI: <https://doi.org/10.1123/jcsp.3.4.320>
25. Birrer, D., Röthlin, P., & Morgan, G. (2012). Mindfulness to enhance athletic performance: Theoretical considerations and possible impact mechanisms. *Mindfulness*, 3(3), 235-246. DOI: <https://doi.org/10.1007/s12671-012-0109-2>
26. Gardner, F. L., & Moore, Z. E. (2012). Mindfulness and acceptance models in sport psychology: A decade of basic and applied scientific advancements. *Canadian Psychology/Psychologie Canadienne*, 53(4), 309-318. DOI: <https://psycnet.apa.org/doi/10.1037/a0030220>
27. Blecharz, J., Luszczynska, A., Scholz, U., Schwarzer, R., Siekanska, M., & Cieslak, R. (2014). Predicting performance and performance satisfaction: Mindfulness and beliefs about the ability to deal with social barriers in sport. *Anxiety, Stress, & Coping*, 27(3), 270-287. DOI: <https://doi.org/10.1080/10615806.2013.839989>
28. Gross, M., Moore, Z. E., Gardner, F. L., Wolanin, A. T., Pess, R., & Marks, D. R. (2018). An empirical examination comparing the mindfulness-acceptance-commitment approach and psychological skills training for the mental health and sport performance of female student athletes. *International Journal of Sport and Exercise Psychology*, 16(4), 431-451. DOI: <https://doi.org/10.1080/1612197X.2016.1250802>
29. Ari, Ç., Ulun, C., Yarayan, Y. E., Dursun, M., Mutlu Bozkurt, T., & Ustun, U. D. (2020). Mindfulness, healthy life skills and life satisfaction in varsity athletes and university students. *Progress in Nutrition*, 22(2-S), e2020024. DOI: <https://doi.org/10.23751/pn.v22i2-S.10561>
30. Kurtipek, S., Gungor, N. B., Esenturk, O. K., & Tolukan, E. (2020). The mediating role of nutrition knowledge level in the effect of mindfulness on healthy nutrition obsession. *Progress in Nutrition*, 22(1-S), 138-145. DOI: <https://doi.org/10.23751/pn.v22i1-S.9807>
31. Tingaz, E. O. (2020a). The mediating role of mindfulness in the relationship between the cognitive flexibility and irrational performance beliefs of university student-athletes. *Curr Psychol*, 39, 1208-1214. DOI: <https://doi.org/10.1007/s12144-020-00891-1>
32. Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Specia, M., Velting, D., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, 11(3), 230-241. DOI: <https://psycnet.apa.org/doi/10.1093/clipsy.bph077>
33. Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4), 822-848. DOI: <https://doi.org/10.1037/0022-3514.84.4.822>
34. Kabat-Zinn, J. (2011). *Mindfulness for beginners: Reclaiming the present moment—And your life*. Boulder, CO: Sounds True.
35. Keng S. L., Smoski M. J. & Robins C. J. (2011). Effects of mindfulness on psychological health: a review of empirical studies. *Clin Psychol Rev.*, 31(6), 1041-1056. DOI: <https://dx.doi.org/10.1016/j.cpr.2011.04.006>
36. Ayalp, H. D. & Hisli Sahin, N. (2018). Turkish adaptation of the Five Facet Mindfulness Questionnaire - Short Form (FFMQ-S). *Journal of Clinical Psychology*, 2(3), 117-127. DOI: <https://doi.org/10.31828/kpd2602443807092018m000002>
37. Tuckey, M. R., Sonnentag, S., & Bryan, J. (2018). Are state mindfulness and state work engagement related during the workday?. *Work & Stress*, 32(1), 33-48. DOI: <https://doi.org/10.1080/02678373.2017.1420707>
38. Du, J., An, Y., Ding, X., Zhang, Q., & Xu, W. (2019). State mindfulness and positive emotions in daily life: An upward spiral process. *Personality and Individual Differences*, 141, 57-61. DOI: <https://doi.org/10.1016/j.paid.2018.11.037>
39. Cox, A. E., Ullrich-French, S., Cole, A. N., & D'Hondt-Taylor, M. (2016). The role of state mindfulness during yoga in predicting self-objectification and reasons for exercise. *Psychology of Sport and Exercise*, 22, 321-327. DOI: <https://doi.org/10.1016/j.psychsport.2015.10.001>
40. Cox, A.E., Ullrich-French, S. & Austin, B. (2020). Testing the Role of State Mindfulness in Facilitating Autonomous Physical Activity Motivation. *Mindfulness* 11, 1018–1027. DOI: <https://doi.org/10.1007/s12671-020-01311-y>

41. Adilogulları, I., & Gorgulu, R. (2015). Adaptation of Emotional Intelligence Inventory in Sports. *International Journal of Sport Exercise and Training Science*, 1(2), 83-94. DOI: <https://doi.org/10.18826/ijsets.05333>
42. Yarayan, Y. & İlhan, E. L. (2018). Sporda Zihinsel Antrenman Envanteri'nin (SZAE) uyarlama çalışması. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, 23(4) , 205-218.
43. Senel, E., Yıldız, M. & Baykose, N. (2019). The perceived stress reactivity scale for adolescent athletes: translation, validity and reliability study. *Turkish Journal of Sport and Exercise*, 21(2), 360-365. DOI: <https://doi.org/10.15314/tsed.492895>
44. Tıngaz, E. (2020b). Sports Mindfulness Scale: Adaptation to Turkish, validity and reliability study. *Spormeter Journal of Physical Education and Sport Sciences*, 18 (1), 71-80. DOI: <https://doi.org/10.33689/spormetre.642682>
45. Yıldırım, A. & Simsek, H. (2013). Qualitative research methods in the social sciences. 9th Edition, Ankara: Seckin Publishing.
46. Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185-216. DOI: <https://doi.org/10.1177%2F135910457000100301>
47. Alpar, R. (2014). Applied statistics and validity - reliability with examples from Sports, Health and Educational Sciences. 3rd Edition, Ankara: Detay Publishing.
48. Erkus, A., Sunbul, O., Sunbul, S. O., Yormaz, S., & Asiret, S. (2017). Psychometric properties and measurement theories of measurement and scale development-II measurement tools in psychology. Ankara: Pegem Academy Publishing.
49. Buyukozturk, Ş. (2013). Data analysis manual for social sciences. Ankara: Pegem Academy.
50. Karagoz, Y. (2016). Spss and Amos 23 Applied statistical analysis. 1st Edition, Ankara: Nobel Academic Publishing.
51. Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23-74.
52. Iacobucci, D. (2010). Structural equations modeling: fit indices, sample size, and advanced topics. *Journal of Consumer Psychology*, 20(1), 90-98. DOI: <https://doi.org/10.1016/j.jcps.2009.09.003>
53. Hu, L.T., & Bentler, P. (1998). Cutoff Criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. DOI: <https://doi.org/10.1080/10705519909540118>
54. Kline, R. B. (2015). Principles and practice of structural equation modeling (4th ed.). New York: The Guilford Press.
55. Tanay, G., & Bernstein, A. (2013). State Mindfulness Scale (SMS): Development and initial validation. *Psychological Assessment*, 25, 1286–1299. DOI: <https://psycnet.apa.org/doi/10.1037/a0034044>

CLIMATE OF AMPUTEE FOOTBALL PLAYERS IN GOAL DIRECTION

Yeşim Karaç ÖCAL¹, Turhan TOROS^{*2}

1. Yozgat Bozok University – Faculty of Sports Sciences

<https://orcid.org/0000-0003-2754-9274>, ysm74@hotmail.com

2. Department of Sports Sciences, Mersin University, Mersin, Turkey-turhantoros@yahoo.com

<https://orcid.org/0000-0002-8328-2925>**Corresponding author:** turhantoros@yahoo.com

ABSTRACT

The purpose of this research is to investigate the role of goal direction, as a result of the relation between sports participation motivation and the perceived motivational climate of amputee football players. 85 amputee football players are cast as a sample group. The average age of amputee football players in this research is 27.51 ± 8.1 years. "Motivation Scale for Sports Participation of People with Disabilities (MSSPPD)", developed by Tekkurşun and others (2018), "Perceived Motivational Climate in Sports Scale" adapted to Turkish sportspeople by Toros (2001) and "Task and Ego Orientation in Sports Scale" are used as data collection tools. "Ethics Committee Approval" and research permissions are obtained from the Ethics Committee to implement the data collection tools of amputee football players. Data and scales, which are uploaded to Google Forms online platform, are collected through scale method on internet. During the analyses of research data, whether the distribution of the scale data is normal or not is observed by the Kolmogorov-Smirnov (K-S) test, in order to find out if there is a need to execute parametric analyses at descriptive statistics of arithmetic average, frequency, standard deviation and percentages. For normally distributed paired comparison, independent t test analysis is employed. As a result of t-test made in a mastery climate, there is a meaningful statistical difference between averages of players with high task orientation and players with high ego orientation ($t=8.123$; $p<0.05$). As a consequence of t test made in performance climate, there is a meaningful statistical difference between averages of players with high task orientation and players with high ego orientation ($t= - 8.458$; $p<0.05$). In the field of sports psychology, although there are several types of research executed with regards to participation motivation and perceived motivational climate, more researches regarding people with disabilities might be considered to be executed.

Keywords: Mastery Climate, Performance Climate, Internal Motivation, External Motivation, Amotivation, Amputee Footballers.

1. INTRODUCTION

There have been several types of research conducted in sports psychology and science of training. Most of these researches are about sportspeople without disabilities.¹³⁻¹⁴ Amputee football, which is a football derivative and played by sportspeople with one leg using a forearm crutch, requires sportive performance skill and high a level of control, including a high-level of endurance, strength, flexibility, speed, rapidness and strategy. Sports participation means attracting people with disabilities, physically and mentally, towards competition and training. As researches about sports participation are examined, it is seen that they involve children and young adults more.³ There are many types of research conducted on sports participation motivation in our country.³⁻⁵ External motivation is the pleasure and attention felt by the sportspeople reaching the target (Wann, 2006). Participation motivation of amputee footballers is designated as describing the factors that lead sportspeople, who join sports and physical activity, to participate in competitions.²¹ Motivation is the total of internal and external motives that leads people to certain actions.⁴⁻¹⁴ For instance, reaching specific targets is evaluated as an important component of participation motivation.¹⁶

The approach closely related to Goal Perspective Approach is the two-factor theory of perceived motivational climate. It is asserted that the sports environment possesses two different perceived motivational climates.¹⁸⁻¹⁹ The first of these is "the mastery climate", which supports social responsibility, life-long skill development and puts forward determination. The second is "the performance climate" that facilitates focusing on the abilities and actions of the rival, and strengthens the idea of being the star and overcoming the rival. Roberts and Treasure (1995) assert that, perceived motivational climate that sportspeople are in is a significant factor that contributes to sportive goals and performances related to these. The sports environment does not only mean different attitudes of coaching and training. At the same time, trainers, coaches, families and spectators constitute such a climate through reinforcements. The performance of sportspeople is affected by this climate.

Achievement Goal Approach, emphasizes the significance of handling basic achievement goals while determining attitudes of the individual. The approach asserts that there are two main styles in reaching and achieving goals.⁴⁻¹⁴ These two goal orientations named task and ego, are related to judging skill levels of individuals. While individual skill development with task-oriented goals focuses on learning new skills, mastering in the task and hardworking; ego-oriented individual concentrates on showing off own superior ability and desires to win over the rival with less effort.⁴ Situational factors might result in prevalence of certain orientations in the individual. In this regard, besides determining which individual achievement goal orientation the individual possesses, individual's learning, skill development and evaluation environment of activities should be tackled and

examined. The motivational level, desire to participate in sports of amputee football players and their awareness of what is desired, ensure their success in sports through finding out their mastery-performance climate and possessing this climate. At the same time, the role of goal direction will determine the individual performance of the sportspeople. In light of all this information, participation motivation and perceived motivational climate in the competitions of amputee football players will come forward through goal direction. In this research, it is intended to examine the role of goal direction as a consequence of the relation between sports participation motivation and perceived motivational climate of amputee football players.

2. MATERIALS AND METHODS

This research is designed according to the descriptive survey model. The descriptive survey is a kind of information gathering method, aimed at studying the relations between categories through interrogating relevant people symbolized in a standard process.

Research Sample:

Amputee football players in Turkey constitute the sample group. 85 amputee football players are designated as a sample. The average age of amputee football players in the research is 27.51 ± 8.14 years.

Data Collection Tools:

The Motivation Scale for Sports Participation of People with Disabilities

In the research, the Motivation Scale for Sports Participation of People with Disabilities (MSSPPD), which consists of 22 items and developed by Tekkurşun and others (2018), is used as the data collection tool. The scale involves sub-dimensions of "Internal Motivation" with 12 items, "External Motivation" with 5 items and "Amotivation" with 5 items. The Cronbach's Alfa reliability coefficients obtained from Tekkurşun and others (2018) are 83 for Internal Motivation, 87 for External Motivation and 88 for Amotivation sub-dimensions.

The Perceived Motivational Climate in Sports Scale:

The Perceived Motivational Climate in Sports Scale is made up of 21 items, 9 of which are about performance climate and 12 of which are about mastery climate. Respondents of the scale are asked to judge each item according to a five-level rating system. The adaptation of the scale in Turkish sportspeople is done by .^{4,14}The construct validity in the original scale is done through the help of both exploratory and confirmatory factor analyses .⁴ In this research, it is specified that there are two factors of mastery and performance climates. Seifriz and his friends (1992), and Walling, Duda and Chi, (1993), determine the internal consistency coefficients of the scale as 73 and 84 for performance climate, 80 and 81 for mastery climate, respectively.

The Task and Ego Orientation in Sports Scale:

The Task and Ego Orientation in Sports Scale consists of 13 items, 7 of which are task-oriented and 6 of which are ego-oriented. Respondents of the scale participate in each item according to the five-level rating system. The adaptation of the scale in Turkish sportspeople is done by .⁴⁻¹⁴The construct validity of the scale is done through exploratory factor analysis and two factors are designated as task orientation and ego orientation .⁷ The internal consistency coefficient of the scale is found as 79 for task orientation and 81 for ego orientation .⁷

Data Collection Process

The Ethics Committee Approval and research permissions are provided from the Ethics Committee to be able to implement the data collection tools on amputee football players. Scales and data, uploaded to Google Forms online platform are collected in the internet environment. Consent Form, describing the purpose of the research to the sportspeople is attached to the forms and an approval box, explaining that sportspeople cannot reach surveys without giving their voluntary consent in participating in the research is added.

Data Analysis

To analyze the collected data in the research, SPSS 22.0 program is used. During the analysis of research data, descriptive statistics of arithmetic average, frequency, standard deviation and percentage values, as well as the normal distribution of scale data to be able to find out whether to make parametric analyses are observed by the Kolmogorov-Smirnov (K-S) test. For paired comparison with normal distribution, t-test analysis is employed.

3. RESULTS

The analysis results of participation motivation, perceived motivational climate and goal direction (task and ego orientations) of amputee football players are given below in detail.

Table 4.1. T-Test Results of Amputee Football Players Regarding Perceived Motivational Climate with Mastery Climate sub-dimension and Task-High – Ego-High Variables

	GOAL DIRECTION	n	X	SS	T	p
MASTERY CLIMATE	TASK-HIGH	43	4,65	0,73	8,123	0,000
	EGO-HIGH	42	3,42	0,89		

As seen in the Table, the average of participants with high task orientation is 4,65 and the average of participants with high ego orientation is 3,42. As a result of t test, there is a meaningful statistical difference between the averages of task-oriented and ego-oriented participants ($t = 8,123$; $p < 0,05$). This difference stands in favor of amputee football players with high task orientation.

Table 4.2. T Test Results of Amputee Football Players Regarding Perceived Motivational Climate with Performance Climate sub-dimension and Task High – Ego High Variable

	GOAL DIRECTION	n	X	SS	T	p
PERFORMANCE CLIMATE	TASK-HIGH	43	3,61	0,69		
	EGO-HIGH	42	4,78	0,83	-8,458	0,000

As seen in the Table, the average of participants with high task orientation is 3,61 and the average of participants with high ego orientation is 4,78. As a result of t test, there is a meaningful statistical difference between high task-oriented and high ego-oriented participants ($t = -8,458$; $p < 0,05$). The difference stands in favor of amputee football players with high ego orientation.

Table 4.3. T Test Results of Amputee Football Players Regarding Sports Participation Motivation with Internal Motivation sub-dimension and Task High – Ego High Variable

	GOAL DIRECTION	n	X	SS	T	p
INTERNAL MOTIVATION	TASK-HIGH	43	3,63	0,56		
	EGO-HIGH	42	3,58	0,72	1,629	0,091

As indicated in the Table, the average of participants with high task orientation is 3,63 and the average of participants with high ego orientation is 3,58. As a result of t test, there is not any meaningful statistical difference between the high task-oriented and high ego-oriented participants ($t = 1,629$; $p > 0,05$).

Table 4.4. T Test Results of Amputee Football Players Regarding Sports Participation Motivation with External Motivation sub-dimension and Task High – Ego High Variable

	GOAL DIRECTION	n	X	SS	T	p
EXTERNAL MOTIVATION	TASK-HIGH	43	3,81	0,91		
	EGO- HIGH	42	3,76	0,94	1,703	0,086

As seen in the Table, the average of participants with high task orientation is 3,81 and that of participants with high ego orientation is 3,76. As a result of the t test, there is not any meaningful statistical difference between the high task-oriented and high ego-oriented participants ($t = 1,703$; $p > 0,05$).

Table 4.5. T Test Results of Amputee Football Players Regarding Sports Participation Motivation with Amotivation sub-dimension and Task High – Ego High Variable

	GOAL DIRECTION	n	X	SS	T	p
AMOTIVATION	TASK- HIGH	43	3,46	0,78		
	EGO- HIGH	42	3,40	0,79	1,716	0,089

As seen in the Table, the average of participants with high task orientation is 3,46 and that of participants with high ego orientation is 3,40. As a result of t test, there is not any meaningful statistical difference between the high task-oriented and high ego-oriented participants ($t=1,716$; $p>0,05$).

4. DISCUSSION

For t test of Mastery Climate, there is a meaningful statistical difference between the averages of the participants with high task orientation and high ego orientation. Concerning t-test of Performance Climate, there is a meaningful statistical difference between the averages of the participants with high task orientation and high ego orientation. According to the scientific literature, high task-oriented players perceive the team environment as a mastery climate and such sports people achieve more satisfaction from activities.⁶ Therefore, obtained results support our research. Having high perceptions of performance climate and ego-oriented goals are not the same things in the United States or Britain.¹ People in individual societies describe social events or situations by using their characteristics and individual aspects.¹⁵ Thus, sports people in western countries evaluate themselves according to task-oriented goals. On the contrary, people in collective nations use social conditions or group characteristics to define social events. People in Turkey, where a cultural structure is based on both individualism and collectivism, use both individual and collective characteristics while commenting on personal and social events.

From the perspective of internal motivation, as a result of t test, there is not any meaningful statistical difference between the averages of participants with high task orientation and high ego orientation. About external motivation, as a result of t test, there is not any meaningful statistical difference between the averages of participants with high task orientation and high ego orientation. From the perspective of motivation, as a result of t test, there is not any meaningful statistical difference between the averages of participants with high task orientation and high ego orientation. In researches within scientific literature, it is confirmed that there are meaningful relations between sub-dimensions of motivation in sportspeople. In researches executed by¹⁰, it is reported that there are meaningful correlations between sub-dimensions of motivation, external motivation, internal motivation and a motivation, while in Pelletier and others (2001) the same correlation is found between internal and external motivations and general motivation levels. Moreover, it is also found out that there are meaningful statistical relations between sub-dimensions of sports participation motivation. In a similar study conducted on amateur and professional footballers, it is concluded that there is a meaningful statistical relation between ego and task orientations of footballers.¹⁶ It is stated that from the perspective of internal motivational orientation factors, physical and physiological development motives come forward, whereas status gaining and feeling of achieving among external motive sources are basic components for mobilization. Sport is an instrument that supports the full development of self-expression in people with disabilities. Following this research, which we think, on the way to socialization, will serve in the dissemination of sports within people with disabilities, and is intended to describe reasons that lead them to sports; it is considered that additional researches to-be-executed at different age groups and different disability conditions will create a precious impact on sports participation and taking precautions to encourage individuals towards such influential mechanism.

CONCLUSION

In this research, it is targeted to investigate the role of goal direction and a result of the relation between sports participation motivation and the perceived motivational climate of amputee football players. Within this framework, findings coming out of the analyses, which are made to specify participation motivation, perceived motivational climate and goal direction of amputee football players; differ in task-high and ego-high sub-dimensions, while do not differ in sports motivation. In sports psychology, though there are several researches executed on participation motivation and perceived motivational climate, it might be considered to execute more researches on people with disabilities.

REFERENCES

1. Abraham, F. E., Roberts, G. C., Pensgaard, A. M. (2008). "Achievement Goals and Gender Effects on Multidimensional Anxiety in National Elite Sport", *Psychology of Sport and Exercise*, 9, 449-464.
2. Acar, Z. Y. (2012). Investigation Of Elementary School Students' Participation Motivation At Physical Education And Extra Curricular Activitie (Doctoral dissertation, Ankara University Institute of Health Sciences Department of Physical Education and Sports).
3. Ardahan, F. (2013). The Examine Of The Factors Motivating People Participating In Recreational Exercise By Using Remm Scale With Respect To Some Demographic Variables: Antalya Case. *Pamukkale Journal of Sport Sciences*, 4(2).
4. Bashan, I., ve Toros, T. (2018). The examination of motivational climate and goal orientation in basketball players-who did and did not experience a sports injury. *Journal of Human Sciences*, 15(4), 1854-1862.
5. Demir, G. T., & Cicioğlu, H. İ. (2018). Motivation Scale For Participation In Physical Activity (MSPPA): A study of validity and reliability . *Journal of Human Sciences*, 15(4), 2479-2492.
6. Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of educational psychology*, 84(3), 290.
7. Duda, J.L. & Whitehead, J. (1998). Measurement of goal perspectives in the physical domain. In J.L. Duda (Ed.), *Advances in sport and exercise psychology measurement*, Morgantown, WV: Fitness Information Technology, Inc.
8. Duda, J.L. (1989). Goal perspectives and behavior in sport and exercise settings. In C. Ames & M. Maehr (Eds.), *Advances in motivation and achievement*. Greenwich, CT: JAI Press.

9. Duda, J.L., Chi, L., Newton, M.L., Walling, M.D. & Catley, D. (1995). Task and ego orientation and intrinsic motivation in sport. *International Journal of Sport Psychology*, 26, 40-63.
10. Guay, F., Vallerand, R. J., Blanchard, C. (2000). " On the assessment of situational intrinsic and extrinsic motivation: The Situational Motivation Scale (SIMS)", *Motivation and emotion*, 24(3), 175-213.
11. Gundogdu, C., Aygun, Y., Ilkim, M., Tufekci, Sakir. (2018). Explaining the Impact of Disabled Children" Engagement with Physical Activity on Their Parents" Smartphone Addiction Levels: A Sequential Explanatory Mixed Methods Research. *Journal of Education and Training Studies*, 6(2), 44-53.
12. Ilkim, M., Canpolat, B., & Akyol, B. (2018). The Effects of Eight-Week Regular Training in Amateur Amputee Football Team Athletes' Body Composition. *Turkish Journal of Sport and Exercise*, 20(3), 199-206. <https://doi.org/10.15314/tsed.466739>
13. Kesilmiş, İ., & Yıldız, R. (2018). The relation between body awareness and track and field athletes' goal setting. *Journal of Human Sciences*, 15(4), 2454-2461. doi:10.14687/jhs.v15i4.5501
14. Kesilmiş, İ., Taştan, Z., & Toros, T. (2020). Comparison of Perceived Motivational Climate and Positive Feedback of Football Players According to Positions . *Spor Eğitim Dergisi*, 4(1), 115-122.
15. Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological review*, 98(2), 224.
16. Papaioannou, A. (1994). Development of a questionnaire to measure achievement orientations in physical education. *Research Quarterly for Exercise and Sport*, 65, 11-20
17. Pelletier, L. G., Fortier, M. S., Vallerand, R. J., Tuson, K. M., Briere, N. M., Blais, M. R. (2001). "Toward A New Measure of Intrinsic Motivation, Extrinsic Motivation, and Amotivation in Sports: The Sport Motivation Scale (SMS)", *Journal of sport and Exercise Psychology*, 17, 35-35
18. Roberts, G.C. & Ommundsen, Y. (1996). Effect of goal orientations on achievement beliefs, cognitions and strategies in team sport. *Scandinavian Journal of Medicine and Science in Sports*, 6, 46-56
19. Roberts, G.C. & Treasure, D.C. (1995). Achievement goals, motivational climate and achievement strategies and behaviors in sport. *International Journal of Sport Psychology*, 26, 64-80.
20. Seifriz, J.J., Duda, J.L. & Chi, L. (1992). The relationship of perceived motivational climate to intrinsic motivation and beliefs about success in basketball. *Journal of Sport and Exercise Psychology*, 14, 375-391.
21. Soyer, F., Can, Y., Güven, H., Hergüner, G., Bayansalduz, M., & Tetik, B. (2010). Investigation of relation between motivation of success and team unity of sportsmen . *International Journal of Human Science*, 7(1), 225-239.

EFFECTS OF KINESIO TAPING ON SPRINT, BALANCE AND AGILITY PERFORMANCE IN 10-12 YEARS OLD BADMINTON PLAYERS

FARUK GÜVEN^{*1}, SAMET AKTAŞ²

1. Recreation Division, School of Applied Sciences, Karamanoğlu Mehmetbey University, Karaman, Türkiye
farukguven@kmu.edu.tr

2. Department of Coaching School of Physical Education and Sports, Batman University, Batman Türkiye,
samet.aktas@batman.edu.tr

Corresponding author: farukguven@kmu.edu.tr

ABSTRACT

The present study aims to investigate the effects of Kinesio taping applied to the foot area of 10-12 years old active badminton players on sprint, agility and balance performance. The experimental pattern model was used in this study. Sixteen male individuals who performed badminton training at least four days a week were included in this study. Since the study is a single group, it was applied by a double-blind method. 48 hours have waited between measurements. Measurements included the Pro-agility/agility test, 5-10-15m sprint test and balance test. Each parameter measurement was applied twice with the application of a Kinesio tape (KT) and a colored tape to create a placebo effect (PT). Paired samples t-test was used to investigate the differences between the measurement averages of the dependent groups. When the sprint values of 5m, 10m and 15m were analyzed after PT and KT applications of the participants, a significant difference was found between 5m PT and KT applications, between 10m PT and KT applications and between 15m PT and KT applications ($p < 0.05$). When the average of agility and balance error scores after PT and KT applications were analyzed, agility after PT and KT applications was between, Eyes Open Balance Error Score (EOBES) after PT and KT applications was between, and Eyes Close Balance Error Score (ECBES) after PT and KT applications was between ($p < 0.05$). Conclusion. Kinesio taping positively affected the agility, sprint and balance performances of the badminton players, but it is recommended to develop hypotheses and research on the subject to answer the question of the continuity of this development.

KEYWORDS: Agility, Balance, Kinesio taping, Badminton, Sprint.

INTRODUCTION

Kinesio taping is a different taping technique that allows the joints and muscles to stand upright in support of the joints and muscles that do not adversely affect the movement of the body based on the natural renewal phase.¹ It is a controversial issue that Kinesio taping affects performance and health development in sports.^{2,3,4} Unlike traditional elastic banding techniques, it allows the skin to breathe with its elastic structure in a special texture with wider flexibility. It does not affect sweat and water, minimizes skin ailments, and provides a comfortable feeling and elasticity.⁵ Removal of edema in the body and pain treatment, tissue healing were the techniques that exist in classical methods, but the applicability of Kinesio banding to different parts of the body is different from other banding methods.⁶ The Kinesio taping technique applied to the ankle reports that the edema in the interstitial space advances and stimulates less clogged lymphatic ducts.⁷ Considering the factors, such as treatment of joint sprains, prevention of soft tissue inflammation, preventing loss of muscle strength, Kinesio taping was found helpful according to coaches.⁸

By improving the fibers, increases the subcutaneous blood and lymph circulation and consequently enables the tissue to work comfortably physically and helps to recover the fascia and muscle by reducing excessive muscle tension.⁹ Elastic bands used by athletes affect the fluid circulation in that area by stabilizing the joint, while the Kinesio taping method causes regeneration in the tissue by allowing the joints to move more comfortably.¹⁰ Scientists are convinced that the Kinesio tape will be an application to prevent prophylaxis as well as preventing and rehabilitating injuries that may occur in athletes.¹¹ Kinesio taping helps to keep the body shape of the athlete the same throughout the exercise to make the movements at the best level in the sports activity; it helps to control the muscles and increase the balance, thereby supporting high performance.¹² In addition to improving the functional performance and the flexibility of athletes, also the Kinesio tape provides a positive increase in postural control competencies.¹³ It has been reported that the Kinesio taping method can reduce muscle tension and help coordination, proprioception and balance disorders.¹⁴ The Kinesio tape applied to the ankle increases dorsiflexion and plantarflexion values in the range of motion, thereby increasing mobility and agility capabilities.¹⁵ The Kinesio tape applied to the left and right ankle improved performance in agility training and significantly improved postural control.¹⁶ The present study aims to reveal the effects of Kinesio taping applied to the foot area of 10-12 years old active badminton players on sprint, agility and balance performance.

METHODOLOGY

Participants

The experimental pattern model was used in this study. Sixteen male individuals who performed badminton training at least four days a week were included in this study. The average age of the participants was 11.00 ± 0.81 (years), the average body weight was 41.06 ± 3.28 (kg), and the average height was 148 ± 6.13 (cm). Since the study is a single group, it was applied by double-

blind method. 48 hours waited between measurements. Measurements included the Pro-agility/agility test, 5-10-15m sprint test and balance test. The study was included in the tests by applying two different applications to a single group (PT and KT). Each parameter measurement was applied twice with the application of a Kinesio tape (KT) and a colored tape to create a placebo effect (PT). Before this study, an informed consent form was obtained from the parents and information was given about this study.

Procedure

Kinesio® Taping 5 cm wide Tex Gold brand Kinesio® Tape (Made in the USA) tapes were used for taping. Kinesio® Tape application was applied by a physiotherapist who had a Kinesio® Tape applicator certificate in a technically appropriate dominant foot area. In the determination of the dominant foot, it was determined with the question, "Which foot do you hit the ball with?" The findings showed that all subjects used their right feet as the dominant foot. Taping on individuals was applied in a sitting position. Before the application, the regions were checked so that there were no factors (e.g., cream, sweat and body-hair) on the skin surface that would prevent the tape from sticking. In KT application to the participants, the first strip (I-strip) was applied without tension on the forefoot, then extended approximately 140% of its maximum length and attached to the tibialis anterior muscle just below the anterior tibial tuberosity. The second strip (Y-strip) was applied to the ankle/lower leg side without tension, then it extended approximately 140% of its maximum length and attached to the peroneus longus and Brevis muscle just below the fibula head. The third strip (Y strip) was applied to the back of the ankle / lower leg¹⁷. PT application was also performed with the same directive with a colored patch tape, which is a pharmaceutical product. All participants were tested 30 minutes after taping.

Pro-Agility Test

The Pro Agility test was set up and administered using the protocol outlined by Harman et al.¹⁸. The validity of the Pro Agility test has been demonstrated by many studies^{19,20,21}. The pro-agility test involved performing acceleration and deceleration during quick turning movements. The participant began in a 3-point stance with the legs across the start line and one hand on the start line; this pose was held for at least 1 s. After a signal was given, the participant immediately ran to the right (or left) and touched the right (or left) 5-yard line with the right (or left) hand, then quickly changed direction to the left (or right) and touched the left (or right) 5-yard line with the left (or right) hand, finally running through the finish line. Each participant was allowed two attempts. The assessor chose the direction in which the participant ran first²².

5-10-15m Sprint Test

Subjects were present, leaning one foot ahead and slightly forward, behind the starting line. With the start mark, they ran to the finish line as quickly as possible. The degrees were recorded in seconds²³.

Balance Error Scoring System

The balance performances of the subjects were performed by the Balance Error Scoring System (BESS). The subjects were asked to maintain their test positions for 20 seconds without any support on the dominant foot foam surface with eyes open and eyes closed. The subjects were asked to maintain their test positions for 20 seconds without any support on the dominant foot foam surface with eyes open and eyes closed. The duration of 20 seconds for each subject was measured with a stopwatch. Each error made by the subjects within 20 seconds was recorded as 1 error score²⁴.

Statistical Analysis

Age, height and body weight values of the participants of this study were given as average and standard deviation. Whether the data showed a normal distribution was tested using the Shapiro-Wilks test. Paired sample t-test was used to determine the difference between the measurement averages of the dependent groups. SPSS 22.0 statistical package program was used in the analysis of the data. The significance level was accepted as 0.05.

RESULT & DISCUSSION

Table 1: Descriptive information of the participants.

	N	Mean ± SD	Minimum	Maximum
Age (Year)	16	11.00±0.81	10.00	12.00
Height (cm)	16	148.18±6.13	138.00	160.00
Weight (kg)	16	41.06±3.28	37.00	50.00

The mean (SD) age was 11.00±0.81 years; height was 148.00 ± 6.13 cm, weight was 41.06 ± 3.28 kg for the 16 badminton children (Table 1).

Table 2: KT and PT Sprint Values of Participants

	N	Mean ± SD	t	P-values
5m	PT	161.09±0.02	13.672	<0.00*
	KT	161.05±0.02		
Sprint ^{sec} 10m	PT	161.72±0.09	9.417	<0.00*
	KT	161.62±0.10		
15m	PT	162.70±0.12	7.747	<0.00*

KT162.60±0.13

PT=Placebo Tape KT=Kinesio Tape

* $p < 0.05$

Table 2 shows the sprint values of 5m, 10m and 15m after KT and PT applications of participants and a significant difference was found. Between 5m PT and KT applications, between 10m PT and KT applications and between 15m PT and KT applications were found as result.

Table 3: KT and PT Agility and Balance Values of Participants

	N	Mean ± SDt	P-values
Agility ^{sec}	PT	165.36±0.09	3.171 <0.00*
	KT	165.31±0.09	
EOBES ^{ES}	PT	1610.75±2.17	3.922 <0.00*
	KT	169.62±1.89	
ECBES ^{ES}	PT	1621.50±3.24	8.878 <0.00*
	KT	1617.25±2.51	

EOBES=Eyes Open Balance Error Score, ECBES=Eyes Closed Balance Error Score

ES=Error Score

In Table 3, the average of agility and balance error points of the participants of this research after PT and KT applications are given. When the average of agility and balance error scores after PT and KT applications were analyzed, agility after PT and KT applications was between, Eyes Open Balance Error Score (EOBES) after PT and KT applications was between, and Eyes Closed Balance Error Score (ECBES) after PT and KT applications was between. As seen, there were statistically significant differences after and between PT and KT applications. Sixteen male individuals who performed badminton training at least four days a week were included in this study. The participants did not have any foot joint discomfort, and this study was carried out to investigate the effects of the Kinesio taping applied on the ankles on the sprint and balance performances of 5-10-15m. After the PT and KT applications of the participants, 5m, 10m and 15m sprint values were determined. When comparing 5m PT and KT applications, a difference was found between 10m PT and KT applications and between 15m PT and KT applications. In a study similar to our study when the groups were compared concerning 20 m sprint test results before and after the Kinesio tape application, there was no difference between the first group and the second group. When the groups were compared with each other concerning 20 m sprint test results before and after Kinesio tape application, the findings showed that the values of the second group before and after the tape application were higher than the application group²⁵. In a study the effects of Kinesio banding applied on the ankle on spasticity, balance and walking were examined. Eleven people with spasticity, balance and walking impairment with chronic spinal cord injury participated in this study. In the treatment, Kinesio taping and traditional non-elastic tapes were applied. The Kinesio tape and traditional non-elastic tape were applied to the muscles in the form of Y-strip and without tension. The results of this research showed that only Kinesio taping had significant effects on spasticity, clonus and pressure center movements, kinematic gait parameters and electromyographic activity. Researchers have concluded that short-term Kinesio taping practice reduces spasticity and pain in individuals with chronic spinal cord injury and also improves balance, walking and running abilities²⁶. Agility and balance error scores of the participants were given after PT and KT applications. There was a statistically significant difference between Agility PT and KT applications, Eyes Open Balance Error Score, PT and KT applications, and Eyes Close Balance Error Score, PT and KT applications. In a similar study, researched with thirty individuals on the balance deficits caused by proprioception and Kinesio banding reduction in people with chronic ankle instability. Compared with the control group, they observed that balance developed within forty-eight hours after the Kinesio tape was applied compared to the pretest. This information proves that improvements in balance are preserved even 72 hours after the removal of the Kinesio tape²⁷. In the study where examined the effects of Kinesio banding on the ankle on postural oscillation, 60 people, including thirty females and thirty males, volunteered to attend. Comparing the balance time with eyes open and eyes closed, that the findings showed that the time measured with eyes open was longer. With Kinesio taping, it was observed that there was an increase in the duration of standing balance. At the same time, it has been concluded that Kinesio tape can be used to eliminate the disorders that may occur due to damage in the mechanoreceptors after injury²⁸. Found that Kinesio banding did not have a significant effect on joint position sensation in the study in which they examined the effects of ankle Kinesio banding on joint position sensation within healthy individuals²⁹. Examined the effects of Kinesio banding on ankle balance in patients with chronic ankle diseases. A thirty-three-year-old male with chronic ankle disease in the last ten years has participated in the study. They applied the Kinesio tape to the right foot of the subject for two months. The researchers concluded that repeated use of Kinesio banding in the ankle could be an effective treatment for rescuing ankle stable pus in patients with chronic ankle disease³⁰. ³¹Stated that there is no change in isokinetic muscle strength after 14 and 12 hours. Found that there was no change in the muscular activities of the elastic performance of the elastic band application in their study on 31 athletes with a different application³². Investigated the short-and long-term effects of Kinesio taping on balance and functional performance. They applied the BBS and quadruple jump test to evaluate the onset of balance, proprioception and functional performance before and after Kinesio taping. There were no significant differences in balance and four hop tests when Kinesio band and placebo groups were compared. The researchers concluded that the Kinesio banding applied to the lower extremity gastrocnemius muscle did not make a significant difference in balance and functional performance³³. Studied the early and late effects of Kinesio taping on balance, lower limb function, and femur quadriceps muscle performance within healthy people. Thirty-six females participated in their study. Subjects were divided into three groups as follows: control, a ten-minute rest, Kinesio taping without tension and Kinesio taping with tension. The primary results were isokinetic performance, while the

secondary results were the single-hop test, one-foot static balance and electromyographic activity. The researchers performed the evaluations in five stages, before the application of the Kinesio tape, immediately after the application of the Kinesio tape, twenty-four, forty-eight and seventy-two hours after the Kinesio tape application. Kinesio taping has been shown to support sudden and delayed changes in femur quadriceps muscle performance within healthy females³⁴. According to the dynamic balance test results of the study group participants, a statistically significant difference was found in favor of Kinesio banding in the pre-test and post-test results of F-B release parameters. The findings obtained in this study suggest that Kinesio tape application provides benefits to the children who have balance problems, who have balance problems during sitting, and who have insufficiency in trunk muscle strength during the rehabilitation process³⁵. The studies on the effects of Kinesio taping on performance in sports are limited because published research has focused on sports injuries and muscle health^{36,37,38}. Our study acknowledges the limitations arising from the learning effects of the measurement tests of the participants and individual differences.

CONCLUSION

As a result, the agility, sprint and balance performance of the Kinesio taping positively affects badminton players. However, it is recommended to develop hypotheses and research on the subject to answer the question of the continuity of this development. The inclusion of the badminton branch and limited age group in this study can be considered as a limitation. It is recommended to study the long-term effects of Kinesio taping and studies with control groups in different branches and age groups.

REFERENCES

1. Back in Motion Sports Injuries Clinic Cited. What does kinesio taping do? <http://www.bimsportsinjuries.com/articles/Kinesiotaping>, 2013.
2. Logan CA, Bhashyam AR, Tisosky AJ, Haber DB, Provencher MT. Systematic review of the effect of taping techniques on patellofemoral pain syndrome, Sports Health, 2017;9 (5) :456-461, doi:[10.1177/1941738117710938](https://doi.org/10.1177/1941738117710938).
3. McLaren C, Colman Z, Rix A, Sullohern C. The effectiveness of scapular taping on pain and function in people with subacromial impingement syndrome: A systematic review, International Musculoskeletal Medicine, 2016;38:3-4, 81-89, doi: [10.1080/17536146.2016.1252550](https://doi.org/10.1080/17536146.2016.1252550)
4. Saracoglu, Y. Emuk, F. Taspinar Does taping in addition to physiotherapy improve the outcomes in subacromial impingement syndrome? A systematic review, Physiother. Theory Pract, 2018;34 (4): 251-263, doi:[10.1080/09593985.2017.1400138](https://doi.org/10.1080/09593985.2017.1400138)
5. Huang C, Hsieh T, Lu S. et al. Effect of the Kinesio tape on muscle activity and vertical jump performance in healthy inactive people. BioMed Eng OnLine 2011;10:70 doi.org/10.1186/1475-925X-10-70
6. Kase K, Wallis J, Kase T. (2003). Clinical therapeutic application of the kinesio taping method. Tokyo, Japan: Ken Ikai Co Ltd.
7. Tsai HJ, Hung HC, Yang JL, Huang CS, Tsao JY. Could Kinesio tape replace the bandage in decongestive lymphatic therapy for breast-cancer-related lymphedema? A pilot study, Support Care Cancer. 2009;17(11):1353-1360. doi:[10.1007/s00520-009-0592-8](https://doi.org/10.1007/s00520-009-0592-8)
8. Janwantanakul P, Gaogasigam C. Vastus lateralis and vastus medialis obliquus muscle activity during the application of inhibition and facilitation taping techniques. Clin Rehabil. 2005;19(1):12-19. doi:[10.1191/0269215505cr834oa](https://doi.org/10.1191/0269215505cr834oa)
9. Kase K, Tatsuyuki H, Tomoki O. Development of kinesio tape. kinesio taping perfect manual. Kinesio Taping Association; 1996;6(10): 117-8.
10. Yapar K. Kinesio taping. <http://www.Fiziktedavi.Com/Fiziktedavi/> 82-Kinesiotapisng-Banding, 2013. [Cited 2020 Jun 11]
11. Thelen MD, Dauber JA, Stoneman PD. (2008). Effect of Kinesio Taping on Bioelectrical Activity of Vastus Medialis Muscle. Ortopedia Travmatologia Rehabilitacja, Medsportpress, 2008;6(6):644-651. doi:[10.2519/jospt.2008.2791](https://doi.org/10.2519/jospt.2008.2791)
12. Sayaca Ç. The effects of different kinesio tape applications applied to ankle on static balance in healthy young people. Master Thesis, Halic University Institute of Health Sciences, Istanbul, 2011.
13. Jaraczewska E, Long C. Kinesiotaping in stroke: improving functional use of the upper extremity in hemiplegia. Top Stroke Rehabil. 2006;13(3):31-42. doi:[10.1310/33KA-XYE3-QWJB-WGT6](https://doi.org/10.1310/33KA-XYE3-QWJB-WGT6)
14. Yasukawa A, Patel P, Sisung C. Pilot study: investigating the effects of Kinesio Taping in an acute pediatric rehabilitation setting. Am J Occup Ther. 2006;60(1):104-110. doi:[10.5014/ajot.60.1.104](https://doi.org/10.5014/ajot.60.1.104)
15. Eom, S. Y., Lee, W. J., Lee, J. I., Lee, H. Y., & Chung, E. J. (2014). The effect of ankle Kinesio taping on range of motion and agility during exercise in university students. Physical Therapy Rehabilitation Science, 3(1), 63-68. doi.org/[10.14474/ptrs.2014.3.1.63](https://doi.org/10.14474/ptrs.2014.3.1.63)
16. Yoshida A, Kahanov L. The effect of kinesio taping on lower trunk range of motions. Res Sports Med. 2007;15(2):103-112. doi:[10.1080/15438620701405206](https://doi.org/10.1080/15438620701405206)
17. Nakajima MA, Baldrige C. The effect of kinesio® tape on vertical jump and dynamic postural control. International Journal of Sports Physical Therapy, 2013;8 (4), 393.
18. Harman E, Garhammer J, Pandorf C. Administration, scoring and interpretation of selected tests. In: TR Baechle, RW Earle, eds. Essentials of strength and conditioning. Champaign, IL: Human Kinetics, 2000: 249– 292.

19. Stewart PF, Turner AN, Miller SC. Reliability, factorial validity, and interrelationships of five commonly used change of direction speed tests. *Scandinavian Journal of Medicine & Science in Sports*, 2014;24(3), 500-506. doi.org/10.1111/sms.12019
20. Mayhew J, Gaines G, Swedenhjelm A, Cooper J, Bird M, Houser J. Difference in 40-yd dash and pro-agility times on artificial turf and natural grass. *The Journal of Strength & Conditioning Research*, 2010;24, 1. doi: 10.1097 / 01.JSC.0000367166.10606.0a
21. Gains Graydon L, Swedenhjelm Andy N, Mayhew Jerry L, Bird H Michael, Houser Jeremy J. Comparison of Speed and Agility Performance of College Football Players on Field Turf and Natural Grass, *Journal of Strength and Conditioning Research*: 2010;24(10),2613-2617 doi: 10.1519/JSC.0b013e3181eccdf8
22. Yuasa Y, Kurihara T, Isaka T. Relationship Between Toe Muscular Strength and the Ability to Change Direction in Athletes. *J Hum Kinet*. 2018; 64:47-55. Published 2018 Oct 15. doi:10.1515/hukin-2017-0183
23. Yan Y. The effect of socio-economic structure on physical activity and physical fitness level of 10-13 years old children, Marmara University, Institute of Health Sciences, Master Thesis, Istanbul: 2007;6-7-25-2
24. Erkmén N, Taşkın H, Sanioğlu A, Kaplan T. Effects of fatigue on balance performance in football players. *Sport Sciences*, 2009;4(4);289-299.
25. Güder G. The effect of two different kinesio tape applications on quadriceps femoris muscle on lower extremity performance in basketball players, *Sports Physiotherapy Program Master Thesis*, Ankara, 2010.
26. Tamburella F, Scivoletto G, Molinari M. Somatosensory inputs by application of KinesioTaping: effects on spasticity, balance, and gait in chronic spinal cord injury. *Front Hum Neurosci*. 2014; 8:367. Published 2014 May 30. doi:10.3389/fnhum.2014.00367
27. Jackson K, Simon JE, Docherty CL. Extended use of Kinesiology Tape and Balance in Participants with Chronic Ankle Instability. *J Athl Train*. 2016;51(1):16-21. doi:10.4085/1062-6050-51.2.03
28. Bayraktar Y. Effect of kinesio taping applied to ankle on postural oscillation, Master Thesis, 2017.
29. Miralles I, Monterde S, Del Rio O, Valero S, Montull S, Salvat I, 2014. Has Kinesio tape effects on ankle proprioception? A randomized clinical trial. *Clinical Kinesiology*, 2014;68(2):9-18.
30. Kim BJ, Lee JH, Kim CT, Lee SM. Effects of ankle balance taping with kinesiology tape for a patient with chronic ankle instability. *J Phys Ther Sci*. 2015;27(7):2405-2406. doi:10.1589/jpts.27.2405
31. Fu TC, Wong AM, Pei YC, Wu KP, Chou SW, Lin YC. Effect of Kinesio taping on muscle strength in athletes-a pilot study. *J Sci Med Sport*. 2008;11(2):198-201. doi: 10.1016/j.jsams.
32. Briem K, Eythörðsdóttir H, Magnúsdóttir RG, Pálmarsson R, Rúnarsdóttir T, Sveinsson T. Effects of kinesio tape compared with nonelastic sports tape and the untaped ankle during a sudden inversion perturbation in male athletes. *journal of orthopaedic & sports physical therapy*, 2011;41(5), 328-335. doi:10.2519/jospt.2011.3501
33. Wilson V, Douris P, Fukuroku T, Kuzniewski M, Dias J, Figueiredo P, (2016). The immediate and long- term effects of kinesio tape on balance and functional performance. *The International Journal of Sports Physical Therapy*, 2016;11(2):247-53.
34. Lins CA, Borges DT, Macedo LB, Costa KS, Brasileiro JS. Delayed effect of Kinesio Taping on neuromuscular performance, balance, and lower limb function in healthy individuals: a randomized controlled trial. *Braz J Phys Ther*. 2016;20(3):231-239. doi:10.1590/bjpt-rbf.2014.0161
35. Şahan AK, 2018. Acute effect of ankle taping method on balance in healthy individuals, Master Thesis.
36. Mine K, Nakayama T, Milanese S, Grimmer K. Effects of Kinesiotape on pain, muscle strength and functional performance: a systematic review of Japanese language literature. *Physical Therapy Reviews*, 2018;23(2):108-115. doi.org/10.1080/10833196.2018.1447257
37. Ferreira R, Resende R, Roriz P. The effects of Kinesio Taping® in lower limb musculoskeletal disorders: a systematic review. *International Journal of Therapies and Rehabilitation Research*, 2017;6(3):1-13. doi: 10.5455/ijtrr.000000266
38. Partoazar B, Ganji B, Dalvand H, Shamsoddini A. The effect of trunk kinesio taping on static and dynamic balance and functional mobility in children with cerebral palsy. *Sport Sciences for Health*, 2020;1-7. doi.org/10.1007/s11332-020-00660-4

VOLLEYBALL REFEREES' SELF-EFFICACY AND LIFE SATISFACTION

Yeşim Karac ÖCAL¹, Turhan TOROS^{*2}¹Yozgat Bozok University- Faculty of Sports Sciences-
<https://orcid.org/0000-0003-2754-9274>, ysm74@hotmail.com²Department of Sports Sciences, Mersin University, Mersin, Turkey-turhantoros@yahoo.com
Corresponding author: turhantoros@yahoo.com; <https://orcid.org/0000-0002-8328-2925>

ABSTRACT

The purpose of this study is to examine characteristics of volleyball referees' self-efficacy and life satisfaction. Referees are the sample group of this study. There are 158 referees, consisting of 73 male ($X_{age}=21,58\pm1,79$), 85 female ($X_{age}=21,91\pm1,63$) participants, who voluntarily attended this study. Data collection tools of "Life Satisfaction Scale", which is developed by Diener and fr. (1985) and adapted to Turkish culture by Yetim (1991), and "General Self-Efficacy Scale" developed by Sherer and fr. (1982) to collect data about self-efficacy situations, and adapted to Turkish culture by Yıldırım and İlhan (2010), are used. In data analysis, a correlational survey model, which includes examination types of comparison and correlation between variables, is used. As the distribution is found normal after the test of normality, unpaired T-Test for comparing two independent groups and Pearson Correlation Coefficient for observing their relations are employed. According to research findings, it is found out that there is not any meaningful difference about genders at sub-factor ratings of starting, standing up to and effort to keeping it up-insisting. When the refereeing age is examined, there is a positive meaningful relation with the sub-dimension of starting ($p<.05$; $r=.217$), while there is another positive meaningful relation with life satisfaction ($p<.05$; $r=.193$).

Keywords: Volleyball, referee, life satisfaction, self-efficacy, sports.

INTRODUCTION

Throughout history, philosophers have seen happiness, as the highest and the only source of motivation. International psychology dissertation summaries started distinguishing a chapter for happiness in 1973, and in 1974 the journal of "Social Indicators Research", most articles of which are reserved for subjective well-being, started to be published. In this research, subjective well-being is used as a synonym for satisfaction with life. Scientific literature on subjective well-being dwells on why people interpret their own lives as positive ways. These studies involve different notions like happiness, satisfaction, morale and positive emotion.²⁵ The notion of "life satisfaction", first raised by Neugarten and fr. (1961), later paved the way for many researchers. Before all, it is better to explain the notion of satisfaction to describe life satisfaction. Satisfaction is the fulfillment of expectations, needs, requests and wishes. "life satisfaction" on the other hand, is the situation or conclusion reached by comparing expectations (what one wants) and possessions (what one has) of a person. Life satisfaction indicates the result emerged from the comparison of one's expectations with a real situation. Life satisfaction includes a person's whole life and various aspects of this life in general. When life satisfaction is said, not a specific satisfaction but in general satisfaction in all living experiences is understood. It states the well-being in different aspects like happiness and morale and means the prevalence of positive emotion over negative emotion in daily relations.²⁰ As for self-efficacy, it is the perception of the individual about possessing the sufficiency to achieve the task faced. Self-efficacy judgment, is the total of judgments that affect how much efforts we are going to expend in a situation, and our emotional reactions regarding moments of expecting a situation or being inside the same situation.²³ The theoretical base of self-efficacy stands on social learning (socio-cognitive) theory developed by Albert Bandura. Bandura first mentioned the concept of self-efficacy in his article "Self-efficacy: Toward a unifying theory of behavioral change" published in 1977. Subsequently, he disposed of the concept of self-efficacy in "social learning theory" and in his book "Self-efficacy: The Exercises of Control" published in 1977, he stated that self-efficacy is inside the "personal and collective center theory", where self-efficacy functions compatible with other social learning factors regulating success and welfare of a person.¹⁸ Strong self-efficacy is a factor ensuring a person be happy and successful in many fields. People with strong self-efficacy, approach their abilities with high confidence. They make efforts to overcome challenging difficult tasks rather than avoiding them. Such individuals motivate themselves as if challenging their aims inexorably. They always raise their bars and pull themselves together in case of failure and misfortune. On the other hand, people having doubts about their capacity abstain from difficult tasks and sees them as threats. They are not willing and take little responsibility in reaching the end.³⁻⁴⁻⁵

METHODOLOGY

Research Model

In this research, which aims at depicting volleyball referees through certain factors, a correlational survey model is used including comparison and correlation examination types between variables.

Research Group

The population of the research is made up of active licensed volleyball referees in Turkey. The sample group consists of referees registered in the cities of Mersin, İstanbul, Ankara, Antalya and İzmir. The total of 158 referees, 73 male ($X_{age}=21, 58\pm1, 79$), 85 female ($X_{age}=21,91\pm1,63$) people participated voluntarily.

The Process

Data used in the research are collected by researchers in person. During the process of data collection, necessary explanations regarding the purpose and scope of the research and privacy of the gathered information are done to the participants by the researchers. Participants are informed according to the Helsinki Criteria and involved voluntarily through their official consent. Relevant permissions for the research are procured from the Ethics Committee. Only voluntary individuals are included in the research.

Data Collection Tool

"Personal Information Form" is distributed to the participants to specify their demographic characteristics such as age and gender.

Life Satisfaction Scale

The original form of the scale developed by Diener and fr. (1985) is in the form of one factor, 5 items and seven-level Likert-type rating. Each item is evaluated according to the seven-level answering system (1= Strongly Disagree, 7=Strongly Agree). In the original study, Diener and fr. (1985), specified the Cronbach alpha value of scale reliability at 87 and criterion-related validity at 82. This scale is adapted to Turkish by Köker (1991) and used by various Turkish researchers in the form of seven-level rating. Köker (1991) specified test-retest reliability coefficient of the scale, implemented once-in three weeks, at 0,85. The corrected split-half value is calculated at 75, and Kuder Richardson -20 value is calculated at 79 by .²⁵ The test-retest reliability coefficient of the scale is 85, item-test correlation coefficient is between 71 and 80.²⁵ Within the reliability study of this research, internal consistency coefficient of life satisfaction is found at 87.

General Self-Efficacy Scale

General Self-Efficacy Scale (GSE), one of the data collection tools of the research, is created by Sherer and friends (1982) and designed in 23 items. The scale, established in two-factor structure of Social Self-Efficacy and General Self-Efficacy, which does not refer to any specific behavior, is 14-level in its original form. The scale is converted to a five-level Likert-type scale after a research conducted by Sherer and Adams (1993), and the increase in scores means an increase in self-efficacy. General Self-Efficacy Scale, which is designed with 17 items by Magaletta and Oliver (1999), is adapted to Turkish culture with the study of .²⁸ Within this period, researchers evaluated the scale according to cultural convenience, comprehensibility and expediency through the support of leading experts and academics in the fields of psychology, psychiatry, linguistics and sociology. Yıldırım and İlhan (2010) specified the criterion-related validity of General Self-Efficacy Scale, besides they used exploratory factor analysis and varimax rotation to designate factor structure. The results of exploratory factor analysis indicated three factors having bigger eigenvalue than 1. Pearson correlation coefficient regarding test-retest reliability coefficient of the scale indicates that there is a mid-level meaningful relation ($r=.80$; $p<.001$). The split-half reliability of the research is detected at 77. Split-half reliability and Cronbach alpha coefficient show that the scale is reliable .²⁸ During the reliability studies made within this research, internal consistency coefficients of the sub-dimensions of General Self-Efficacy Scale stand at 83 for starting sub-dimension, 77 for never giving up sub-dimension, and 81 for keeping up-insisting sub-dimension.

Data Analysis

Data are analyzed statistically. As a result of the normality test, the Kolmogorov-Smirnov value of Satisfaction with Life Scale and General Self-Efficacy Scale sub-dimension scores according to gender, age, refereeing age, is not found meaningful ($p>.05$). As the distribution is found to be normal following the normality test, Independent Groups T-Test for paired comparisons and Pearson correlation coefficient for observing relationship status are used.

FINDINGS

Table 1. Comparison of General Self-Efficacy Scale Scores of the Research Group According to Gender

Scores	Gender	n	$\bar{X}$	ss	Sh $\bar{x}$	t Testi		
						T	Sd	p
Starting	Man	73	25,75	4,01	,55	,90	156	,33
	Woman	85	26,54	3,84	,53			
Never Giving Up	Man	73	16,43	1,65	,12	,89	156	,37
	Woman	85	15,68	1,59	,19			
Keeping Up-Insisting	Man	73	11,13	3,01	,22	,48	156	,65
	Woman	85	10,98	2,93	,31			

When Table 1 is examined, it is found out that there is not any meaningful difference within sub-factor scores of starting, never giving it up, keeping it up-insisting according to gender ($p>.05$).

Table 2. Comparison of Life Satisfaction Scale Scores of the Research Group According to Gender

Scores	Gender	n	$\bar{X}$	ss	Sh $\bar{x}$	t Test		
						T	Sd	p

Life Satisfaction	Man	73	29,54	3,42	,45	,79	156	,43
	Woman	85	28,31	3,71	,48			

When Table 2 is examined, it is observed that life satisfaction scores of the research group does not differentiate according to gender ($p>.05$).

Table 3. The Relation of General Self-Efficacy Scale Scores of the Research Group with Refereeing Age Variable

	Refereeing Age	
Starting	r	,217*
Never Giving Up	r	,105
Keeping Up-Insisting	r	,098

* $p<.05$

When Table 3 is examined, it is found out that there is a positive meaningful relation between refereeing age and the Starting sub-dimension of the scale ($p<.05$; $r=.187$). There is not any relation detected between the sub-dimensions of Never Giving Up and Keeping Up-Insisting and refereeing age variable ($p>.05$).

Table 4. The Relation of Life Satisfaction Scale Scores of the Research Group with Refereeing Age Variable

	Refereeing Age	
Life Satisfaction	r	,193*

* $p<.05$

When Table 4 is examined, there is a relation detected between the refereeing age and life satisfaction variable ($p<.05$).

DISCUSSION

The purpose of this research is to investigate volleyball referee's characteristics of self-efficacy and life satisfaction. People with the high level of self-efficacy desire to start an acquisition process in belief of being influential on things going around and keeping it up until the result is obtained. In this sense referees seek to keep up with their decision of starting.²⁴ Within this period, life satisfaction increases in relation to the will of succeeding. Self-efficacy and life satisfaction become significant thanks to the thought of making the right decision and performing more efficiently. There is not any meaningful difference specified at sub-factor scores of self-efficacy sub-dimensions; starting, never giving up and keeping up-insisting, according to gender. It is observed that life satisfaction scores of the research group do not differ according to gender. There is a positive meaningful relation between refereeing age and starting sub-dimension of the scale. There is not any meaningful relation found between never giving up and keeping up-insisting sub-dimensions and age variables. A meaningful relation between refereeing age of the research group and life satisfaction variable. Research results, in parallel to the results of many studies (Gökçe, 2008; Kabanoff, 1982), show that there are meaningful differences regarding life satisfaction according to the variable of gender. While the study of Ngai (2005) confirms that life satisfaction according to gender differs in favor of male participants, studies made by,^{2 -6-7 -8} do not show any differentiation of life satisfaction according to gender. In the research made by McCarthy and fr. (2007), children interested in team sports state that they are more satisfied by experience than children dealing with individual sports. Moreover, there are other studies that are in parallel with research findings.¹¹ The self-confidence of referees, despite problems they face, defers a state of anxiety following their professional responsibilities, and it is thought that satisfaction with profession and self-confidence move forward in parallel. Findings, coming out of the relation between life satisfaction and variables of gender and age, showing similarities with the study made by Agyar (2014), while the study by Yiğit, Dilmaç and Deniz (2011) confirms that life satisfaction does not differentiate according to the age. In the research made by Broughton and Beggs (2007), it is confirmed that participants between the ages of 70 and 74 have a higher level of life satisfaction compared to participants over the age of 80. As to the study by Kumartaşlı (2010), it is stated that the average life satisfaction values of students at ages of 11-12 and 13-14 are higher than students over the age of 15. The research made by Şahin in 2010, found out that there is also a decrease in the sense of achievement in individuals with low level of life satisfaction. Like Bandura (1999), when we think about a personal sense of achievement as a positive life experience, it is likely to say that it will also have positive effects on general self-efficacy.

CONCLUSION

It is considered that researches for self-efficacy, personal development, conscientiousness and emotional intelligence to be made by researchers in future, will contribute significantly to the scientific literature. Therefore, it is acknowledged that through studies and researches, which tackle the issue from the perspective of different independent variables as well, on wider sample groups with different characteristics, scientific literature will be contributed more.

REFERENCES

1. Agyar, E. (2014). Contribution of perceived freedom and leisure satisfaction to life satisfaction in a sample of Turkish women. *Social indicators research*, 116(1), 1-15.
2. Ardahan, F., & Lapa, T. Y. (2010). An Examination of Leisure Satisfaction Level of University Students with regard to Gender and Income. *Hacettepe J. of Sport Sciences*, 21(4), 129-136.

3. Bandura, A. (1994). Social cognitive theory and exercise of control over HIV infection. In *Preventing AIDS* (pp. 25-59). Springer, Boston, MA.
4. Bandura, A. (1997). The anatomy of stages of change. *American journal of health promotion: AJHP*, 12(1), 8-10.
5. Bandura, A.; K. Bussey, (1999), Social Cognitive Theory of Gender Development and Differentiation, *Psychological Review*.
6. Broughton, K., & Beggs, B. A. (2007). Leisure satisfaction of older adults. *Activities, Adaptation & Aging*, 31(1), 1-18.
7. Broughton, K., & Beggs, B. A. (2007). Leisure satisfaction of older adults. *Activities, Adaptation & Aging*, 31(1), 1-18.
8. Çelik G. (2011). Analyse leisure constraints and satisfaction of disabled people working in public sector: Antalya city center (Antalya center example), Mediterranean University Social Sciences Institute. Master's Thesis, Antalya
9. Diener, E., Emmons, R.A., Larsen, R.J., Griffin, S., (1985). "The Satisfaction with Life Scale", *Journal of Personality Assessment*, 49, p.p. 71-75.
10. Gökçe, H. (2008). Examining Of The Leisure Satisfaction With The Relation Between Life Satisfaction And Socio – Demographic Variables Master's thesis, Pamukkale University Institute of Health Sciences
11. Johansen, B. T., & Haugen, T. (2013). Anxiety level and decision-making among Norwegian top-class soccer referees. *International Journal of Sport and Exercise Psychology*, 11(2), 215-226.
12. Kabanoff, B. (1982). Occupational and sex differences in leisure needs and leisure satisfaction. *Journal of Organizational Behavior*, 3(3), 233-245.
13. Köker, S. (1991). Comparison of life satisfaction levels of normal and problematic adolescents. Unpublished Master's Thesis, Ankara University Institute of Social Sciences, Ankara.
14. Kumartaşlı, M. (2010). Second-grade elementary school students attitudes toward physicaleducation and investigation of life satisfaction. Unpublished Ph.D. Thesis, *Gazi Üniversitesi, Ankara*.
15. Magaletta, P. R., & Oliver, J. M. (1999). The hope construct, will, and ways: Their relations with self-efficacy, optimism, and general well-being. *Journal of clinical psychology*, 55(5), 539-551.
16. McCarthy, M. P., Best, M. J., & Betts, R. A. (2007). Climate change in cities due to global warming and urban effects. *Geophysical research letters*, 37(9).
17. Neugarten BL, Havighurst RJ, Tobin SS (1961) The measurement of life satisfaction. *Journal of Gerontology* 16:134-143.
18. Ngai, P. (2005). *Made in China: Women factory workers in a global workplace*. Duke University Press.
19. Pajares, F. (1997). Current directions in self-efficacy research. *Advances in motivation and achievement*, 10(149), 1-49.
20. Pavot, W., & Diener, E. (2009). Review of the satisfaction with life scale. In *Assessing well-being* (pp. 101-117). Springer, Dordrecht.
21. SAHİN, Esra (2010), Creativity, professional burnout and life satisfaction of primary school teachers: Master's thesis, Sakarya University Institute of Social Sciences Educational Sciences
22. .Sherer, M., Maddux, J. E., Mercandante, B., Prentice-Dunn, S., Jacobs, B., Rogers, R. W. (1982). The self-efficacy scale: Construction and validation. *Psychological reports*, 51(2), 663-671.
23. Tokınan, B. Ö., & BİLEN, S. (2011) The Effects Of Creative Dancing Activities On Motivation, Self- Esteem, Self-Efficacy And Dancing Performance . *Hacettepe Journal of Sports Sciences*, 40(40), 363-374.
24. Vecchio GM, Gerbino M, Pastorelli C ve ark. (2007) Multi-faceted self-efficacy beliefs as predictors of life satisfaction in late adolescence. *Pers Individ Dif* 43:1807-1818.
25. Yetim, Ü. (1991). Life satisfaction in terms of organization and pattern of personal projects
26. . Unpublished Master's Thesis, Ege University, Institute of Social Sciences, , İzmir.
27. Yiğit, R., Dilmaç, B., & Deniz, M. (2011). Job and Life Satisfaction: A Survey of Konya Police Department . *Turkish Journal of Police Studies Vol.*, 13(3), 1-18.
28. Yildirim, F., & İlhan, İ. Ö. (2010). The validity and reliability of the general self-efficacy scale-Turkish form. *Türk Psikiyatri Dergisi*, 21(4), 301.

POST-ACTIVATION POTENTIATION (PAP): EFFECT ON TARGET PERFORMANCE IN ARCHERY

BURCU BAYAZIT¹, BULENT TURNA^{2*}

1. PHD, Akdeniz University Faculty of Sport Sciences Antalya, Turkey, bayazittburcu@gmail.com

2. Assistant Professor, Akdeniz University Faculty of Sport Sciences, Antalya, Turkey

Corresponding author: bulentturna@akdeniz.edu.tr

ABSTRACT

Post-activation potentiation (PAP) is a physiological phenomenon referring to acute improvement in muscle's ability to generate strength and thus performance potentially. The purpose of this study was to investigate the effect of PAP on target performance in archery. Thirteen male archery athletes competing in Olympic archery voluntarily participated in this study. Participants' ages, experience in this sport (years), stature, body mass, body-mass index, bent-over row 1 repetition maximum (1RM) 85% were determined in the first session. PAP protocols were applied with a load of 85% of 1RM. Athletes participated in each protocol in a crossover design. The test protocols applied to athletes were as follows; Archery Specific Warm-up Protocol (ASW), five-minutes rest following PAP protocol prior to the first phase (PAP5), eight-minutes rest following PAP protocol prior to the first phase (PAP8), and lastly eight-minutes rest PAP protocol before both phases (PAP8x2). After each protocol, athletes shoot at targets set at 60 meters away, and each score was recorded. Statistical analyses were conducted using SPSS 20, and statistical significance was set at $p < 0.05$. One-way ANOVA with repeated measures was used for normally distributed data. No statistically significant difference was determined between ASW and PAP protocols, yet better target performance was noted following PAP considering score means. The findings of this study suggest that PAP protocols applied before shooting are effective considering score means even though this effect is not statistically significant. Per this trend, both the positive effects of PAP on performance, particularly on strength, and the need for considering PAP for each athlete individually are suggested not to be overlooked.

KEYWORDS: archery, post-activation potentiation, target performance, warm-up

INTRODUCTION

Sportive performance and physical activity is affected by the developments in various fields such as technology, education, medicine and health sciences^{1,2}. The competition level in sportive performance has increased all around the world due to these developments. Especially in important competitions where the best athletes in the world compete with each other, championships can be determined with very small differences like split seconds². Shooting skills in archery require various skills such as assessment, readiness, adaptation, pulling and synchronization of the hands. The fitness level in archery includes aerobic and anaerobic endurance, flexibility, general and special forces, general balance and coordination, and body control skills³. The widely used methods in selecting the warm-up protocol, which is one of the most important issues in sportive performance, are dynamic and static stretching exercises applied after submaximal warm-up conditions^{4,5,6}. Post-activation potentiation (PAP) is the acute increase in muscle strength gain and potentially performance in response to a preloaded exercise⁷. The physiological main mechanism of PAP is considered to be the phosphorylation of myosin regulatory light chains that provide more sensitive actin-myosin interaction to Ca^{2+} released from the sarcoplasmic reticulum⁸. As a result, the level of myosin cross-bridge activity increases in response to submaximal concentrations of myoplasmic Ca^{2+} ⁹. The second mechanism is that the increased neural activity level due to maximal and near-max contractions causes more motor units to be activated¹⁰. Although all muscles generate force with the sliding filament mechanism, the ability of the same muscle to generate different amounts of force depends on the motor unit requirement, cross-sectional area, fibril alignment and muscle length^{11,12}. An intense and prolonged conditioning activity can activate the PAP mechanism more, but fatigue increases with PAP¹³. In other words, after near-max contractions, fatigue and potentiation occurs simultaneously and their combined effect begins to decrease with time. The PAP effect is seen for a while after fatigue disappears. This process, in which the effects of fatigue diminish as much as possible and potentiation continues, can provide an advantage in sportive performance. This advantageous time period, in which potentiation is maximum and fatigue is minimum after the conditioning activity, is also referred to as "window of opportunity"¹⁴. The longer the recovery times between the end of the conditioning activity and the start of the performance, the higher the fatigue recovery, but also the greater the disruption of the PAP mechanism¹³. The balance between fatigue and potentiation is affected by the characteristics of the individual and strength-power-potentiation complex^{15,16}. According to the literature review, PAP applications have various effects on sportive performance. Therefore, while benefiting from the advantages of PAP in professional athletes, it should not be ignored that the PAP effect be evaluated individually for each athlete. This study aimed to investigate the effect of PAP on the target performance in archery.

METHODOLOGY

Participants

13 male archers competing in the Olympic archery category participated in the study by filling out the "Informed Volunteer Consent Form". Participants were enabled to participate in each protocol (24-hour interval) using the cross over design method. At least 2 hours before each application, they were asked not to consume caffeine and do anaerobic exercise.

Measurements

Stature measurement

Statures were measured with 0.1 m accuracy in an upright position using SECA (Germany) height scale.

Body weight measurement

Body weights were obtained using SECA (Germany) electronic scale with a sensitivity of 0.5 kg.

BMI calculation

Body mass index (BMI) was calculated using the relationship "weight (kg)/height (m)²".

Bent Over Row IRM measurement

Bent over row movement was selected as the resistant exercise in this study because it is an upper body movement including explosive pulling strength. A standard warm-up protocol was applied to the athletes before IRM measurement. This protocol includes 5 minute-jogging followed by five upper extremity static stretching exercises with 40-50% of the maximum perceived heart rate. The movements were applied for 2 sets and 15 seconds. Before IRM measurement, athletes applied bent over row movement with light weights for 1 set of 5 repetitions. They did this movement after lying face down on a bench parallel to the floor by using their pulling hand (the hand holding the bar). They got support from the weight on the ground with their other hand to remain stable (Figure 2.1). With the increasing load in each trial, the IRM value of the athlete was determined and 85% of IRM was calculated. 2-3 minute rest intervals were used between trials.

Arrow Shooting Score Test

The shooting score test was carried out in a 60 meters indoor archery hall; thus the wind factor was eliminated. In archery, 60 meters is one of the non-Olympic competition distances. In determining the archery score, JVD 122 cm Olympic target paper consisting of 10 rings was used. 3 series of trial shots were performed to warm up and adjust the sight and in each series, 6 arrows were shot. 72 arrows were shot in total, being 2 sets for each protocol with 6 series in each tour and 6 arrows in each series. 240 seconds was given for each series, including trial shots. Except for the PAP8x2 procedure, 15 minute-rest was given between every two tours.

Procedures

The research was planned to carry out in 5 phases. In the first phase, age, training age, stature, body weight, BMI and bent over row IRM values of the participants were recorded. 85% of IRM values were calculated and then used in PAP protocols. 3 different PAP protocols and 1 archery-specific warm-up protocol were applied to all participants in 4 phases by cross over method. They were subjected to 60 meter-shooting tests and their scores were recorded. 24 hour-resting was given between each session. In each test, athletes were verbally encouraged to reach the maximum level.

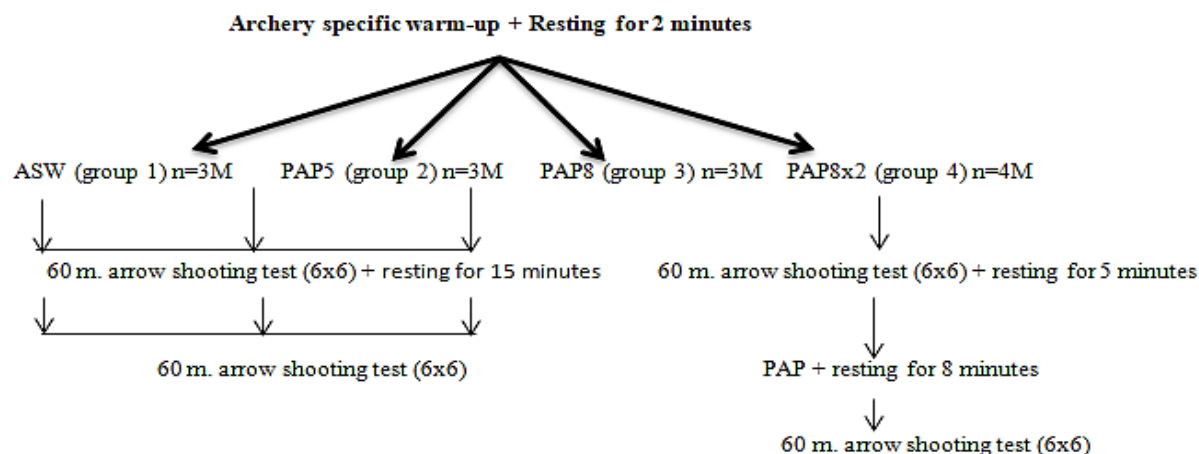


Figure 1. Research design (participants applied each protocol with cross over design)

Archery Specific Warm-up Protocol (ASW)

The classical warm-up procedure applied in the study includes 5 minute-jogging with 40-50% of the maximum heart rate, followed by 5 upper extremity static stretching exercises (Figure 1). The movements were applied for 2 sets and 15 seconds. After 60 meter-trial shots (6 arrows, 3 series), the athletes were subjected to the shooting test.

PAP protocol prior to the first phase (PAP5)

After the archery-specific warm-up protocol (ASW), bent over row movement was applied first using light weights for 1 set with 5 repetitions and then with 85% of IRM for 1 set with 3 repetitions. Archers were subjected to the shooting test after a 5-minute rest.

Eight-minutes rest following PAP protocol prior to the first phase (PAP8)

After the ASW, bent over row movement was applied first using light weights for 1 set with 5 repetitions and then with 85% of IRM for 1 set with 3 repetitions. Archers were subjected to the shooting test after an 8 minute-rest.

Eight-minutes rest PAP protocol prior to both phases (PAP8x2)

After the ASW, bent over row movement was applied first using light weights for 1 set with 5 repetitions and then with 1RM 85% for 1 set with 3 repetitions. Archers were subjected to the shooting test after an 8 minute-rest. After the end of the 1st tour shots, 5 minute-rest was given. The athletes applied the bent over row movement with 85% of 1RM for 1 set with 3 repetitions. Archers were subjected to the shooting test after 8 minute-rest.

Statistical Analysis

The analysis of the data was evaluated according to the significance level of $p < 0.05$ in the SPSS 20 statistics program. Descriptive statistical values such as arithmetic mean and standard deviation were calculated for all variables. Whether the data showed a normality distribution was determined by the Shapiro-Wilk test. One-way ANOVA with repeated measures was used for normally distributed data.

RESULTS & DISCUSSION

Table 1. Descriptive characteristics of the study group

(n=13)	Minimum	Maximum	Mean±SD
Age (year)	15.00	21.00	17.23±1.87
Stature (cm)	160.00	190.00	176.38±8.84
Body Weight (kg)	57.00	98.00	71.46±12.08
Training Age (year)	1.00	7.00	5.07±1.84
BMI (kg/m ²)	18.83	33.91	23.06±4.29
1RM (kg)	25.00	45.00	33.00±6.77
85% of 1RM (kg)	21.00	38.00	28.07±5.75
Bow Stiffness (lb)	39.00	47.50	43.17±2.62

Table 2. Comparison of total mean scores with respect to protocols

(n=13)	Minimum	Maximum	Mean ± SD	F	P
ASW	608.00	666.00	640.38±17.47	0.62	0.60
PAP5	631.00	666.00	646.38±11.03		
PAP8	605.00	681.00	642.53±20.37		
PAP8x2	618.00	673.00	643.61±15.80		

$p < 0.05$

When examining Table 2, in the comparison of mean scores concerning protocols, the mean scores of the archers were found to be higher in the PAP protocols than the ASW protocol. Moreover, the highest mean score was obtained in the PAP5 protocol. There was no statistically significant difference found in the comparison of the mean scores with respect to the protocols ($p > 0.05$).

Table 3. Comparison of 1st and 2nd tour mean scores with respect to protocols

1st Tour (n=13)	Minimum	Maximum	Mean ± SD	F	P
ASW	293.00	335.00	320.23±10.59	0.10	0.95
PAP5	309.00	336.00	321.38±7.13		
PAP8	296.00	338.00	320.30±12.48		
PAP8x2	304.00	333.00	319.61±8.76		
2nd Tour (n=13)	Minimum	Maximum	Mean ± SD	F	P
ASW	304.00	336.00	320.15±10.80	1.21	0.31
PAP5	312.00	338.00	325.00±6.86		
PAP8	305.00	348.00	322.61±10.93		
PAP8x2	309.00	340.00	324.00±9.02		

According to Table 3, the mean values of 1st and 2nd tour scores were found to be higher in the PAP5 protocol compared to other protocols. Comparing the mean scores of 1st and 2nd tour according to the protocols, there was an increase determined in the mean score of the 2nd tour in the PAP protocols. Accordingly, it can be considered that as the potentiation continues with time, it can improve the target performance in archery. No statistically significant difference was found between protocols when comparing the mean scores of the 1st and 2nd tour concerning the protocols ($p > 0.05$).

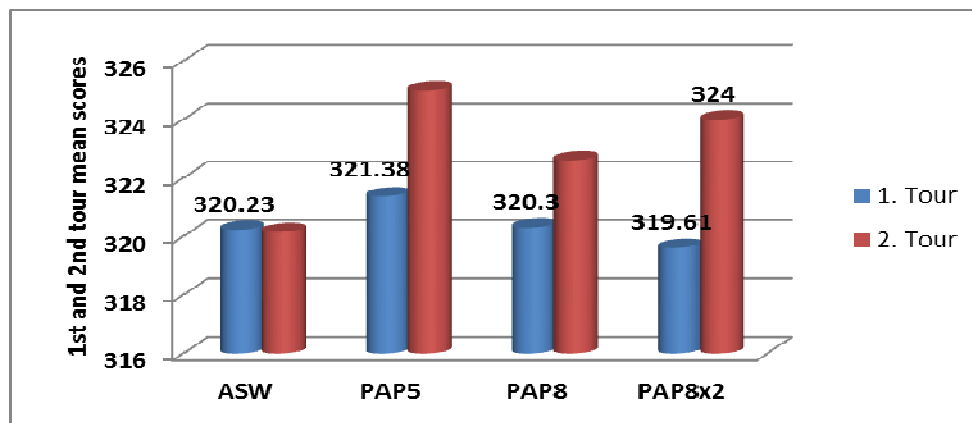


Figure 2. 1st and 2nd tour mean scores with respect to protocols

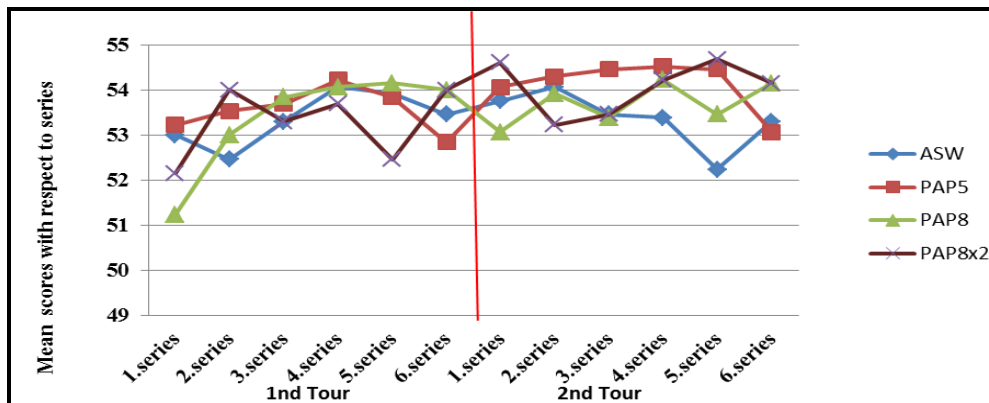


Figure 3. Mean scores of 1st and 2nd tour with respect to protocols

The data obtained from the warm-up protocols applied to participants before the shooting score test were examined and it was revealed that the PAP5 protocol increased the target performance more than other protocols, but this difference was not statistically significant. This study contributes to the archery literature on warm-up protocols that can be selected in the warm-up phase for target performance. Moreover, it is the first study examining the PAP effect in archery, which has not been studied yet in the literature. Although the effects of PAP have been studied for a long time, the studies investigating its effects on sportive performance have been limited. It should be noted that PAP provides an acute increase in strength. Acute strength increase in archery can potentially improve target performance by providing comfort during shooting. There are some studies in the literature indicating that PAP improves sportive performance and also other studies reporting contradictory results that it does not affect or reduce sportive performance. Bodden et al. (2019) found no statistically significant difference in comparing plyometric impulse and take-off velocities obtained after ballistic and non-ballistic bench press applications ($p > 0.05$). The results of that study support the conclusion of the present study that the PAP effect in the upper body did not reveal a statistically significant difference. De Assis et al. (2012) concluded that 1, 3, and 5 minute-rest periods given after the IRM bench press did not affect mean and peak power values. In the present study, after the 5 and 8-minute rest intervals given after PAP applications, when comparing the total mean scores, it was observed that a 5-minute rest improved the archery target performance more; however, this difference was not statistically significant ($p > 0.05$). The changes in the balance between fatigue and potentiation can vary the magnitude of the PAP effect⁸. Considering the relationship between fatigue and potentiation, RM loads can cause greater fatigue at submaximal loads. Therefore, submaximal loads can reduce the magnitude of the PAP response¹⁶. Seitz and Haff (2006) demonstrated that PAP had a slight effect on improving upper body ballistic bench press ($ES = 0.23$) and release performance ($ES = 0.26$). According to the findings of that study, the 5-7 minute rest intervals between the conditioning and next performance activity showed a greater PAP effect than the 3-4 minute rest intervals. Multiple sets of conditioning activities in eliciting the PAP effect show that they have a significantly larger effect ($ES = 0.69$) than a single set ($ES = 0.24$). IRM load during the conditioning activity had a greater effect ($ES = 0.51$) in eliciting the PAP effect rather than using a submaximal load ($ES = 0.34$). It can be considered in the light of the findings obtained in the present study that PAP has a low effect on the upper body following the results of the study performed by Seitz and Haff (2006). However, another important point is that professional athletes can win or lose matches with very small differences (sec, points). As in the study of Seitz and Haff (2006), it was concluded in the study of Bevan et al. (2009) that very short rest intervals inhibited the PAP effect. Therefore, in the present study, it was aimed to reveal a greater PAP effect by using 5 and 8-minute rest intervals. In contrast to the study of Forup and Sorensen (2010), Seitz and Haff (2006) found that using IRM load had a greater effect ($ES = 0.51$) in eliciting the PAP effect than using submaximal load ($ES = 0.34$). The main reasons for these differences are due to athlete's training age, bone age, fibril type, aerobic and anaerobic endurance capacity; accordingly, it is considered that each athlete should be evaluated individually by trainers or athletic performance coaches. Various literature studies are reporting that PAP increases sportive performance. It has been determined that PAP applications positively affect the biomotor properties as in the functional training method^{19,20}. Forup and Sorensen (2010) concluded that PAP performed at maximum intensity (IRM) to elicit potentiation in the

upper body increases the strength after 2, 10 and 12 minute rest periods. It was also emphasized that further studies should be carried out on this subject. Bevan et al. (2009) concluded that an 8-minute recovery period was required between heavy resistance activity and explosive movements to achieve optimal performance in the upper body and it was also indicated that it would be beneficial to determine the optimal recovery time individually. Although the 8-minute rest interval given after PAP application in the present study increased sportive performance compared to the warm-up protocol without PAP application, this difference was not statistically significant ($p>0.05$). De Assis et al. (2012) revealed that the 7-minute rest period given after IRM bench press increased both mean and peak power values. The researchers also stated that PAP could be used as an alternative method to increase performance during the competition or increase upper body strength in training. The volume and intensity of the conditioning activity, as well as the rest time between the training activity and next exercise, have significant effects on the magnitude of the PAP response. Higher levels of potentiation occur in several sets of moderate-intensity conditioning activities and subsequent exercises performed after 7-10 minute-recovery^{23,16}. In a study by Turna et al. (2019) examining the effect of PAP applications on some performance parameters in young male soccer players, it was concluded that PAP applications improved different performance variables more than classical loading methods ($p<0.05$).

CONCLUSION

As a result, this study revealed that PAP applications increased the target performance in archery by creating shooting comfort, but this difference was not statistically significant. As a strategy, PAP can be advantageous when the purpose is to increase performance during the competition or increase muscle strength during training. It should also be kept in mind that different PAP protocols can create different performance responses for each athlete. It is considered that further studies are necessary to benefit from the PAP in archery and determine the best strategy.

REFERENCES

1. Akyol B, İlkin M. 2018. Socialization of disabled people with sports activities and their problem encountered in participating in sports activities. *Türk Spor ve Egzersiz Dergisi*, 20: 100_104.
2. Turna B. 2020. Paramedikler için fiziksel uygunluk, beslenme, spor ve egzersiz. (Ed: Yurdakul BB, Özden H.) 1st edition. Hedef CS Publishing and engineering. Ankara
3. Ergen E, Hibner K. 2004. Sports medicine and science in archery. FITA.
4. Faigenbaum AD, Kang J, McFarland J, Bloom JM, Magnatta J, Ratamess NA, Hoffman JR. 2006. Acute effects of different warm up protocols on anaerobic performance in teenage athletes. *Pediatric Exercise Science*. 18: 64-75.
5. Gelen E, Dede M, Bergun MB, Aydin M. 2012. Acute effects of static stretching, dynamic exercises, and high volume upper extremity plyometric activity on tennis serve performance. *Journal of Sports Science & Medicine*. 11: 600.
6. Mandengue SH, Miladi I, Bishop D, Temfemo A, Cisse F, Ahmaidi S. 2009. Methodological approach for determining optimal active warm-up intensity: predictive equations. *Science & Sports*; 24: 9_14.
7. Stone M, Sands W, Pierce K, Ramsey MW, Haff GG. 2008. Power and power potentiation among strength-power athletes: preliminary study. *Int J Sports Physiol Perform*. 3: 55_67.
8. Rassier DE, MacIntosh BR. 2000. Coexistence of potentiation and fatigue in skeletal muscle. *Braz. J. Med. Biol. Res*. 33: 499_508.
9. MacIntosh HR. 2003. Role of calcium sensitivity modulation in skeletal muscle performance. *News Physiol Sci*. 18: 222_225.
10. Baker DA. 2001. Series of studies on the training of high-intensity muscle power in rugby league football players. *J Strength Cond Res*; 15: 198_209.
11. Cael C. Functional Anatomy. 2017. Translator: Avcı Ş, Yıldırım ÜN, Bakar Y. 3rd edition, Nobel Tıp Bookstores Ltd. Şti., Istanbul. 59-60.
12. Isildak K. 2020. Investigation the correlation of leg volume with anaerobic power and dynamic balance. *International Journal of Applied Exercise Physiology*. 9: 31_38.
13. Sale DG. 2002. Post activation potentiation: role in human performance. *Exerc. Sport. Sci Rev*. 30: 138_143.
14. Hancock AP, Sparks KE, Kullman EL. 2015. Postactivation potentiation enhances swim performance in collegiate swimmers. *J Strength Cond Res*. 29: 912_917.
15. Tillin NA, Bishop D. 2009. Factors modulating post-activation potentiation and its effect on performance of subsequent explosive activities. *Sports Med*. 39: 47_66.
16. Seitz LB, Haff GG. 2006. Factors modulating post-activation potentiation of jump, sprint, throw, and upper-body ballistic performances: A systematic review with meta-analysis. *Sports Medicine*. 46: 231_240.
17. Bodden D, Suchomel TJ, Lates A, Anagnost N, Moran MF, Taber CB. 2019. Acute effects of ballistic and non-ballistic bench press on plyometric push-up performance. *Sports*. 7: 47.
18. De Assis F, Panissa SL, Miarka VLG, Franchini E. 2012. Postactivation potentiation: Effect of various recovery intervals on bench press power performance. *J Strength Cond Res*. 26: 739_744.
19. Turna B, Alp M. 2020. The Effects of Functional Training on Some Biomotor Abilities and Physiological Characteristics in Elite Soccer Players. *Journal of Education and Learning*. 9: 164_171.
20. Turna B, Gençtürk B, Bulduk Y. 2019. PAP uygulamalarının genç erkek futbolcularda bazı performans parametreleri üzerine etkisinin incelenmesi. *Mediterranean Journal of Humanities*. 1: 335_347.
21. Forup J, Sorensen H. 2010. Postactivation potentiation: Upper body force development changes after maximal force intervention. *J Strength Cond Res*. 24: 1874_1879.
22. Bevan, HR, Cunningham DJ, Tooley EP, Owen NJ, Cook CJ, Kilduff LP. 2010. Influence of postactivation potentiation on sprinting performance in professional rugby players. *The Journal of Strength & Conditioning Research*, 24: 701_705.
23. Wilson JM, Duncan NM, Marin PJ, Brown LE, Loenneke JP, Wilson SM, Ugrinowitsch C. 2013. A meta-analysis of post-activation potentiation and power: effects of conditioning activity, volume, gender, rest periods, and training status. *J Strength Cond Res*. 27: 854_859.

EVALUATION OF SPORTS AWARENESS OF PARENTS OF INDIVIDUALS WITH AUTISM ATTENDING TO SPORTS CLUBS

Mehmet ILKIM¹, Fatma ÖZOĞLU², Metin Can KALAYCI³

1-mehmet.ilkim@inonu.edu.tr, ORCID:0000-0003-0033-8899- Associate Professor, Department of Exercise and Sport Education in Disabilities, Inonu University, Malatya, Turkey

2-fmne_fatma44@hotmail.com, Postgraduate Student of the Department of Physical Education and Sports, Inonu University, Malatya, Turkey

3-m.c.k@windowslive.com, ORCID:0000-0001-5047-7358, Dicle University, Diyarbakir, Turkey

*Corresponding author: mehmet.ilkim@inonu.edu.tr

ABSTRACT

This study aimed to examine the awareness of the sport for the parents of individuals with autism attending to sports clubs in terms of various demographic variables. In line with the stated purpose, this research was conducted following the scanning model in the quantitative research type. The population of the sports clubs in Turkey ongoing autism research while creating individuals with parents; the sample consisted of parents with autism, aged between 26 (years) and 64 (years) in Malatya, and attending sports clubs, 15 men and 22 women. The Demographic Variables Information Form was prepared by the researchers following the purpose of the research and the Sports Faculty Scale developed by Uyar and Sunay (2020) was used as the main data collection tool in the study. The analysis of the data was done using the SPSS 15.0 statistics package program. The normality distribution of the data was determined with the Shapiro-Wilk Normality Test. Differences between independent groups were determined by independent sample T-test and one-way analysis of variance (one-way ANOVA). Statistical significance was accepted as $p < 0.05$. According to the statistical analysis results; a significant difference was found in the sports awareness level values of the parents of individuals with autism who attend sports clubs, according to their gender, educational status, their participation in sports, their interest in sports, and the presence of individuals engaged in sports in their families. ($p < 0.05$). It can be said that male parents of an individual with autism who attend sports clubs may have higher levels of sports awareness than female parents. It can be said that higher education graduate parents of an individual with autism who attend sports clubs may have higher levels of sports awareness than parents with only secondary education and only primary education graduates with an individual with autism attending sports clubs. It can be said that parents who have an individual with autism who attend sports clubs and who show an interest in sports as a participant may have higher levels of sports awareness than parents with an individual with autism who attend sports clubs and show an interest in sports as a viewer. It can be said that parents of an individual with autism who attend sports clubs and individuals who are engaged in sports in their families, may also have higher levels of sports awareness than parents who have an individual with autism who attend sports clubs and do not have an individual engaged in sports in their family.

Keywords: Autism, Sports Awareness, Parents

1. INTRODUCTION

Sport is a phenomenon that appeals to large masses in the national and international arena, is carried out as a universal, competition, tournament, and competition, and is a widely popular phenomenon.¹ Sport is important for all individuals, but it is much more important for private individuals. Because particular individuals will have the opportunity to be together with other special individuals and healthy individuals thanks to sports, it becomes easier for them to adapt to society thanks to sports. Sports in private individuals; It takes part in rehabilitating the individual, physical and mental development, physiological and metabolic events.²

Autism is a neurological behavioral disorder that emerges in the early stages of life and affects the individual throughout life, which forces the individual to communicate and establish social relationships.¹² Since they are exhibiting individuals, their social areas are very few. Thanks to sports, these individuals gain communication skills, reduce this type of problem behavior and increase their adaptation skills.⁴

Parents of individuals with autism have a great role in integrating their children into society. For this reason, parents with an individual with autism should socialize with their children, have positive psychological health, be innovative, enjoy life, and make the processes they experience positive. Sports activities among all these; It is a field where children will participate with their parents and where they can participate in leisure activities where they can feel comfortable in terms of spiritual, physical, and mental aspects.⁵ The more parents support their children's participation in sports and the more opportunities they offer, the healthier and more positive socialization the child is seen. Therefore, the better the individual has mental and mental health at the point of socialization, the higher his success.⁶ Sports awareness; It can be defined as learning the contribution of sports to the person and society, associating it with other disciplines, adapting it to daily life, and increasing the consciousness and sensitivity of the environment by sharing all these with the environment.⁷ In early childhood, it is very important for the future and sportive success of the country that parents introduce their children to sports and direct them to the appropriate branch according to their interests and abilities. Based on this, many parents should be reached, supported, awareness and sensitivity about sports should be increased and cooperation should be made.⁸

1.1. Purpose of the research

This study aimed to examine the sports awareness levels of parents of individuals with autism who attend sports clubs in terms of various demographic variables.

1.2. Importance of Research

This research is important to learn what the sports awareness levels of parents of individuals with autism who attend sports clubs are, what should be done to increase the current level, and since it will be a pioneer for future studies.

2. METHOD

2.1. Research Model

In this research, the scanning model, one of the quantitative research methods, was used.

2.2. Research Population - Sample

While the research population consisted of parents of individuals with autism still attending a sports club, the sample consisted of parents of individuals with autism, aged between 26 (years) and 64 (years) in Malatya, and attending sports clubs, 15 men and 22 women.

2.3. Collection of Data

The Demographic Variables Information Form prepared by the researchers following the purpose of the study and the Sports Faculty Scale developed by Uyar and Sunay (2020) was used as the main data collection tools in the study. Due to the pandemic, the scales were delivered to the parents online via Google forms and the responses were collected online via Google Forms. Later, it was saved in Excel and transferred to the SPSS 15.0 package program for Windows.

2.4. Data Analysis

The analysis of the data was done in SPSS 15.0 statistics package program for Windows. Percentage (%), frequency (f) arithmetic mean (X), standard deviation (Std. D.), Maximum (Max) and minimum (Min) values were determined for the parameters obtained from the demographic information form and data collection tools. Shapiro-Wilk normality test was used to determine the normality distributions of the data. After the assumptions of the parametric tests were not met, the differences between independent groups were determined using the independent samples t-test and one-way analysis of variance (One-Way ANOVA) tests. The statistical significance level in the study was accepted as $p < 0.05$.

Cronbach Alpha Coefficients

Sports Awareness (Scale total): .967

Sports Information and Discrimination (Sub-dimension): .973

Social and Individual Benefit (Sub-dimension): .960

I. RESULTS

All findings obtained from the research are given in tables in detail.

Table 1. Occupational Status Distribution of Parents of Autistic Individuals Attending Sports Clubs

Occupation	f(Frequency)	%(Percentage)
Academician	1	2,7
Retired	1	2,7
Housewife	10	27,0
Worker	2	5,4
Officer	15	40,5
Teacher	2	5,4
Self-employment	6	16,2
Total	37	100,0

In Table 1, the occupation distribution of parents with an individual with autism who attends the sports clubs participating in the research is given in detail. It is seen that the majority of the parents who attend the participating sports clubs who have an individual with autism are officers (40.5% / $f = 15$) or housewives (27.0% / $f = 10$).

Table 2. The Scores Obtained by the Parents of Individuals with Autism Attending Sports Clubs from the Sports Awareness Scale

Parameter	n	Min.	Max.	$\bar{X}$	Std. D.
Sports Awareness (Total Scale)	37	72,0	146,0	106,4	21,6
Sports Knowledge and Discrimination of Knowledge (Sub-Dimension)	37	54,0	102,0	76,1	13,8
Social and Individual Benefit(Sub-Dimension)	37	18,0	44,0	30,4	8,1

According to Table 2, the average values obtained from the Sports Awareness Scale by the parents of individual with autism who attend the sports clubs participating in the study are 106.4 ± 21.6 points for Sports Awareness (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-Dimension), and 30.4 ± 8.1 points for Social and Individual Benefit (Sub-dimension).

Table 3. Comparison of Sports Awareness Levels of Parents of Autistic Individuals Attending Sports Clubs by Gender

Parameter	Group	n	$\bar{X}$	Std. D.	t	Sd.	p
Sports Awareness (Total Scale)	Man	15	119,0	18,6	3,306	35	,002*
	Woman	22	97,9	19,4			
Sports Knowledge and Discrimination of Knowledge (Sub-Dimension)	Man	15	84,2	11,8	3,348	35	,002*
	Woman	22	70,5	12,5			
Social and Individual Benefit (Sub-Dimension)	Man	15	34,8	7,2	3,080	35	,004*
	Woman	22	27,4	7,2			

***p<0.05**

According to Table 3, a significant difference was found in Sports Awareness (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension), and Social and Individual Benefit (Sub-dimension) scores of parents of individuals with autism who attended sports clubs participating in the study. ($p < 0.05$). In all of these differences; Sports Awareness Scale (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension), and Social and Individual Benefit (Sub-dimension) scores of male parents of an individual with autism who attend sports club were found to be higher than female parents ($p < 0.05$).

Table 4. Comparison of Sports Awareness Levels of Parents of Individuals with Autism Attending Sports Clubs According to Their Ages

Parameter	Age(Year)	n	$\bar{X}$	Std. D.	t	Sd.	p
Sports Awareness (Total Scale)	40≤	17	102,5	22,2	-1,031	35	,310
	41≥	20	109,8	21,0			
Sports Knowledge and Discrimination of Knowledge (Sub-Dimension)	40≤	17	72,8	13,6	-1,322	35	,195
	41≥	20	78,8	13,8			
Social and Individual Benefit (Sub-Dimension)	40≤	17	29,6	8,7	-,506	35	,616
	41≥	20	31,0	7,5			

***p<0.05**

According to Table 4, no significant difference was found in the Sports Awareness (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension) and Social and Individual Benefit (Sub-dimension) scores according to the ages of the parents of individuals with autism who attend sports clubs ($p > 0.05$).

Table 5. Comparison of Sports Awareness Levels of Parents of Individuals with Autistic Person Attending Sports Clubs According to Their Interest in Sports

Parameter	Interest	n	$\bar{X}$	Std. D.	t	Sd.	p
Sports Awareness (Total Scale)	Audience	16	91,3	19,0	-4,712	35	,000*
	Participant	21	118,0	15,5			
Sports Knowledge and Discrimination of Knowledge (Sub-Dimension)	Audience	16	66,8	12,8	-4,375	35	,000*
	Participant	21	83,1	10,1			
Social and Individual Benefit (Sub-Dimension)	Audience	16	24,5	6,6	-5,047	35	,000*
	Participant	21	34,9	5,9			

***p<0.05**

According to Table 5; a significant difference was found in the Sports Awareness (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension), and Social and Individual Benefit (Sub-dimension) scores according to the interests of the parents of an individual with autism who attended the sports clubs participating in the study ($p < 0.05$). In all of these differences; Sports Awareness Scale (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension), and Social and Individual Benefit (Sub-dimension) scores of parents of an individual with autism who attends sports clubs, and an audience with an individual with autism attending sports clubs. It was found to be higher than parents who showed interest ($p < 0.05$).

Table 6. Comparison of Sports Awareness Levels of Parents of Individuals with Autism Attending Sports Clubs According to Their Families with Individuals Engaged in Sports

Parameter	Status	n	$\bar{X}$	Std. D.	t	Sd.	p
Sports Awareness (Total Scale)	Yes	24	111,0	19,7	2,612	35	,015*
	No	13	97,9	23,18			
Sports Knowledge and Discrimination of Knowledge (Sub-Dimension)	Yes	24	78,7	12,7	2,313	35	,024*
	No	13	71,2	15,1			
Social and Individual Benefit (Sub-Dimension)	Yes	24	32,4	7,3	2,161	35	,038*
	No	13	26,7	8,2			

***p<0.05**

According to Table 6, Sports Awareness (Scale Total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension), and Social and Individual Benefit (Sub-dimension) scores of parents of individuals with autism who attend sports clubs participating in

the research. A significant difference was determined ($p < 0.05$). In all of these differences; Sports Awareness Scale (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension), and Social and Individual Benefit (Sub-dimension) scores of parents who have an individual with autism who attends sports clubs and have an individual who is engaged in sports have an individual with autism attending sports clubs and It was determined that it was higher than the parents who did not have a sportsman in their family ($p < 0.05$).

Table 7. Comparison of Parents of Individuals with Autistic Person Attending Sports Clubs by Educational Status

	Group/Group number	n	$\bar{X}$	Std. D.	F	Sd.	p	Post-Hoc/(p)
Sports Awareness (Total Scale))	Primary Education / 1	10	96,6	18,9	3,662	2	,034*	1<2*/p= ,004
	Secondary Education / 2	11	101,5	20,2				1<3*/p= ,018
	Higher Education / 3	16	116,0	21,3				2<3*/p= ,007
Sports Knowledge and Discrimination of Knowledge (Sub-Dimension)	Primary Education / 1	10	69,4	12,1	3,905	2	,030*	1<2*/p= ,001
	Secondary Education / 2	11	72,5	12,8				1<3*/p= ,013
	Higher Education / 3	16	82,7	13,3				2<3*/p= ,006
Social and Individual Benefit (Sub-Dimension)	Primary Education / 1	10	27,2	7,0	3,394	2	,041*	1<2*/p= ,000
	Secondary Education / 2	11	29,0	7,6				1<3*/p= ,022
	Higher Education / 3	16	33,3	8,3				2<3*/p= ,009

* $p < 0.05$

According to Table 7, a significant difference was determined in Sports Awareness (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-dimension), and Social and Individual Benefit (Sub-dimension) scores according to the educational status of parents of individuals with an individual with autism attending sports clubs participating in the study. ($p < 0.05$). In all of these differences; Higher Sports Awareness than only primary education graduate parents who attend sports clubs of higher education graduate parents with autism and only primary education graduates with an individual with autism, only secondary school graduates with autistic individuals who continue sports clubs, and only primary school graduates with autistic individuals who continue sports clubs (Scale total), Sports Knowledge and Discrimination of Knowledge (Sub-Dimension), and Social and Individual Benefit (Sub-dimension) scores ($p < 0.05$).

4. DISCUSSION

Considering those particular individuals are less in contact with those around them than other individuals and have difficulty in communicating with their peers socially, and considering their social skills and adaptation, the necessity of some sports activities for the development of these individuals comes to the fore.

Based on this study aimed to examine the sports awareness levels of parents of individuals with autism who attended sports clubs in terms of various demographic variables. In line with the stated purpose, statistical significance was accepted as $p < 0.05$. According to the statistical analysis results, a significant difference was found in the sports awareness level values of the parents of an individual with autism who attend sports clubs, according to their gender, educational status, their participation in sports, their interest in sports, and the presence of individuals engaged in sports in their families. ($p < 0.05$).

5. CONCLUSION

It can be said that those attend in sport clubs may have higher sports awareness levels than parents who are not present.

6. SUGGESTIONS

- Since this research is conducted on parents with autism who regularly attend sports clubs, future research can be repeated by comparing the awareness of the sport of individuals with autism who do not attend sports clubs and individuals with autism.
- Since the sample of this research is made up of parents in the province of Malatya, future studies can be repeated on a larger sample group.
- Since this research is conducted only on individuals with autism, future research can be adapted to other disability groups.
- Projects can be carried out in cooperation with public institutions and organizations to increase the awareness of the sport of parents with disabled individuals.

5. REFERENCES

1. Atılğan, D. ve Tükel, Y., (2019). Exemanation of Refrees Decision Making Styles, Sport Sciences (NWSASPS), 14(2): 22-32,

2. Atay M (1995) The Importance of Sports Activities in the Self Development of Individuals with Disabilities. Antalya international sports symposium for the Disabled. T.C. Prime Ministry, General Directorate of Youth and Sports Education. Publication number: 1197/1. 97-100 s, Ankara.
3. Aydın A. First Step in Autism . İstanbul: Epsilon Publishing, 2005: 25-40.
4. Ozer-Sevimay, D., (2001) "Engelliler İçin Beden Eğitimi ve Spor" İstanbul: İnd Ed., Nobel Yayınları.
5. Dogduay, G. (2013). The Effect of Sports on Quality of life of Parents with Disabilities. (Master thesis). Sakarya University, Institute of Education Sciences, Sakarya.
6. Dever, A. (2010). Sport Sociology: Sports and Society in Historical and Contemporary Dimensions . Başlık Publication. Episode, 3 and 4.
7. Uyar, Y. (2019). Spor Farkındalığı Ölçeğinin Geliştirilmesi ve Toplumun Spor Farkındalıklarının Değerlendirilmesi. Erişim adresi: [Ulusal Tez Merkezi | Anasayfa (yok.gov.tr)] Erişim Tarihi: 17.01.2021
8. Hergüner, G. (1991). Çocuğun spora yönelmesinde ailenin rolü ve önemi. Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 6(1): 91-95.
9. İlkım M. Kalaycı MCK, Güleroglu F., Gündogdu C. (2018). Down Sendromlu Çocuklarda Sportif Etkinliklere Katılma Durumuna Göre Sosyal Uyum Ve Beceri Düzeyinin İncelenmesi İnönü University International Journal of Social Sciences / İnönü Üniversitesi Uluslararası Sosyal Bilimler Dergisi, Volume/Cilt 7, Number/Sayı 1, (2018)

THE EFFECT OF SELF-TALK ON DRIBBLING AND LAY-UPS IN BASKETBALL DURING A 12-WEEKS TRAINING

Abdulaziz KULAK¹ and Turhan TOROS^{*2}

1. School of Physical Education and Sports, <https://orcid.org/0000-0003-4054-3336>

2. Department of Sports Sciences, Mersin University, Mersin, Turkey <https://orcid.org/0000-0002-8328-2925>

*Corresponding author: turhantoros@yahoo.com

ABSTRACT

This study was conducted to investigate the effect of self-talk on lay-ups and dribbling during twelve weeks of training. The study adopted an experimental design and a pre-test/post-test control group model was used. There is an experimental group (twelve weeks of training + self-talk) and a control group (twelve weeks of training) in the research. Groups were formed through random sampling. A total of 30 basketball players, 15 in the experimental group and 15 in the control group, were selected aged between 16-17 who played in a youth basketball team. After the approval of the Ethics Committee for the study, the necessary permission was obtained from the Provincial Directorate of Youth and Sports. The basketball players were equally divided into two groups as experimental and control groups according to their pre-test results. While the control group continued their routine training, the experimental group was given a 15-minutes mental training program before training 3 days a week for 12 weeks. After the mental training program of self-talk technique was completed, the athletes in experimental and control groups were given a post-test. Dribbling Evaluation Form and Lay-ups Evaluation Form were used as data collection tools. In the data analysis, the normality test was performed and the data was not found to be normally distributed according to the Shapiro Wilk test. Since the data distribution was not normal, Wilcoxon Signed Ranks Test and Mann Whitney-U Test for independent paired comparisons were used in data analysis in addition to arithmetic mean (X) and frequency (f). A significant difference was found between the dribbling skills pre-test and post-test scores of the athletes ($z = -3.651$, $p < .01$). A significant difference was found between the lay-up skills post-test scores of the athletes ($U = 36.50$; $p < .01$). It can be concluded that the self-talk training had a significant effect on improving the dribbling and lay-up skills of the athletes.

KEYWORDS: Self-talk, dribbling, lay-ups, basketball,

INTRODUCTION

It is natural for individuals to have inner dialogues with themselves in their daily lives. Consistent inner dialogue with ourselves allows our feelings and thoughts to be organized. The most important psychological skill practiced by athletes is self-talk. Regarding the theoretical basis of inner speech, Hardy (2006) stated that theory-based studies on self-talk are insufficient.¹ Also, it is stated that Vygotsky's (1986) concept of mental effort will be adopted. Inner-speech is defined as an inner-dialogue that enables people to empower themselves by giving instructions as well as by understanding, evaluating, regulating, and changing their emotions and perceptions.¹¹ Self-talk refers to a much wider meaning than inner speech, and external factors have also an influence.¹⁴ Self-talk can be defined as a person's directing him/herself internally or externally (aloud).⁶ Negative self-talk leads to negative emotions (anxiety, worry) and consequently negative behaviors, which influences our performance negatively. Negative internal dialogue with ourselves for any reason before, during, or after a competition or training is the cause of negative performance. In this sense, the important thing is to identify negative emotions and attitudes and to be able to learn to replace them with positive and more realistic thoughts. There several studies on goal setting, leadership and motivational climate in sports.^{8, 13, 14} Studies on self-talk, on the other hand, are recent. Sports psychology is a multi-dimensional field that includes skills learning, cognitive and affective domains. For this reason, skills must be acquired most appropriately. This study investigates the effect of self-talk, which increases the qualities of athletes related to basketball, has been the subject of many studies globally and is thought to have a major role in skill learning, on basketball skills. This study was conducted to identify the effect of self-talk on lay-ups and dribbling during twelve weeks of training.

METHOD

The study adopts an experimental design and a pre-test/post-test control group model was used. There is an experimental group (twelve weeks of training + self-talk) and a control group (twelve weeks of training) in the research. Groups were assigned randomly.

Study Group

In order to investigate the effect of self-talk on dribbling and lay-up performance in basketball, 30 basketball players were selected aged between 16-17 including 15 in the experimental group and 15 in the control group.

Procedure

Following the approval of the Ethics Committee, the necessary permission was obtained from the Provincial Directorate of Youth and Sports. Parents of the athletes were informed about the study through a Parental Consent Form, and their approval was obtained for the children to participate in the study. The basketball players whose parents gave consent were informed about the study and they filled out the Consent Form, and then pre-tests were carried out. According to the pre-test results, basketball players were equally divided into experimental and control groups. While the control group continued their

routine training, the experimental group was given a 15-minute mental training program for self-talk before training, 3 days a week for 12 weeks. Following the mental training program for self-talk technique, the athletes in experimental and control groups were given a post-test.

Data Collection Tools

Dribbling Evaluation Form

The Dribbling Evaluation Form, which was tested and found reliable and valid by³ was used to evaluate the competencies of the participants in dribbling skills. The form includes a measurement tool that evaluates the following parameters by assigning a score ranging between 0-5. These parameters are A-Ball-Handling: can dribble the ball in front of the body, does not look down at the ball, can dribble with fingertips, can push the ball at an angle using elbow first and then wrist. B- Stepping: can do stepping with knees bent, feet are shoulder-width apart, stepping foot point straight ahead, knees are at a certain angle forward. C- Body Position: maintains body's center of gravity at hip level, the body moves leaning forward, head and shoulders are facing straight ahead. D- Coordination: The whole body hops off at knee level, the body moves freely.

Lay-up Evaluation Form

Lay-up Evaluation Form, reported to be valid and reliable by³ was used to evaluate the competencies of the participants in lay-up skills. The form includes a measurement tool that evaluates the following parameters by assigning a score ranging between 0-5: A- Stepping: holds the ball in the abdominal line, start stepping with the right foot when performing the right lay-up, make two steps, finishes lay-up with the same foot as in the start, knees touch the floor at an angle bent forward. B- Jumping: pulls knee into an abdominal level, the jumping foot is stretched, the body is stretched, looks forward the rim. C- Releasing the Ball: body reaches over the rim, the arm is above and extended, lifts the ball up from the abdominal level to the rim, releases the ball with palms up, rotates wrist inward (to give the ball spin), shoulders are slightly rotated towards the rim D- Landing: lands with the jumping foot, lowers the arm for balance, bends the knees slightly while landing.

Data Analysis

To transform the data obtained from the players into numerical values, the data was transferred to the computer programme and necessary statistical analyses were made. The normality test was performed for the sample group before the analysis, and Shapiro Wilk test results indicated that the data was not normally distributed. Since the data distribution was not normal, Wilcoxon Signed Ranks Test and Mann Whitney-U Test for independent paired comparisons were used in data analysis in addition to arithmetic mean ($\bar{X}$) and frequency (f).

RESULTS

Table 4.1. Wilcoxon Signed Ranks Test Findings on the Experimental Group's Pre-test and Post-Test Dribbling Performance Scores

Pre-Post Test		n	$\bar{x}_{sira}$	$\sum sira$	z	p
Experimental Group	Negative Rank	0	.00	.00	-3.651	.001**
	Positive Rank	15	7.00	110.00		
	Ties	0				
	Total	15				

**p<.01

As can be seen in Table 4.1, a significant difference was found between the dribbling skills pre-test and post-test scores of the athletes participating in the study ($z = -3.651$, $p < .01$). Considering the mean and sum of the ranks, the observed difference was in the post-test due to the intervention. In the light of these results, it can be inferred that the self-talk training completed by the athletes had an important effect on improving their dribbling skills.

Table 4.2. Wilcoxon Signed Ranks Test Findings pertaining to the Experimental Group's Pre-Test and Post-Test Lay-Up Performance Scores

Pre-Post Test		n	$\bar{x}_{sira}$	$\sum sira$	z	p
Experimental Group	Negative Rank	0	.00	.00	-3.981	.001**
	Positive Rank	15	9.00	140.00		
	Ties	0				
	Total	15				

**p<.01

As can be seen in Table 4.2, a significant difference was found between pre-test and post-test scores of the athletes participating in the study in terms of lay-up skills ($z = -3.981$, $p < .01$). Regarding the mean and sum of the ranks, the observed difference was considered to be in the post-test due to the intervention. The results indicate that the self-talk training completed by the athletes had an important effect on improving their lay-up skills.

Table 4.3. Mann Whitney U Test Results about Experiment and Control Groups' Post-Test Dribbling Scores

Score	Groups	n	$\bar{x}_{sira}$	$\sum sira$	U	z	p
Post-test							
Dribbling	Experimental	15	20.00	305.00	32.00	-3.123	.001**
	Control	15	11.00	170.00			
	Total	30					

**p<.01

Table 4.3 shows that a significant difference was found between pre-test and post-test scores of the athletes participating in the study in terms of their dribbling skills ($U=32.00$; $p<.01$). Regarding the mean and sum of the ranks, the observed difference was considered to be due to the post-test. Based on these results, it can be claimed that the self-talk training completed by the athletes had an important effect on improving their dribbling skills.

Table 4.4. Mann Whitney U Test Results about Experiment and Control Groups' Post-Test Lay-Up Scores

Score	Groups	n	$\bar{x}_{sira}$	$\sum sira$	U	z	p
Post-test							
Lay-up	Experimental	15	19.49	311.50	36.50	-3.004	.001**
	Control	15	9.87	163.50			
	Total	30					

**p<.01

As presented in Table 4.4, a significant difference can be seen between pre-test and post-test scores of the athletes participating in the study in terms of their lay-up skills ($U=36.50$; $p<.01$). Regarding the mean and sum of the ranks, the observed difference was considered to be due to the post-test. The findings indicate the self-talk training completed by the athletes had an important effect on improving their lay-up skills.

DISCUSSION

The present study was conducted to investigate the effect of self-talk on lay-ups and dribbling during twelve weeks of training. A significant difference was found between pre-test and post-test dribbling skill scores of the athletes. A significant difference was found between the pre-test and post-test lay-up skill scores of the athletes participating in the study. A significant difference was found between the dribbling skills post-test scores of the athletes in the experimental and control groups. A significant difference was found between the lay-up skills post-test scores of the athletes in the experimental and control groups. Botwina and Krawczynski (2003) examined the effect of mental training on penalty shoot-outs in their study and found that both mental and physical training groups made more accurate shots than the other two groups. Van Gyn et al. (1990) investigated the performance effect and reported significant differences in the strength training group, but did not find any significance only in the visualization training group. Negative internal dialogues reduce the performance of athletes. Many athletes are surprised when they realize that their mood is the result of the way of thinking related to an event and they can experience very different feelings when they change the form of inner speech. In modern approaches, self-talk methods are divided into two groups: Instructional Self-Talk and Motivational Self-Talk. Instructional self-talk refers to strategical options and technical knowledge while motivational self-talk refers to a concept implying a positive mood and an inner effort, which increases confidence.⁵ Several studies have investigated the effectiveness of motivational and instructional self-talk to increase performance. Ziegler (1987) concluded that instructional self-talk had a positive effect on forehand shots in tennis players at the initial stages. Rushall et al. (1988) reported that instructional and motivational self-talk improved performance in skiing exercises. Mallet and Hanrahan (1997) and Landin and Hebert (1999) concluded that instructional self-talk had positive effects on the performance of top-level runners and tennis athletes. Self-talk has been used in sports psychology for a short period and its methods have been frequently used. Athletes need to develop their attitudes and cognitive structures to increase their performance. Therefore, the relationship between how athletes behave themselves and what they say to themselves is significant.

CONCLUSION

In conclusion, the self-talk training that athletes completed had a significant effect on improving their dribbling and lay-up skills. Self-talk is an important strategy for trainers and athletes as it increases sportive performance. For this reason, it is important to include related activities in training programs for a better performance.

REFERENCES

1. Bandura, A. (1997). The anatomy of stages of change. American journal of health promotion: AJHP, 12(1), 8-10. Başer, 2004
2. Botwina, R., & Krawczynski, M. (2003). Application of visulation in training of young football players. In XI. European Congress of Sport Psychology.

3. Çamur H. (2001). Effects of verbal, videotape and verbal+videotape feedback on teaching dribbling and lay-up in basketball. Unpublished Master's Thesis. Hacettepe University Graduate School of Health Sciences, Ankara
4. Hardy, C. (2006). *Some dare call it power*. Sage Publications.
5. Hardy, J., Begley, K., & Blanchfield, A. W. (2015). It's good but it's not right: instructional self-talk and skilled performance. *Journal of Applied Sport Psychology*, 27(2), 132-139.
6. Hatzigeorgiadis, A., Theodorakis, Y., & Zourbanos, N. (2004). Self-talk in the swimming pool: The effects of self-talk on thought content and performance on water-polo tasks. *Journal of Applied Sport Psychology*, 16(2), 138-150.
7. Kesilmiş, İ., & Yıldız, R. (2018). The relation between body awareness and track and field athletes' goal setting. *Journal of Human Sciences*, 15(4), 2454-2461. doi:10.14687/jhs.v15i4.5501
8. Kesilmiş, İ., Taştan, Z., & Toros, T. (2020). Comparison of Perceived Motivational Climate and Positive Feedback of Football Players According to Positions. *Journal of Sports Education*, 4(1), 115-122.
9. Landin, D., & Hebert, E. P. (1999). The influence of self-talk on the performance of skilled female tennis players. *Journal of applied sport psychology*, 11(2), 263-282.
10. Mallet, C. J., & Hanrahan, S. J. (1997). Race modelling: An effective strategy for the 100m sprinter? *The Sport Psychologist*, 11, 72-85.
11. Nergiz, S., Bayköse, N., & Yıldız, M. (2015). Self-Talk: The Self-Talk Status among Modern and Folk Dances. *Journal of Physical Education and Sport Sciences*9(9), 40-49.
12. Rushall, B. S., Hall, M., Roux, L., Sasseville, J., & Rushall, A. C. (1988). Effects of three types of thought content instructions on skiing performance. *The Sport Psychologist*, 2(4), 283-297.
13. Taştan, Z., Kesilmiş, İ., & Toros, T. (2020). Comparison of Democratic and Autocratic Behavior Perceived by the Basketball Player from the Coach. *Gaziantep University Journal Of Sport Science*, 5(3), 219-230.
14. Toros, T. (2001). Effect of goal orientations, motivational climates on life satisfaction among the elite and non-elite Turkish basketball players. Unpublished master thesis, Mersin University, Mersin/TURKEY.
15. Van Gym, G. H., Wenger, H. A., & Gaul, C. A. (1990). Imagery as a Method of Enhancing Transfer From Trailing to Performance. *Journal of Sport and Exercise Psychology*, 12(4), 366-375.
16. Ziegler, S. G. (1987). Effects of stimulus cueing on the acquisition of groundstrokes by beginning tennis players. *Journal of Applied Behavior Analysis*, 20: 405-411.

INVESTIGATING THE EFFECT OF FEEDBACK ON SHOOTING PERFORMANCE OF FOOTBALL PLAYERS DURING 10-WEEKS TRAINING

Abdulaziz KULAK¹, Turhan TOROS^{*2}

1. School of Physical Education and Sports, <https://orcid.org/0000-0003-4054-3336>

2. Department of Sports Sciences, Mersin University, Mersin, Turkey

<https://orcid.org/0000-0002-8328-2925>

*Corresponding author: turhantoros@yahoo.com

ABSTRACT

This study aims to investigate the effect of ten-week feedback training on shooting performance in football players. The study adopts an experimental design and a pre-test/post-test control group model was used. There is an experimental group (ten weeks of training + feedback) and a control group (ten weeks of training) in the research. Groups were formed through random sampling. A total of 40 football players participated in the study including 20 football players in the experimental group (age = 23.67 ± 1.68) and 20 football players in the control group (age = 23.12 ± 1.10), who played in an amateur football team. After the approval of the Ethics Committee for the study, the necessary permission was obtained from the Provincial Directorate of Youth and Sports. According to the pre-test results, the football players were equally divided into two groups as experimental and control groups. While the control group continued their routine training, the experimental group was administered a 25-minute program on feedback strategies before training 3 days a week for 10 weeks. Following the feedback training program, the athletes in experimental and control groups were given a post-test. Before the research, the shooting test developed by Kayalar et al. (1991) was given to the experimental and control group athletes to measure their shooting skill performance. The sum of the scores of the best 3 shots was recorded as the result. In the data analysis, the normality test was performed and the data was not found to be normally distributed according to the Shapiro Wilk test. Since the data was not normally distributed, Wilcoxon Signed Ranks Test was used for the difference between dependent samples and Mann Whitney-U Test was used for independent paired comparisons in data analysis in addition to the arithmetic mean (X) and frequency (f). A significant difference was found between the shooting skill pre-test and post-test scores of the athletes participating in the study ($z = -4.452$, $p < .01$). A significant difference was found between the shooting skill post-test scores of the athletes in the experimental and control groups ($U = 3.50$; $p < .01$). It can therefore be concluded that the feedback received by the athletes had an important effect on improving the shooting skills of the athletes.

KEYWORDS: Feedback, shots, football, pre-test, post-test

INTRODUCTION

In the process of acquiring a skill, individuals who perform the skill can achieve their goals only after a complex and long program depending on many reasons to accomplish the learning. Instructors try to teach skills to individuals by using various methods in skill teaching.^{4,5} In this process, the most frequently used practice by the trainers is the feedback given to performers.⁹ Feedback is considered to be any sensory information given to a performer about the skill he or she is practicing at the moment of the action or at the end of the action. Feedback is the information received by individuals about their performance during or after performance. According to Singer (1975), feedback is the information that a person receives through sensory receptors about the result of a movement. Feedback, in general, is considered as the comparison between the state of the skill performed and the target skill. Feedback appears in two types during learning process. One of them is intrinsic feedback, also known as natural sensory information, which performers can continuously receive through their senses in the form of information without any need for external support with the help of their proprioceptive senses, namely body sensation, from muscles, joints or tendons.⁶ The second one is extrinsic feedback, frequently used by the instructors in teaching process, which refers to the information provided by external sources to performers practicing the skill about the detail or quality of their movement in cases when intrinsic feedback is not sufficient. Providing feedback through verbal and non-verbal forms or devices such as stopwatches and videos given by the coach or teacher is referred to as external feedback.¹² External feedback, one of the most important tools in the acquisition phase, has been reported to be important teaching aid in many studies.¹³

This study was conducted to reveal the effect of ten-week feedback on shooting performance in football players. Sports psychology is a multi-dimensional field that includes skill acquisition, and cognitive and affective domains. For this reason, skills must be acquired most properly. This study investigates the effect of verbal feedback, which increases the qualities of athletes related to football, has been the subject of many studies globally and is thought to have a large role in skill learning, on shooting performance.

METHOD

Research Design

The study adopts an experimental design and a pre-test/post-test control group model was used. There is an experimental group (ten weeks of training + feedback) and a control group (ten weeks of training) in the study. Groups were assigned through random sampling.

Study Group

A total of 40 football players were chosen for the study including 20 football players in the experimental group (age = 23.67 ± 1.68) and 20 football players in the control group (age = 23.12 ± 1.10), who played in an amateur football team, to investigate the effect of feedback strategies on shooting performance in football.

Procedure

Following the approval of the Ethics Committee, the necessary permission was obtained from the Provincial Directorate of Youth and Sports. After the Consent Form was completed by the football players playing in the Amateur Football Club, pre-tests were conducted. According to the pre-test results, football players were equally divided into experimental and control groups. While the control group continued their routine training, the experimental group was given a 25-minute program for feedback methods before training 3 days a week for 10 weeks. Following the feedback training program, the athletes in experimental and control groups were given a post-test.

Data Collection Tools

Measurements of Football Skills

Before the research process, the shooting test developed by Kayalar et al. (1991) was administered to the experimental and control group athletes to measure their shooting skill performance.

Shooting test: A 7.32-by-2.44-meter goal is visible from a long distance in width and length. The goal is divided into sections with colored tape. Footballers make 6 shots from a distance of 10 meters. The sum of the scores of the best 3 shots was recorded as the result

Data Analysis

To transform the data obtained from the players into numerical values, the data was transferred to the computer program and necessary statistical analyses were made. The normality test was performed for the sample group before the analysis, and Shapiro Wilk test result indicated that the data was not normally distributed. Since the data distribution was not normal, Wilcoxon Signed Ranks Test and Mann Whitney-U Test for independent paired comparisons were used in data analysis in addition to arithmetic mean ($\bar{X}$) and frequency (f).

RESULTS

Table 4.1. Wilcoxon Signed Ranks Test Findings about the Experimental Group's Pre-Test and Post-Test Shooting Performance Scores

Pre-Post Test	n	$\bar{x}_{sira}$	$\sum sira$	z	p
Negative Rank	0	.00	.00	-4.452	.001**
Positive Rank	20	5.00	105.00		
Ties	0				
Total	20				

**p<.01

As can be seen in Table 4.1, a significant difference was found between the shooting skill pre-test and post-test scores of the athletes participating in the study ($z=-4.452$, $p<.01$). Considering the mean and sum of the ranks, the observed difference was considered to be due to the post-test. It can be inferred from the results that the feedback training that the athletes completed had an important effect on improving their shooting skill.

Table 4.2. Mann Whitney U Test Results about Experiment and Control Groups' Pre-Test and Post-Test Shooting Performance Scores

Score	Groups	n	$\bar{x}_{sira}$	$\sum sira$	U	z	p
Post-test							
Post-test shooting	Experimental	20	11.26	157.50	3.50	-4.342	.000**
	Control	20	4.22	64.50			
	Total	40					

**p<.01

As presented in Table 4.2, there was a significant difference between post-test scores of the athletes participating in the study in terms of their shooting skills ($U=3.50$; $p<.01$). Regarding the mean and sum of the ranks, the observed difference was considered to be due to the post-test. The findings indicate the feedback training completed by the athletes had an important effect on improving their shooting performance.

DISCUSSION

This study aims to investigate the effect of a ten-week feedback program on shooting performance in football players. A significant difference was found between the shooting skill pre-test and post-test scores of the athletes participating in the study. A significant difference was found between the shooting skill post-test scores of the athletes in the experimental and control groups. In the study conducted by Müftüler (2005) investigating the effect of verbal feedback and self-control on basic basketball skill acquisition, significant findings were reported related to the groups receiving verbal feedback, which are in line with our study. According to the findings reported by Çamur (2001), a significant difference was found between the cognitive field achievement levels in teaching dribbling skills, and the fact that this difference was reported to be caused by the group who received the video and live + video feedback supports the findings in our research. In the study conducted by Guadagnoli (2002) on 30 golfers, it was observed that the scores of the groups which received verbal and visual feedback in the tests in the second week of the study procedure were lower than the control group. When a second test was conducted following the same procedure, the test results of the groups that received verbal and visual feedback were found to be much better than the control group. In the study conducted by Mirzeoğlu (2006), the pre-test and post-test findings of the groups that were taught by both Computer-Aided Education and traditional methods were found to be statistically significant regarding their cognitive domain in basketball. When the psychomotor domain pre-test and post-test findings of the groups were analysed, a statistically significant difference was reported. The findings of the study indicated that there was a significant increase in knowledge and performance in both groups resulting from the program applied for knowledge and skills in cognitive and psychomotor domains, which are consistent with the findings of our study. In the study carried out by Konttinen (2004) investigating the effect of verbal feedback on learning psychomotor skills for precision shooting with verbal feedback group, the knowledge-of-results group, and a non-training group, it was reported that the shots of the group given verbal feedback contained fewer errors than the knowledge-of-results group and the control group as a result of the feedback given for four weeks, and that verbal feedback practice for four weeks improved rifle-shooting in non-elite shooters.

CONCLUSION

In the light of the results obtained in the study, it can be concluded that the feedback received by the athletes had an important effect on improving their shooting skills.

REFERENCES

1. Çamur H. (2001). Effects of verbal, videotape and verbal+ videotape feedback on teaching dribbling and lay-up in basketball. Unpublished Master's Thesis. Hacettepe University Graduate School of Health Sciences, Ankara
2. Guadagnoli, M., Holcomb, W., & Davis, M. (2002). The efficacy of video feedback for learning the golf swing. *Journal of Sports Sciences*, 20(8), 615-622.
3. Kesilmiş, İ., & Yıldız, R. (2018). The relation between body awareness and track and field athletes' goal setting. *Journal of Human Sciences*, 15(4), 2454-2461. doi:10.14687/jhs.v15i4.5501
4. Kesilmiş, İ., Taştan, Z., & Toros, T. (2020). Comparison of Perceived Motivational Climate and Positive Feedback of Football Players According to Positions. *Journal of Sports Education*, 4(1), 115-122.
5. Konttinen, N., Mononen, K., Viitasalo, J., & Mets, T. (2004). The effects of augmented auditory feedback on psychomotor skill learning in precision shooting. *Journal of Sport and Exercise Psychology*, 26(2), 306-316.
6. Magill, R. A. (2010). *Motor learning and control: concepts and applications*. Boston: McGraw-Hill, 2010.:111.
7. Mirzeoğlu, D., Aktaş, İ., Göcek, E., & Boşnak, M. (2006). The effects of computer assisted instruction on teaching skills in basketball. *Sports Management and Information Technologies*, 1(2).
8. Müftüler, M. (2005). Effects of verbal feedback and self-evaluation on learning fundamental basketball skills. Unpublished Master's Thesis. Middle East Technical University Graduate School of Social Sciences, Ankara.
9. Schmidt, R. A., Wrisberg, C. A. (2012). *Motor learning and performance* (Z. Koruç, N. Arsan, S. Kağan, Trans.). Ankara: Anı Publishing.
10. Singer, R. N. (1975). *Motor learning and human performance: An application to physical education skills*. Macmillan.
11. Taştan, Z., Kesilmiş, İ., & Toros, T. (2020). Comparison of Democratic and Autocratic Behavior Perceived by the Basketball Player from the Coach. *Gaziantep University Journal Of Sport Science*, 5(3), 219-230.
12. Toros, T. (2001). Effect of goal orientations, motivational climates on life satisfaction among the elite and non-elite Turkish basketball players. Unpublished master thesis, Mersin University, Mersin/TURKEY.
13. Zelaznik, H. N. (1996). *Advances in motor learning and control*. Human Kinetics.

DETERMINATION OF FOOTBALLERS ANXIETY AND SLEEP QUALITY OF GETTING INFECTED BY NEW TYPE CORONAVIRUS

KEMAL SARGIN

Assistant Professor, Van Yuzuncu Yil University, Physical Education and Sport Department, Van, Turkey

Corresponding author: sargin_kemal@hotmail.com, ID : 145846

ABSTRACT

This research was carried out to determine the anxiety and sleep quality of amateur football players catching the new type of coronavirus (Covid-19) during the Covid-19 period. The universe of the research consists of amateur footballers in Van. The sample of the study, on the other hand, consists of 205 football players from 17 amateur teams. The data of the study were collected online via using a personal information form, Athletes' New Type Coronavirus Anxiety Scale (ANTCAS) and Pittsburgh Sleep Quality Scale. The data obtained were analyzed in the SPSS package program. As a result of the analysis made it was found that there was no significant difference between the anxiety levels of athletes in getting the new type of coronavirus and the variables of marital status, educational status, age and BMI ($p > 0.05$), while the sleep quality showed a significant difference with the age variable ($p < 0.05$). As a result, it was found that athletes have high anxiety of getting infected with the virus during the pandemic period, and their sleep quality is long-term sleep disturbance.

KEYWORDS: *New type of coronavirus, Amateur Football Player, Anxiety, Sleep Quality.*

INTRODUCTION

Coronavirus disease (COVID-19), recognized as a pandemic by the World Health Organization (WHO), is an important public health problem that seriously affects life in our country as well as in the whole world. With the measures taken to control the spread of the epidemic, sleep quality, regularity, physical activity levels and daily life are rapidly changing. During the COVID-19 epidemic, people's responsibility to support the immune system has been stated as choosing a healthy lifestyle, eating rich in fruits and vegetables, exercising in their spare time, trying to maintain healthy body weight, and sleeping for sufficient time¹. A basic safety step that can limit the spread of infection is home quarantine. However, staying home for a long time; The proliferation of sedentary behaviors such as sitting, lying, playing, watching television, and using mobile devices can lead to a decrease in regular physical activity, thus lower energy expenditure and consequently an increased risk and lead to potential worsening for chronic health conditions. Therefore, consuming high levels of pulp, whole grains, unsaturated fats and antioxidants is of great importance for maintaining immune function^{1,2,3}. The purpose of this article is to determine the Covid19 effect on sleep patterns and quality in these days when we have to spend more time at home due to Covid-19. Although there are many studies examining sleep quality, studies investigating the effects on sleep quality and layout are quite inadequate during coronavirus outbreak of the period of self-isolated individuals and changing environmental conditions in Turkey. For this reason, it is thought that this study can contribute to the literature on the subject.

MATERIALS AND METHODS

Population and Sample

The population of the research consists of amateur footballers in Van during the 2020 New Type Corona Virus (Covid-19) pandemic period. The sample of the study, on the other hand, consists of 205 football players from 17 amateur teams. Data were collected voluntarily from 205 athletes.

Data Collection Tools

The data of the study were obtained using the personal information form, the Athletes' New Type Coronavirus Anxiety Scale (ANTCAS) and the Pittsburgh Sleep Quality Scale.

Personal Information Form

The personal information form was created by the researchers to determine the age, gender, BMI, marital status and educational status of the participants.

Athletes' New Type Coronavirus (Covid-19) Anxiety Scale (ANTCAS)

Athletes' New Type Coronavirus (Covid-19) Anxiety Scale was developed by Tekkurşun et al. (2020) to be applied to athletes. The scale, which is evaluated in five-point Likert type, consists of 2 sub-dimensions and 16 items, namely Individual Anxiety (IA) and Socialization Anxiety (SA). In the evaluations made on the total ANTICAS score, the lowest score that can be obtained from the scale is 16 and the highest score is 80. Since only the 2nd item in the scale contains negative statements, it should be reverse coded⁴. Pittsburgh Sleep Quality Index (PSQI): The PSQI, which was accepted in determining sleep quality, was developed by Buysse et al. in 1989, and its validity and reliability study was conducted by Ağargün et al.⁵. PSQI consists of 19 questions and 7 components to evaluate the sleep quality in the last month. 18 items and 7 components are included in the scoring. Each item is evaluated on a score of 0-3 and the sum of the 7 component scores constitutes the total PSQI score. The total score has a value

between 0-21, the higher the total score indicates that the sleep quality is poor. A total PSQI score of ≤ 5 indicates "good sleep quality", and a score of > 5 indicates "poor sleep quality" ⁶.

Collection of Data

The scales were applied online by the researcher through Google Forms, after making detailed and necessary explanations about the research to the players participating in the study.

STATISTICAL ANALYSIS

SPSS package program was used in the statistical analysis of the data collected and the level of significance was taken as ($p < 0.05$). In the analysis of the research data, normality distribution test Kolmogorov-Smirnov, paired comparisons Mann Whitney-U, multiple comparisons Kruskal Wallis-H Tests were performed.

RESULTS

In the study, where we examined the effect of football players on the pandemic sleep quality and anxiety levels of the new type of coronavirus, significant differences were found according to some variables. According to the data obtained depending on the marital status variable, no significant difference was found in the anxiety levels of the athletes in the pandemic period of getting new type of coronavirus and in the individual anxiety sub-dimension, and a significant difference was found in the socialization anxiety sub-dimension. Büyükbayraktar (2016) could not detect a significant difference between married and single individuals. This result supports our result. Some studies reached such conclusion as singles have higher anxiety levels⁸, married individuals have higher anxiety compared to single ones⁹, and death anxiety of married individuals is higher than the anxiety of single individuals^{7,10}. The result of our study shows that single athletes have higher socialization anxiety than married athletes and that the sportsmen who are married during the pandemic period have less socialization anxiety. Also, this situation may be because epidemic diseases pose the same danger for everybody. According to the data obtained depending on the marital status variable, no significant difference was found in the pittsburgh sleep quality and sub-dimensions of the athletes, only a significant difference was found in the subjective sleep quality sub-dimension. Yüksel (2013) stated that there was no difference between the marital status of individuals and their sleep quality in a study on healthcare professionals¹¹. In a study conducted by Çakır (2019) on hospital staff, it was determined that the effect of shift change on sleep is less in married people compared to single ones^{12,13}. On the other hand, Karakoç (2009) found that the sleep quality of married participants was better than single, widowed and divorced individuals in his study on healthcare personnel¹⁴. The different results are based on the different families, cultures and lifestyles of the participants. The results of this study seem to support our study results. The results of our study show that the subjective sleep quality of married athletes is worse than single athletes. This information shows that the subjective sleep quality of single athletes is better than married individuals during the pandemic period^{15,16}. In the data obtained depending on the educational status variable, no significant difference was found in the anxiety levels of the athletes and in the sub-dimensions of individual anxiety and socialization anxiety in the pandemic period of getting a new type of coronavirus (Covid-19). The results of this study seem to support our study results. Therefore, it can be said that the educational status is not an effective factor on the pandemic anxiety levels of the participants. According to the data obtained depending on the educational status variable, a significant difference was found in the Pittsburgh sleep quality of athletes and in the sub-dimensions of subjective sleep quality, sleep latency, sleep duration, sleep disturbance, use of sleeping pills and total scale scores according to their education status. Bayram (2010) found that there was no relationship between educational status and sleep quality of diabetic individuals¹⁷. In his study, Yüksel (2007) stated that all illiterate and illiterate diabetic individuals had poor sleep quality, and 17 of 20 primary school graduates had poor sleep quality it is also emphasized that there is a significant difference between education condition and sleep quality^{11,18}. Karagözoğlu et al. (2007) found that sleep quality changes according to education level and that the higher the education level, the more change is observed in sleep quality. This difference in findings may suggest that sleep quality is not affected by educational status but may be affected by other independent variables. Education status is not considered to be determinative in terms of sleep quality. The results of this study seem to support our study results. Therefore, it can be said that the educational status is an impressive factor on the sleep quality of the participants during the pandemic period^{4,18}.

According to the data obtained depending on the age variable, no significant difference was found in the anxiety levels, individual anxiety and socialization anxiety sub-dimensions of the athletes in the pandemic period of getting a new type of coronavirus (Covid-19). Civan et al. (2010) in their study with individual and team athletes and Güvendi and Bilgin (2016) in their study with football players did not find a significant difference between the age variable and anxiety levels^{19,20}. The results of this study seem to support our study results. Therefore, it can be said that age does not affect the anxiety levels of the participants during the pandemic period. According to the data obtained depending on the age variable, no significant difference was found in the athletes' pittsburgh sleep quality and sub-dimensions, but only in the sleep disorder sub-dimension. Özdemir (2014) stated in his study with non-physician healthcare professionals that sleep quality was poor in employees under the age of 35, and sleep quality improved in other age groups²¹. Bingöl (2006), in the study with nurses, found that the difference between the average sleep quality scores of 35 years and above was statistically insignificant²². The results of this study seem to support our study results. The result of our study shows that athletes between the ages of 38-48 have the highest subjective sleep disorders, followed by those between the ages of 16-26 and 27-37. Therefore, it can be said that age does not affect the anxiety levels of the participants during the pandemic period. According to the data obtained depending on the BMI variable, no significant difference was found in the anxiety levels, individual anxiety and socialization anxiety sub-dimensions of the athletes in the pandemic period of getting new type of coronavirus. The results of this study seem to support our study results. Therefore, it can be said that BMI is not an element that affects the anxiety levels of the participants during the pandemic period. According to the data obtained depending on the BMI variable, no significant difference was found in the athletes' pittsburgh sleep quality and sub-

dimensions. Aktaş et al. showed that the increase in BMI negatively affects the quality of sleep²³. Ulutaş et al. Found in a study that the obese group had a higher sleep time²⁴. In other studies, it was reported that regular and adequate sleep may be associated with body weight and general health, and insufficient sleep, especially in childhood, is an important risk factor for obesity^{25, 26, 27}. The results of this study seem to support our study results. Therefore, it can be said that BMI is not an element that affects the sleep quality of the participants during the pandemic period.

The results obtained from the study and the statistical analysis of these results are presented in the following tables and graphs.

Table 1. Descriptive Characteristics of Athletes

Variables	n	Avr±Ss
Age (years)	204	28.46 ± 6.67
Height (m)	204	1.73 ± .08
Body Weight (kg)	204	69.83 ± 10.82
BMI (kg / m ²)	204	22.67 ± 2.98

Table 2. U-Test Result of Athletes' Anxiety Levels of New Type Coronavirus According to Marital Status

Variables		n	Average Rank	Total Rank	U	p
Individual Anxiety	married	44	91.61	4031.00	3041.000	.166
	Single	160	105.49	16879.00		
Socialization Anxiety	married	44	85.75	3773.00	2783.000	.032*
	Single	160	107.11	17137.00		
ANTCAS	married	44	87.94	3869.50	2879.500	.064
	Single	160	106.50	17040.50		

In the comparison of the anxiety of getting coronavirus and its sub-dimensions according to the marital status of the participants in the study in Table 2; No significant difference was found in the coronavirus anxiety levels and individual anxiety sub-dimension ($p > 0.05$), while a significant difference was found in the socialization anxiety sub-dimension ($p < .05$). Considering the average rank, it is understood that the socialization anxiety of single athletes is higher than married sportsmen. This information shows that athletes who are married during the pandemic have less anxiety about socialization.

Table 3. U-Test Result of Pittsburgh Sleep Quality Index according to Marital Status of Athletes

Variables		n	Average Rank	Total Rank	U	p
Subjective Sleep Quality	married	44	120.26	5291.50	2738.500	.016*
	Single	160	97.62	15618.50		
Sleep Latency	married	44	104.82	4612.00	3418.000	.739
	Single	160	101.86	16298.00		
Sleep Time	married	44	106.82	4700.00	3330.000	.504
	Single	160	101.31	16210.00		
Sleeping disorder	married	44	104.41	4594.00	3436.000	.772
	Single	160	101.98	16316.00		
Use of Sleeping Medicine	married	44	95.86	4218.00	3228.000	.314
	Single	160	104.33	16692.00		
PSQI Total	married	44	100.64	4428.00	3438.000	.811
	Single	160	103.01	16482.00		

As seen in Table 3, there is a significant difference between the subjective sleep quality of married athletes and single athletes ($p < .05$). Considering the average rank, it is understood that the subjective sleep quality of married athletes is worse than single athletes.

Table 4. Kruskal-Wallis Test Result of Athletes' Anxiety Levels of Getting New Type of Coronavirus According to Education Status

Variables		n	Average Rank	sd	X ²	p
Individual Anxiety	Primary education	3	83.17	3	.833	.842
	Secondary education	77	104.31			
	License	107	103.21			
	Master degree	17	93.24			
Socialization Anxiety	Primary education	3	118.33	3	1.126	.771
	Secondary education	77	106.81			
	License	107	100.26			
	Master degree	17	94.29			
ANTCAS	Primary education	3	92.67	3	.922	.820
	Secondary education	77	106.20			
	License	107	101.75			
	Master degree	17	92.21			

When Table 4 is examined, it is seen that the anxiety scale of athletes getting coronavirus and sub-dimensions do not differ according to the educational status ($p > .05$).

Table 5. Kruskal-Wallis Test Result of Pittsburgh Sleep Quality Index According to Athletes' Training Status

Variables		n	Sıra Ortalaması	sd	X ²	p
Subjective Sleep Quality	Primary education	3	95.17	3	10.417	.015*
	Secondary education	77	87.65			
	License	107	109.80			
	Master degree	17	125.12			
Sleep Latency	Primary education	3	43.00	3	20.888	.000*
	Secondary education	77	85.94			
	License	107	111.00			
	Master degree	17	134.50			
Sleep Time	Primary education	3	93.33	3	13.114	.004*
	Secondary education	77	87.53			
	License	107	113.60			
	Master degree	17	102.06			
Sleeping disorder	Primary education	3	41.00	3	21.166	.000*
	Secondary education	77	86.21			
	License	107	112.10			
	Master degree	17	126.68			
Use of Sleeping Medicine	Primary education	3	67.50	3	8.801	.032*
	Secondary education	77	91.97			
	License	107	108.09			
	Master degree	17	121.18			
PSQI Total	Primary education	3	42.00	3	19.946	.000*
	Secondary education	77	85.03			
	License	107	110.45			
	Master degree	17	142.26			

Table 5 shows that the scores of the athletes participating in the study differ significantly according to their educational status in the sub-dimensions of subjective sleep quality, sleep latency, sleep duration, sleep disturbance, use of sleeping pills and total scale scores ($p < .05$).

Table 6. Kruskal-Wallis Test Result of Athletes' Anxiety Levels of Getting New Type Coronavirus According to Age

Variables		n	Average Rank	sd	X ²	p
Individual Anxiety	16-26	76	94.39	2	2.891	.236
	27-37	112	108.83			
	38-48	16	96.69			
Socialization Anxiety	16-26	76	94.29	2	5.098	.078
	27-37	112	110.60			
	38-48	16	84.78			
ANTCAS	16-26	76	93.66	2	3.872	.144
	27-37	112	109.86			
	38-48	16	92.97			

When Table 6 is examined, it is seen that the anxiety scale of athletes getting coronavirus and sub-dimensions do not differ according to age ($p > .05$).

Table 7. Kruskal-Wallis Test Result of Pittsburgh Sleep Quality Index of Athletes According to Age

Variables		n	Average Rank	sd	X ²	p
Subjective Sleep Quality	16-26	76	106.36	2	3.545	.170
	27-37	112	97.05			
	38-48	16	122.31			
Sleep Latency	16-26	76	110.22	2	2.674	.263
	27-37	112	97.64			
	38-48	16	99.84			
Sleep Time	16-26	76	97.20	2	1.701	.427
	27-37	112	106.45			
	38-48	16	100.00			
Sleeping disorder	16-26	76	109.86	2	7.383	.025*
	27-37	112	94.56			
	38-48	16	123.13			
Use of Sleeping Medicine	16-26	76	101.38	2	.063	.969
	27-37	112	103.21			
	38-48	16	102.88			
PSQI Total	16-26	76	108.20	2	1.632	.442

27-37	112	97.76
38-48	16	108.59

Table 7 shows that pittsburgh sleep quality index differs according to age only in the sleep disorder sub-dimension ($p < .05$). Considering the mean ranks of the groups, it is seen that athletes between the ages of 38-48 have the highest subjective sleep disorders, followed by those between the ages of 16-26 and 27-37.

Table 8. Kruskal-Wallis Test Result of Athletes Getting New Type Coronavirus Anxiety Levels According to BMI Classification

Variables		n	Average Rank	sd	X ²	p
Individual Anxiety	Low Weight	4	87.50	4	7.185	.126
	Normal weight	161	104.97			
	Overweight	35	91.71			
	1st Degree Obese	2	28.00			
	3rd Degree Obese	1	190.00			
Socialization Anxiety	Low Weight	4	92.50	4	2.754	.600
	Normal weight	161	104.82			
	Overweight	35	93.46			
	1st Degree Obese	2	53.00			
	3rd Degree Obese	1	83.00			
ANTCAS	Low Weight	4	90.13	4	6.235	.182
	Normal weight	161	105.00			
	Overweight	35	91.10			
	1st Degree Obese	2	35.00			
	3rd Degree Obese	1	181.50			

When Table 8 is examined, it is seen that the athletes' getting coronavirus anxiety scale and sub-dimensions do not differ according to the BMI classification ($p > .05$).

Table 9. Kruskal-Wallis Test Result of Pittsburgh Sleep Quality Index According to BMI Classification of Athletes

Variables		n	Average Rank	sd	X ²	p
Subjective Sleep Quality	Low Weight	4	76.63	4	3.420	.490
	Normal weight	161	103.24			
	Overweight	35	95.70			
	1st Degree Obese	2	129.75			
	3rd Degree Obese	1	169.00			
Sleep Latency	Low Weight	4	95.63	4	1.280	.865
	Normal weight	161	102.85			
	Overweight	35	97.13			
	1st Degree Obese	2	135.75			
	3rd Degree Obese	1	93.50			
Sleep Time	Low Weight	4	110.88	4	5.221	.265
	Normal weight	161	103.07			
	Overweight	35	96.90			
	1st Degree Obese	2	134.00			
	3rd Degree Obese	1	9.50			
Sleeping disorder	Low Weight	4	94.00	4	.883	.927
	Normal weight	161	103.64			
	Overweight	35	96.06			
	1st Degree Obese	2	94.00			
	3rd Degree Obese	1	94.00			
Use of Sleeping Medicine	Low Weight	4	90.00	4	2.714	.607
	Normal weight	161	104.34			
	Overweight	35	95.59			
	1st Degree Obese	2	67.00			
	3rd Degree Obese	1	67.00			
PSQI Total	Low Weight	4	93.25	4	2.733	.603
	Normal weight	161	105.14			
	Overweight	35	90.59			
	1st Degree Obese	2	64.75			
	3rd Degree Obese	1	106.00			

When Table 9 is examined, it is seen that pittsburgh sleep quality index and its sub-dimensions do not differ according to BMI classification ($p > .05$).

CONCLUSION

As a result, the anxiety levels and sleep qualities of the athletes in the research of getting the new type of coronavirus (Covid-19) during the pandemic period were examined according to the variables of age, BMI, marital status and educational status and it has been found that athletes have high anxiety of getting infected with the virus during the pandemic period, and their sleep quality is long-term sleep disturbance.

REFERENCES

1. Naja, Farah, and Rena Hamadeh. "Nutrition amid the COVID-19 pandemic: a multi-level framework for action." *European journal of clinical nutrition* 74.8 (2020): 1117-1121.
2. Butler, Michael J., and Ruth M. Barrientos. "The impact of nutrition on COVID-19 susceptibility and long-term consequences." *Brain, behavior, and immunity* (2020).
3. Çakir, Ergün. "The Examination of Exercise Addiction Levels of University Students Studying in Health Field." *Journal of Education and Training Studies* 7.3 (2019): 177-181.
4. Tekkurşun D, G,Cicioğlu, H. İ, & İlhan, E L. (2020).Athlete's Anxiety to Catch the Novel Coronavirus (Covid-19) Scale (AACNCS): Validity and reliability study. *Journal of HumanSciences*.2020;17(2): 458-468. DOI:10.14687/jhs.v17i2.5988
5. Ağargün, M.Y, Kara H, Anlar O. The Validity and Reliability of the Pittsburgh Sleep Quality. *Turkish Journal of Psychiatry*. 1996;7:107-15. Available from :<https://ci.nii.ac.jp/naid/20001210233/>.
6. Güneş Z, Körükcü Ö, Özdemir G. The Determination of the Quality of Sleep of the Patients with Diabetes Mellitus. *Journal of Anatolia Nursing and Health Sciences Atatürk Üniversitesi Hemşirelik Yüksekokulu Dergisi*.2009;12: 2,10-17.DOİ: 2645/34022
7. Büyükbayraktar, A. The effect of stress and anxiety levels on premenstrual syndrome in married and single individuals. Unpublished Master Thesis. Beykent University, Istanbul. 2016.
8. Kartopu S. Examination of Level of State- Trial Anxiety of Students and Teachers in High Schools From Several Variables , *Journal Of The Faculty Of Theology*.2012; 17 (2): 147-170.
9. Turgay M. Relationship between fear of death and personality structure (Published doctoral thesis), Istanbul University, Institute of Health Sciences, Istanbul.2003.
10. Erdoğan M, Özkan, M. The Relationships between Death Anxiety with Dispositional Symptoms and Socio-Demographic Variables of Individuals from Different Religions. *Journal of Inonu University Medical Faculty*.2007;14 (3): 171-179.DOİ: 11616/1251
11. Yüksel C. Investigation of the Relationship Between Sleep Quality Job Satisfaction Burnout in Nurses. Master Thesis. Eskişehir. Eskişehir Osmangazi University Institute of Health Sciences. 2013.DOİ: 11684/861.
12. Çakır E. The Investigation Of The Relationship Between The Body Mass Index And The Participation In Physical Activity Of High School Students *Journal of Physical Education and Sport Sciences* 21.1-A (2019): 30-39.
13. Çetinol, T, Özvurmaz, S. *Medical Sciences (NWSAMS)*.2018; 13(4): 80-89.DOİ: 39586/453064.
14. Karakoç B. A Study on Sleep Quality: Özel Dal Hospital Health Workers Example. Master's Thesis. Marmara University, Institute of Health Sciences. Istanbul.2009.DOİ: 11424/26376
15. Eriş, Fatih, Kemal Sargin, and Ergün Çakır. "The Effect Of Fitness On Socialization." *European Journal of Physical Education and Sport Science* (2018).
16. İlkin, M, Halil T, and Mehmet Ö. "Socialization Effect of Physical Activity in Students Who Need Special Education." *Asian Journal of Education and Training* 4.2 (2018): 128-131.
17. Bayram, D. The effect of sleep quality and fatigue level on quality of life in patients with type 2 diabetes. Nursing Program. Unpublished Master's Thesis, Abant İzzet Baysal University Institute of Health Sciences. Bolu, Türkiye.2010.
18. Göktaş E, Çelik, F, Özer H, Çıray Gündüzoğlu N. The Determination of the Quality of Sleep of the Obese Individuals. *DEUHFED* 2015; 8 (3):156-161.DOİ: 46802/586862
19. Civan, A, Arı, R, Görücü, A, Özdemir, M. Comparison of the pre and post game state and trait anxiety levels of individual and team athletes. *International Journal of Human Sciences*, 2010 ;7 (1): 193-206.DOİ:1303-5134.
20. Güvendi B, Bilgin U. Examining the relationship between imagery and anxiety among elite academy league players. *International Journal Of Refereed Psychiatry And Psychology Research*, 2016;7: 62-82.
21. Özdemir C. Sleep Quality and Related Factors in Non-Physician Health Personnel Working in Erciyes University Medical Faculty Hospitals. Master Thesis. Erciyes University, Institute of Health Sciences, Kayseri. 2014.
22. Bingöl, N. Investigation of the Nurses' Sleep Quality, Job Satisfaction Levels and Relationship Between Them. Master Thesis. Cumhuriyet University Institute of Health Sciences, Sivas. 2006.
23. Aktaş, H, Şaşmaz, C,T, Kılınçer, A, Mert, E., Gülbol, S, Külekçioğlu D, Kılar, S, Yüce R, İbik Y, Uğuz, E, Demirtaş A. Study on the factors related to physical activity levels and sleep quality in adults. *Mersin University Journal of Health Sciences*.2015;8 (2): 60-70. DOI: 19539/208012
24. Ulutaş A.P, Pınar, A, Say Z.A, Erdal S. Investigation of the factors affecting the formation of 6-18 years school-age children obesity. *Medical Bulletin of Zeynep Kamil*.2014: 45 (4): 192-196.DOİ: 22041/236679
25. Kılıç M, Büyükbayraktar R B, Kilic, GB, Aydın, S. and Eski N. Comparing the packing densities of yarns spun by ring, compact and vortex spinning systems using image analysis method, *Indian Journal of Fibre & Textile Research*.2014 ; 39(4) : 351- 357.DOİ: 3723
26. Asma M. B, Coşkun F, Gencer Y.G, Eriş F. The Analysis Of Recreation Activities Of Students Residing At Yuzuncu Yıl University Dormitories Institution, *Journal of social science*, 2017 1(3);
27. Zeynep K, Burcu G, Ayşe T, Evren E.A. The Relationship Between Imagery Usage and Achievement Motivation of Team Sportsmen, İstanbul University, Sports science Faculty *Journal of Sport Sciences*.2017; 7(1); 1303-1414

COMPARISON OF SPINAL CURVES OF 13-15 YEARS OLD ATHLETES IN DIFFERENT BRANCHES

FATİH ERİŞ

Assistant Professor, Van Yuzuncu Yıl University, Physical Education and Sport Department, Van, Turkey

Corresponding author: fatiheris@yyu.edu.tr, ORCID:0000-0002-2301-6801

ABSTRACT

This study aims to compare the spinal curvatures of Badminton, Boxing, Table Tennis, Athletics and Taekwondo athletes in the sagittal plane. The study included a total of 58 athletes aged 13-15, who has at least 2 years of active sports: Athletics (mid-distance runner 12), Badminton (10), Boxing (11), Table tennis (15) and Taekwondo (10). Spinal curvatures of the subjects in the sagittal plane in vertical stance, trunk forward flexion and back extension positions, Sagittal thorax (ST), Sagittal lumbar (SL), Sagittal sacrum (SS) values were measured by using the Spinal Mouse device. According to the measurements, a statistically significant correlation was obtained in all branches of body weight and height in Badminton, Taekwondo, Athletics, Table tennis and Boxing ($p < 0.05$). As a result of the comparisons made for Spinal Mouse measurements, there was no statistically significant difference in ST1, SL2 and SL3 values between Badminton, Taekwondo, Athletics, Table tennis and Boxing branches ($p > 0.05$). A statistically significant difference was found in SL1, SS1, ST2, SS2, ST3 and SS3 values ($p < 0.05$). As a result; It is concluded that the spinal curvatures of different sportsmen in the sagittal plane in vertical stance (anatomical stance) are different from the norm values and it is concluded that there is a difference between branches in flexion and extension position.

KEYWORDS: Sport, Spine, Curvature

INTRODUCTION

The investigation of the effects of sports training on different systems of the human body has been the subject of many studies. Each sport discipline is unique because the athlete's body takes special postures and applies different movements for a long time during training or competition¹. Some sports, such as cycling, skiing or rowing athletes, are characterized by the spine taking and maintaining a different position for a long time during the branch-specific activity^{1,2,3}. Tennis flexes with the trunk while standing, includes stepping, reaching and turning movements^{4,5}. The embryological source of the spine, which consists of bone and cartilage tissues like other elements of the skeletal system, is the mesoderm. In adults, the spine consists of 26 vertebrae: cervical (neck) 7, thoracic (chest) 12, lumbar (waist) 5, sacral (coccyx) 1, and coccygis (tail)⁶. Although vertebrae differ according to their regional locations, they generally have similarities. The spine is characterized by the presence of degrees of curvature that is anatomically accepted as normal⁷. Physiological curvatures in a normal adult is graded as 20 ° -50 ° kyphosis in the thoracic region, 40 ° -80 ° lordosis in the lumbar region and 40 ° -60 ° kyphosis in the sacral region and is graded as 30-50 ° kyphosis in the thoracic region, 40-60 ° lordosis in the lumbar region and Kyphosis of 40-50 ° in the sacral region^{8,9}. In some cases, an increase or decrease in the size of the curves of the spine can lead to spine misalignment^{10,7}. In addition, curvatures in the sagittal plane of the spine may affect the mechanical properties and load balance of intervertebral tissues¹⁰. Sagittal spine shape is affected by a variety of factors, including intense sports training. While Rajabi et al. (2012) stated that exposure to intense athletic sports training for years may increase the risk of developing spinal disorders in active athletes in certain sports disciplines, there is a direct relationship between the amount of training and increased thoracic kyphosis and lumbar lordosis curves, also, reported that there is a positive correlation between thoracic kyphosis¹¹. It is thought that some changes in spinal curvatures may pave the way for back discomfort, which is common among athletes¹⁰. Today, many invasive and noninvasive methods are used to evaluate the structure of the spine. Radiographic methods and some methods such as flexicurve, inclinometer, back ROM measurement, Spinal Mouse (SM) are used^{12,13}. In addition to the different reliability and validity of each method (Korovessis P., et al., 2004), there are disadvantages such as radiation risk or implementation duration. Spinal Mouse (SM) is among the noninvasive measurement methods. The SM device (Idiag, Switzerland) is used as a valid, reliable and non-invasive method with its advantages such as low cost and short examination time, in cases where it is necessary to renew the measurements, such as monitoring the curvature of the spine, as well as evaluating the functional level of the spine (Figure 1). It has been stated that the SM measurement method is valid and reliable in healthy people¹³. The SM device is a non-invasive device that determines the structural disorders of the spine by marking the vertebrae of the spine beforehand while measuring the spinal mouse and determining the structural disorders of the spine with measurements taken from this marked area. It measures the structure of the spine with the raster stereography method thanks to the sensors on it^{14,15}, the validity and reliability of the device were made by Livaneli et al., (2016) and Büyükturan et al., (2018).

MATERIALS AND METHODS

Research Group

Athletics (12) (middle distance), Badminton (10), Boxing (11), Table tennis (15) and Taekwondo (10) athletes who are actively engaged in sports between the ages of 13-15 with at least 2 years of sports history were included in the study. The groups were informed about the measurement.

Collection of Data**Height Measurement**

The height of the subjects participating in the study was made with a Holtain brand stadiometer with a sensitivity of ± 1 mm. The height of the subjects was measured in cm in such ways as anatomical posture, bare feet, feet together, while the subject held his breath, the head in the frontal plane and after overhead sign positioned at the vertex point for measurement.

Body Weight Measurement

The weight measurements of the subjects were made with a scale with an accuracy of ± 100 gr. Measurement was taken in kg in bare feet and anatomic posture, while the subjects were wearing only shorts and an undershirt.

Spinal Measurement

Measurement of the vertebral angles of the subjects was evaluated with the Spinal Mouse (Idiag, Volketswil, Switzerland), a computer-assisted wireless telemetry device that is moved from the cervical region to the lumbar region along the spinous processes of the vertebral column. All the data obtained by the Spinal Mouse was taken and transferred to a computer at the same time. A periodic algorithm is used to calculate the mobility of the curves. The same procedure was followed for all measurements and two measurements were made in the same sequence. First, the processus spinosus of C7 was determined by palpation (tapping). Then, on the height of S1-S2, the lower side of the posterior superior iliac spine was marked¹⁶. The athletes were required to stay in the waiting room for 30 minutes. Thus, it was aimed not to change the spinal movement in the second measurements made after the waiting period and, accordingly, to prevent an increase in the range of motion of repeated measurements^{17,18}. Then, the athletes were taken to the measurement room, the markings on the spine were re-made and the second measurement series was performed. All measurements were made in the morning at a constant ambient temperature of 26° - 27° C.

Sagittal plane

angle measurements were taken as (a) In anatomical stance position, feet parallel and distance between them shoulder width, hands parallel to body in anatomical stance (ST2-SL2-SS2), (b) Spine in flexion position, While the athlete is in a full-extension, in an upright position from the lumbar region of the spine, as much as possible, without bending the knees, hands parallel to each other (ST1-SL1-SS1), (c), Spine Extension, in the anatomical posture position, in a neutral position (ST3-SL3-SS3) at the end point that can be reached by fully flexing the trunk backwards. The functionality of the spine and posture, in general, was calculated.

STATISTICAL ANALYSIS

The data obtained via the spss package program was analyzed. The Kolmogorov-Smirnov test was used to determine whether the data showed normal distribution. As a result of the test, the data showed a normal distribution. One way analysis of variance (one-way anova) was used to determine whether there was any difference between the branches in terms of the parameters used in the study. The duncan multiple comparison test was used to determine the significant difference as a result of the variance analysis. Significance levels were evaluated according to $p < 0.05$.

RESULTS AND DISCUSSION

As a result of a cross-sectional study conducted to determine the effect of branch training of such athletes-13-15 years old- as Athletics, Badminton, Taekwondo, Table tennis and Boxing on the spinal curvature; A statistically significant relationship was found in all branches of Badminton, Taekwondo, Athletics, Table tennis and Boxing as a result of the comparison made according to age, sports age, body weight, height values ($p < 0.05$). As a result of the comparisons made for Spinal Mouse measurements, there was no statistically significant difference in ST1 value between Badminton, Taekwondo, Athletics, Table Tennis and Boxing branches ($p > 0.05$), while a statistically significant difference was found in SL1 and SS1 values ($p < 0.05$). While there was no statistically significant difference in SL2 value between Badminton, Taekwondo, Athletics, Table tennis and Boxing branches ($p > 0.05$), there was a statistically significant difference in ST2 and SS2 values ($p < 0.05$). Although there was no statistically significant difference in SL3 value between Badminton, Taekwondo, Athletics, Table tennis and Boxing branches ($p > 0.05$), a statistically significant difference was found in ST3 and SS3 values ($p < 0.05$). When the literature is examined; Imhof, K., et al. (2015) conducted a screening study on sedentary children between the ages of 6 and 8 years using the Spinal Mouse device, and found that the angles of the sacrum (pelvic tilt) $^{\circ}$ in standing upright (anatomical posture) was in women (21.1°) and in men (18.1°), in the flexion position in women (53.6°), in men (52.0°), in the extension position in women (-4.8°), and in men (-8.3°). It was found that the angle values of the thoracic vertebrae in standing upright (anatomical posture) was in females (33.4°), in males (35.8°), in flexion position (56.6°) in males (56.8°) in the extension position (38.5°) in males (39.2°). It was also found that in standing upright (anatomical posture), the angle values of the lumbar vertebrae was in women (-33.6°), in men (-29.6°), in flexion position in women (32.4°) in men (32.2°), in the extension position in women (-41.5°) in men (-36.0°)¹⁹. As a result of the study performed on 97 sedentary children between the ages of 12-15 in Tehran with a spinal mouse device in an upright standing (anatomical position), it was found that the angle values of the thoracic vertebrae was (44.2°) and the angle values of the lumbar vertebrae was (29.4°) as the average value²⁰. López-Miñarro, et al. (2012) investigated the relationship between the flexibility of the hamstring muscle and spinal curvature by including 68 young canoe athletes with an average age of 15.23 in the studies by the Spinal Mouse device and determined in group (A), the angle values of the thoracic vertebrae (39.07°), the angle values of the lumbar vertebrae (-28.57°), and the sacrum (pelvic tilt) angle values (13.93°) as the average value. And also it was determined in group (B), the angle values of the thoracic vertebrae (40.93°), the angle values of the lumbar vertebrae (-28.40°), and the sacral (pelvic tilt) angle values (16.30°) as the average value^{21,27,28}. Muyor, et al. (2011) conducted a study by comparing the spinal angles of 60 elite men with an average age of 22.95 and 60 master men cycling athletes with an

average age of 34.27, in anatomical posture and in three different positions on the bicycle, using a spinal mouse device and found in standing upright (anatomical stance), sacrum (pelvic tilt) angle values in elite athletes (13.7 °), im master (11.3 °), lumbar angle values in elite athletes (-27.3 °) in master (-25.3 °) thoracic angle values in elite athletes (48.2 °) in master (47.0 °)²². When compared in terms of height and body weight variables of the athletes participating in the study, it is seen that Boxing athletes have the lowest values and Taekwondo athletes have the highest values. This situation can be attributed to the average age of the participants, because the boxing athletes has the lowest average age, and the taekwondo athletes has the highest average age. This may cause the highest development among the groups to be Taekwondo and the lowest development among the groups to be boxing. Besides, socio-economic status and genetic infrastructure may also be effective. According to the results obtained in our study by comparing the spinal curvatures of athletes who actively practice Badminton, Taekwondo, Athletics, Table tennis and Boxing in the sagittal plane via the Spinal Mouse device; If we compare the average angle values of the spine in standing upright, flexion and extension positions with the study of Imhof, K., et al., (2015) on sedentary people in the literature, according to the spine angle values obtained, the difference between the sacrum (pelvic tilt) was large, but this difference decreased or created close values in thoracic and lumbar angles. The difference in the data obtained as a result of the two studies can be attributed to the difference in the age range of the subject groups and the fact that one of the groups is sedentary and the other consists of athletes participating in regular sports training¹⁹. When compared with the Rabieezadeh (2016) study, the difference between the mean angle of the two groups can be attributed to the groups being sedentary and athletes^{20,25,26}. Making a comparison with the studies conducted on athletes in the literature and comparing the data we obtained with the results of the studies conducted by López-Miñarro et al. (2012) on canoe athletes and the studies of Muyor et al. on cycling athletes, although the ages of the athletes participating in our study were lower than the athletes participating in the other two studies, it is observed that the numerical data obtained in three studies have a common point^{22,23,24}. This means that thoracic angle values are only in the range of normal angle values. The occurrence of this result can be attributed to the stress caused by sports activities.

The average angles of the thoracic, lumbar and sagittal regions of the spine in the cervical plane of the athletes of Athletics, Badminton, Boxing, Table tennis and Taekwondo, who voluntarily participated in the study, are as follows.

Table I. Descriptive statistical results of the athletes participating in the study (mean, standard deviation, f and p values)

Variables		N	Mean	Std. Deviation	f	p
Age	Athletics	12	14,66	,65	3,46	,01
	Boxing	11	13,54	,68		
	Table tennis	15	14,33	1,39		
	Taekwondo	10	14,90	,73		
	Badminton	10	14,50	,52		
Sports Age	Athletics	12	1,50	,52	12,51	,00
	Boxing	11	2,54	2,16		
	Table tennis	15	2,20	1,56		
	Taekwondo	10	6,20	1,75		
	Badminton	10	4,20	2,39		
Body weight	Athletics	12	55,90	9,17	3,51	,01
	Boxing	11	43,91	12,29		
	Table tennis	15	55,91	9,33		
	Taekwondo	10	57,70	6,77		
	Badminton	10	53,22	10,49		
Height	Athletics	12	1,66	,06	8,04	,00
	Boxing	11	1,54	,08		
	Table tennis	15	1,63	,06		
	Taekwondo	10	1,70	,08		
	Badminton	10	1,60	,06		

A statistically significant relationship was found in all branches of Badminton, Taekwondo, Athletics, Table tennis and Boxing as a result of the comparison made according to age, sports age, body weight, height values ($p < 0.05$).

Figure 1: Spinal Mouse sagittal plane measurements

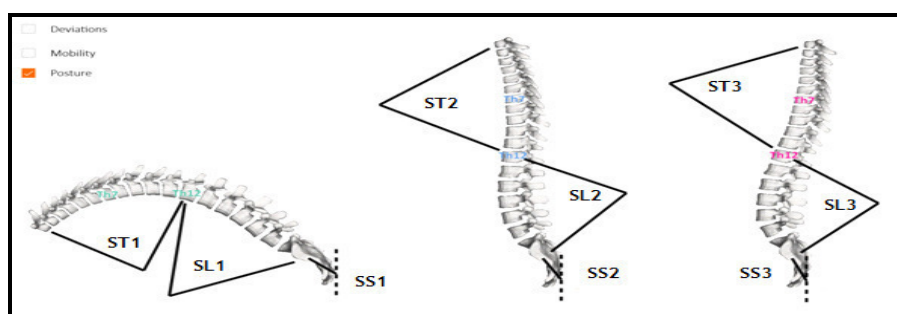


Table 2. Descriptive statistical results of the athletes participating in the study (mean, standard deviation, f and p values)

Variables	N	Mean	Std. Deviation	f	p
ST1 Athletics	12	51,41	15,82	,57	,67
Boxing	11	57,18	7,25		
Table tennis	15	52,80	13,18		
Taekwondo	10	51,30	8,19		
Badminton	10	51,00	5,77		
SL1 Athletics	12	28,75	10,49	4,60	,00
Boxing	11	40,00	9,54		
Table tennis	15	29,80	10,76		
Taekwondo	10	31,70	6,78		
Badminton	10	23,00	7,30		
SSI Athletics	12	45,75	10,83	12,24	,00
Boxing	11	47,90	7,68		
Table tennis	15	45,80	10,58		
Taekwondo	10	60,90	6,20		
Badminton	10	60,40	8,09		

As a result of the comparison, there was no statistically significant difference in ST1 value between Badminton, Taekwondo, Athletics, Table tennis and Boxing branches ($p > 0.05$), while a statistically significant difference was found in SL1 and SSI values ($p < 0.05$).

Table 3. Descriptive statistical results of the athletes participating in the study (mean, standard deviation, f and p values)

Variables	N	Mean	Std. Deviation	f	p
ST2 Athletics	12	32,33	7,80	12,56	,00
Boxing	11	38,90	6,68		
Table tennis	15	34,86	8,53		
Taekwondo	10	26,80	4,68		
Badminton	10	25,60	9,64		
SL2 Athletics	12	-38,33	8,90	,50	,73
Boxing	11	-35,27	11,67		
Table tennis	15	-35,86	7,88		
Taekwondo	10	-33,10	5,19		
Badminton	10	-35,80	8,85		
SS2 Athletics	12	29,41	8,77	6,15	,00
Boxing	11	30,54	8,92		
Table tennis	15	29,86	11,45		
Taekwondo	10	29,60	5,69		
Badminton	10	32,00	7,20		

As a result of the comparison, there was no statistically significant difference in SL2 value between Badminton, Taekwondo, Athletics, Table tennis and Boxing branches, while a statistically significant difference was observed in ST2 and SS2 ($p < 0.05$).

Table 4. Descriptive statistical results of the athletes participating in the study (mean, standard deviation, f and p values)

Variables	N	Mean	Std. Deviation	f	p
ST3 Athletics	12	33,58	12,42	10,3	,00
Boxing	11	41,09	5,412		
Table tennis	15	33,46	11,71		
Taekwondo	10	21,50	9,82		
Badminton	10	20,60	9,55		
SL3 Athletics	12	-39,00	30,77	,32	,86
Boxing	11	-44,63	9,80		
Table tennis	15	-41,93	12,40		
Taekwondo	10	-37,00	14,38		
Badminton	10	-43,20	12,53		
SS3 Athletics	12	23,50	5,26	12,24	,00
Boxing	11	15,27	6,92		
Table tennis	15	24,00	7,91		
Taekwondo	10	28,50	5,42		

As a result of the comparison, although there was no statistically significant difference in SL3 value between Badminton, Taekwondo, Athletics, Table tennis and Boxing branches ($p > 0.05$), a statistically significant difference was found in ST3 and SS3 values ($p < 0.05$).

CONCLUSION

As a result; It is concluded that the spinal curvatures of different sportsmen in the sagittal plane in vertical stance (anatomical stance) are different from the norm values and it is concluded that there is a difference between branches in flexion and extension position.

REFERENCES

- López-Miñarro, P.A, Muyor, J.M, Alacid, F., & Rodríguez, P.L. 2011. Influence of sport training on sagittal spinal curvatures. In A.M. Wright & S.P. Rothenberg (Eds.), *Posture Types, assessment and control* pp. 63-98. New York: Nova Publishers.
- Muyor, J.M, Alacid, F, López-Miñarro, P.A, & Casimiro, A.J.2012. Evolución de la Morfología del Raquis e Inclinación Pélvica en Ciclistas de Diferentes Edades. Un Estudio Transversal. [Evolution of spinal morphology and pelvic tilt in cyclists of different ages. A cross-sectional study. In Spanish.] *International Journal of Morphology*, 30(1), 199-204.
- Muyor, J.M, Vaquero -Cristóbal, R., Alacid, F, & López-Miñarro, P.A. 2014. Criterion-related validity of sit-and-reach and toe-touch teste as a measure of hamstring extensibility in athletes. *Journal of Strength and Conditioning Research*, 28(2), 546-555.
- Dalichau S. & Scheele K. 2002 Influence of sports mechanic demands in competitive tennis on the thoracolumbar spinal profile *Sportverletz Sportschaden*, 162, 64-69.
- Muyor, J.M, Sánchez-Sánchez, E., Sanz-Rivas, D, & López-Miñarro, P.A. 2013. Sagittal spinal morphology in highly trained adolescent tennis players. *Journal of Sports Science and Medicine*, 12, 588-593.
- Tekelioğlu M. Vertebra embryology. Ege R, Editor. In the vertebra-spine. Ankara: Turkish Aeronautical Association Printing House; 1992.s.15-9.
- Santonja F, Pastor A, & Serna, L.2000. Valoración radiográfica de las desalineaciones sagitales del raquis. X-ray diagnosis of sagittal alignment of spine. In Spanish *Selección*, 9(4), 216-229.
- Arıncı K, Elhan, A. 2006 Anatomy 2nd volume 4th edition. Ankara, Turkey, Güneş Bookstore, 54-7.
- Ege R. Vertebra-Spine, Turkish Aeronautical Association Printing House, Ankara 1992, 29: 189-191
- McGill, S.M. 2002. *Low back disorders. Evidence-based prevention and rehabilitation*. Champaign, IL: Human Kinetics.
- Rajabi, R., Mobarakabadi, L., Alizadhen, H.M., & Hendrick, P. 2012. Thoracic kyphosis comparisons in adolescent female competitive field hockey players and untrained controls. *Journal of Sports Medicine and Physical Fitness*, 52(5), 545-550.
- Kachingwe AF, Phillips BJ. Inter- and intrarater reliability of a back range of motion instrument. *Arch Phys Med Rehabil*. 2005; 86:2347-53.
- Mannion AF, Knecht K. 2004 A new skin surface device for measuring the curvature, and global and segmental ranges of motion of the spine: reliability of measurements and comparison with data reviewed from the literature. *Eur Spine J*; 13: 122-136.
- Livanelioglu A, Kaya F, Nabiye V, Demirkiran G, Fırat T. The validity and reliability of "Spinal Mouse" assessment of spinal curvatures in the frontal plane in pediatric adolescent idiopatin thoraco-lumbar curves. *Eur Spine J* 2016; 25:476-82.
- Odom CJ, Taylor AB, Hurd CE, Denegar CR. Measurement of scapular asymetry and assessment of shoulder dysfunction using the Lateral Scapular Slide Test: a reliability and validity study. *Phys Ther* 2001;81:799-809.
- Chakraborty R. Pynsent P. Isaacs K, which spinallevels are identified by palpation of iliac crest and the poste-rrior superior iliac spines J. *Anatom* 2007 Vol. 210, 232–236.
- Graves J.E, Pollock M.L, Carpenter D.M, Leggett S.H. Jones A, Macmillan M, Fulton Quantitative assess-ment of full range-of-motion isometric lumbar extensionstrength, *Spine Philadelphia Pa* 1976, 1990, Vol. 15,289–294.
- Severinsson Y, Elisson L, Bunketorp O, Reliabilityof measuring the cervical sagittal translation mobilitywith a simple method in a clinical setting, *Rehabilitation Research and Practice*, 2012, in press ID: 629104, DOI:10.1155/2012/629104.
- Imhof, K, Faude, O, Strebel, V, Donath, L, Roth, R, & Zahner, L. 2015. Examining the association between physical fitness, spinal flexibility, spinal posture and reported back pain in 6 to 8 year old children. *Journal of Novel Physiotherapies*, 5, 274.
- Rabieezadeh, A, Hovanloo F, Khaleghi, M, & Akbari, H. 2016. The relationship of height, weight and body mass index with curvature of spine kyphosis and lordosis in 12-15-year old male adolescents of Tehran. *Turkish Journal of Sport and Exercise*, 18(3), 42-46.
- López-Miñarro, P. A. Muyor, J. M, & Alacid, F. 2012. Influence of hamstring extensibility on sagittal spinal curvatures and pelvic tilt in highly trained young kayakers. *European Journal of Sport Science*, 12(6), 469-474.
- Muyor, J.M, Alacid, F, & López-Miñarro, PA. 2011. Morfología Sagital del Raquis en Palistas Jóvenes de Alto Nivel. [Sagittal spinal in young highly-trained paddlers. In Spanish.] *International Journal of Morphology*, 29(3), 1047-1053.
- López-Miñarro, P.A, & Alacid, F. 2010. Cifosis funcional actitud cifótico lumbar en piragüistas adolescentes. [Functional kyphosis and lumbar kyphosis in adolescent paddlers. In Spanish.] *Retos. Nuevas Tendencias en Educación Física, Deporte y Recreación*, 17(1), 5-9.
- Çakır E. The Investigation of The Relationship Between The Body Mass Index and The Participation In Physical Activity Of High School Students *Journal of Physical Education and Sport Sciences* 21.1-A (2019): 30-39.
- Eriş, Fatih, Kemal Sargin, and Ergün Çakır. "The Effect Of Fitness On Socialization." *European Journal of Physical Education and Sport Science* (2018).

26. Ilkim, M, Halil T, and Mehmet Ö. "Socialization Effect of Physical Activity in Students Who Need Special Education." *Asian Journal of Education and Training* 4.2 (2018): 128-131.
27. Sargin K., and Selçuk, M. Investigation of Some Biomatoric and Physiological Effects of People's Plays in Individuals in Regenarian Folk Player Exercises (Van Sample). *Journal of Education and Training Studies*, 6(6) (2018): 84-93.
28. Çakir E., Şenel Ö., and Arslanoğlu, E. The Effect of Cold Water Immersion on Cardiac Troponin T and Myoglobin Levels. *Neuroendocrinology Letters*, 40(1) (2019): 22-28

INVESTIGATION OF STATE ANXIETY AND LIFE SATISFACTION CHARACTERISTICS OF TENNIS PLAYERS

M.Toprak KESKIN¹, Turhan TOROS^{*2}, Rabia Yıldız ÖZTÜRK³

1. Nevsehir Hacı Bektas Veli University- School of Sports Sciences and Technology- <https://orcid.org/0000-0001-9439-0094>,
toprakkeskin@hotmail.com
2. Department of Sports Sciences, Mersin University, Mersin, Turkey
<https://orcid.org/0000-0002-8328-2925>
Corresponding author turhantoros@yahoo.com
3. Department of Sports Sciences, Mersin University, Mersin, Turkey
Corresponding author: rbyldz1@gmail.com
<https://orcid.org/0000-0003-0911-6459>,

ABSTRACT

This study aims to examine the relationship between tennis players' state anxiety (somatic anxiety, cognitive anxiety, and self-confidence) and their life satisfaction. To examine the problem statements put forward, sports ages between 21-34 ($X^{\perp}$ -years = 27.44 ± 3.50) and sports ages between 4-10 (X years sports age = 6.49 ± 2.90) 46 women; and 51 men aged between 21-32 ($X^{\perp}$ -years = 26.16 ± 2.98) and sport ages between 4-12 years ($X^{\perp}$ -sports age = 6.92 ± 2.10). tennis player participated. As a result of the normality test, the independent T-test was used to find the difference between the two groups as statistical analysis, and the Pearson Correlation Analysis was used to look at their relationship with age and sports age. In the research findings, there was no significant difference in state anxiety levels according to gender category ($p > .05$), and a negative significant relationship was found between cognitive anxiety and life satisfaction in female tennis players ($p < .05$; $r = -.198$). On the other hand, there was no relationship between state anxiety and life satisfaction scores in male tennis players ($p > .05$).

Keywords: Tennis, anxiety, state anxiety, satisfaction with life, gender, age.

I. INTRODUCTION

The individual wants to be successful both in his private life and sports life. Sports psychology has worked in many fields.⁷⁻⁹ Performing under pressure ensures success. The individual who grows up under these pressures also begins to fear failure.^{20, 24} For him, success means being accepted and loved by his environment. Fear of failure is the most important source of anxiety. Köknel (2005) anxiety. Schultz and Schultz (2002) defined it as the power that motivates the individual to reduce this state of tension by causing tension in human behavior. Anxiety is when stimuli that do not normally evoke a feeling of fear cause some fear reactions. Here, there is a painful effect that is not related to reality, cannot be understood and explained (Bedir, 2008). In the case of anxiety and fear, the reactions of the individual are similar. Therefore, it is not easy to distinguish between anxiety and fear.¹⁵ When anxiety is managed successfully, coordination and flexibility in attention develop. Mindful skills keep athletes from focusing on negative thoughts. For example; many people who disagree with the whistle blown by the referees respond angrily. How anger a person responds to such situations is related to their personality tendencies to anger and their anxiety levels.¹⁰ For the first time, Neugarten et al. (1961), the concept of "satisfaction with life" guided many researchers later. To define life satisfaction, it would be appropriate to explain the concept of "satisfaction" first. Satisfaction is the fulfillment of expectations, needs, wishes, and wishes. "Life satisfaction" is the situation or result obtained by comparing a person's expectations (what he wants) with what he has. Life satisfaction shows the result of the comparison of one's expectations with the actual situation. Life satisfaction generally includes a person's entire life and a wide variety of aspects of that life. When it comes to life satisfaction, it is not the satisfaction of a particular situation, but the satisfaction of all experiences in general happiness, morale, etc. It expresses the state of well-being from different angles and the dominance of positive emotion over negative emotion in daily relationships.¹⁷ This study aims to examine the relationship between tennis players' state anxiety (somatic anxiety, cognitive anxiety, and self-confidence) and their life satisfaction.

METHOD

Research Model

In this study, which aims to reveal the characteristics of tennis players' state anxiety and life satisfaction in terms of some factors, a relational screening model, which includes comparison and type of correlation between variables, was used.

Research Group

The universe of the study consisted of active licensed tennis players in Turkey. The sample of the study is composed of tennis players from Mersin, Istanbul, Ankara, Antalya, and Izmir provinces. 46 women aged between 21-34 ($X^{\perp}$ -year = 27.44 ± 3.50) and sports age between 4-10 years ($X^{\perp}$ -sports age = 6.49 ± 2.90), and 51 men aged between 21-32 ($X^{\perp}$ -years = 26.16 ± 2.98) sport ages between 4-12 years ($X^{\perp}$ -sports age = 6.92 ± 2.10), a total of 97 tennis players participated voluntarily.

Operation Way

The data used in the study were collected by the researchers themselves. During the data collection process, the necessary explanations were made to the participants by the researcher for the purpose, scope and protection of the information to be obtained. Participants voluntarily participated with an informed consent form according to the Helsinki criteria. The ethics committee was consulted for this study and the necessary permissions were obtained. Only individuals who volunteered to participate were included in the study.

Data Collection Tools

A "Personal Information Form" containing questions such as gender and age was distributed to the participants to determine their demographic characteristics.

Life Satisfaction Scale

The original form of the scale developed by Diener et al. (1985), is a single factor, 5-item, and 7-point Likert-type. Each item is evaluated according to a 7-graded response system (1 = Strongly Disagree, 7 = Strongly Agree). Diener et al. (1985) found the Cronbach alpha value of the scale's reliability as .87 and the criterion-related validity as .82 in the original study. The related scale was previously adapted to Turkish by Köker (1991) and 7-item is used as a rating by various researchers in Turkey. Köker (1991) found that the test-retest consistency coefficient of the scale, which was applied three weeks apart, was 0.85. Yetim (1991) calculated the corrected split-half value as 75 and Kuder Richardson-20 as 79. The test-retest reliability coefficient of the scale and 85 item-test correlation coefficients are between 71 and 80 (Yetim, 1991). In the reliability study conducted within the scope of this study, the internal consistency coefficient of the Life Satisfaction Scale was found as 91.

Competitive State Anxiety Inventory

The Competitive State Anxiety Inventory-2 CSAI-2 is one of the scales used to measure pre-competition anxiety in the field of sports psychology. The inventory, which was developed by Martens et al. To measure cognitive anxiety, somatic anxiety, and self-confidence, consists of three subscales and 27 items. Judgments are made according to 4 evaluation steps. CSAI-2 was adapted to Turkey by Koruç (1998). The test-retest reliability coefficients of the scale performed one month apart, were calculated as .96 for cognitive anxiety, .93 for somatic anxiety, and .95 for self-confidence. As the competition approached, anxiety started to increase. While there was a correlation at the level of .56, .67, .54, respectively, in the measurements made two weeks apart, a correlation was found at the level of .23, .22, .32 two days before the competition. This finding gives information about the stability of the tool based on time and also gives information about its validity. During the adaptation of the scale to Turkish, item analysis and factor analysis were also performed. The results of the factor analysis performed to test the construct validity of the scale show that the factor loads varied between .68 and .98 for the cognitive anxiety sub-dimension, .69 and .98 for the somatic anxiety sub-dimension, and .75 and .97 for the self-confidence sub-dimension. In the reliability studies conducted within the scope of this study, it was observed that the internal consistency coefficients of the Competitive State Anxiety Inventory were .78 for cognitive anxiety, .81 for somatic anxiety, and .88 for self-confidence.

Analysis of the Data

The data were analyzed statistically. Kolmogorov Smirnov's value of life satisfaction scale and general self-efficacy scale sub-dimension scores were not found significant as a result of the normality test ($p > .05$). While the distribution was found to be normal as a result of the normality test, the Independent Groups T-test for paired comparisons and the Pearson Correlation Coefficient were used to look at the relationship status.

FINDINGS

Table 1. Comparison of the state anxiety scores of the study group in terms of gender

Score	Category	n	$\bar{x}$	Std d.	Sh $_{\bar{x}}$	t Test		
						t	Sd	P
Cognitive Anxiety	Woman	46	20,34	4,45	,72	,146	78	,88
	Man	51	20,21	3,33	,51			
Somatic Anxiety	Woman	46	18,15	3,83	,62	1,25	78	,21
	Man	51	17,14	3,43	,53			
Self-Confidence	Woman	46	27,71	4,94	,80	1,15	78	,25
	Man	51	26,26	6,16	,95			

When Table 1 was examined, no statistically significant difference was found in the cognitive anxiety, somatic anxiety and self-confidence levels of the sample group participating in the study according to the gender category variable ($p > .05$).

Table 2. The relationship between the state anxiety scores of the female tennis players in the study group and their life satisfaction scores

	Life Satisfaction
Cognitive Anxiety	-,198*
Somatic Anxiety	-,045

Self-Confidence	,083

*p<,05

When Table 2 is examined, a significant negative relationship was found between the life satisfaction of female tennis players and the cognitive anxiety sub-dimension of the inventory ($p < .05$; $r = -.198$). There was no relationship between somatic anxiety and self-confidence sub-dimensions and life satisfaction scores ($p > .05$).

Table 3. The relationship between the state anxiety scores of the male tennis players in the study group and their life satisfaction scores

	Life Satisfaction
Cognitive Anxiety	-,088
Somatic Anxiety	-,070
Self-Confidence	,103

When Table 3 is examined, no relationship was found between male tennis players' life satisfaction and state anxiety scores ($p > .05$).

DISCUSSION

The aim of this study is to examine the relationship between tennis players' state anxiety (somatic anxiety, cognitive anxiety, and self-confidence) and their life satisfaction. No statistically significant difference was found in the cognitive anxiety, somatic anxiety, and self-confidence levels of the participating sample group according to the gender category variable. A significant negative relationship was found between the life satisfaction of female tennis players and the cognitive anxiety sub-dimension of the inventory. No relationship was found between somatic anxiety and self-confidence sub-dimensions and life satisfaction scores. There was no relationship between male tennis players' life satisfaction and state anxiety scores. Based on the results of the research showing that anxiety harms life satisfaction, the inference that individuals with high levels of stress control will have higher life satisfaction levels supports the positive and direct effect of this study on life satisfaction. In addition, this study seems to be compatible with Deniz's (2006) finding that there is a positive relationship between anxiety and life satisfaction.

When the literature is examined, there are studies that men have high life satisfaction, women have high life satisfaction levels.²⁵ and there is no difference according to gender.²⁵ In a study conducted by Tümkaya, Çelik, and Aybek (2011) on 274 high school students, it is stated that life satisfaction does not differ according to gender. It has been demonstrated that demographic variables and gender have little effect on life satisfaction during adolescence and childhood.¹⁸ Different societies and different research group structures are thought to cause different results in the literature and the result in the research. It is known that moderate anxiety as a state of general arousal is preparatory, triggering, and functional factor in coping with stressors.¹ In other words, it's not neurotic anxiety in dealing with any stressor; state anxiety is required. In this context, when life satisfaction is evaluated as discussed.³ It becomes necessary in daily life, in accepting the difficulties of life and in coping with the stressors involved in reaching desired goals. On the other hand, considering Meulemann's (2001) approach to life satisfaction, it means that the individual generally evaluates his/her life, evaluates the stressors he/she encounters in his life, and the positive and negative results he receives after the events. In this context, tennis players are likely to experience state anxiety in parallel with their other experiences at the time of the assessment. In addition, since the instantaneous anxiety experienced by tennis players has a triggering and preparatory function to cope with the stressors they encounter, the anxiety in question may have a positive effect on their evaluation of their lives as a factor that increases their coping success. In other words, life satisfaction is important as a driving force for the individual to direct his / her goals.

CONCLUSION

The most important contribution of the study to sports sciences is the study of anxiety and life satisfaction in sports and the demonstration of these relationships. In addition, it is seen that studies on anxiety and life satisfaction in the literature. For these two reasons, it is predicted that this research will be a reference. In addition, it is thought that the results of the research will benefit practitioner sports psychologists. In future studies, it will be more useful to conduct research not only on the individual but also on team sports. It is thought that examining the relationship between anxiety and other parameters of life satisfaction will be useful for future studies.

REFERENCES

1. Bacanlı, H. (2008). Social Skills Education. Ankara: Asal Publications, 83.
2. Bedir, R. (2008). The Effect of State Anxiety Levels of Taekwondo National Team Athletes on Success (Doctoral dissertation, Selcuk University Health Sciences Institute).
3. Clark, S. D., Long, M. M., & Schiffman, L. G. (1999). The mind-body connection: The relationship among physical activity level, life satisfaction, and cognitive age among mature females. *Journal of Social Behavior and Personality*, 14(2), 221.
4. Deniz, M. E. (2006). The Relationships among Coping with Stress, Life Satisfaction, Decision-Making Styles and Decision Self-Esteem: An Investigation with Turkish University Students. *Social Behavior and Personality*, 34(9), 1161- 1170.
5. Diener, E., Emmons, R.A., Larsen, R.J., Griffin, S., (1985). "The Satisfaction with Life Scale", *Journal of Personality Assessment*, 49, p.p. 71-75.

6. Dost, M. T. (2007). Examining the Life Satisfaction of University Students According to Some Variables. Pamukkale University Journal of Education, 22(22), 132-143.
7. Ilkim, M., Tanir, H., & Özdemir, M. (2018). Socialization Effect of Physical Activity in Students Who Need Special Education. Asian Journal of Education and Training, 4(2), 128-131.
8. Kesilmis, I., & Yıldız, R. (2018). The relation between body awareness and track and field athletes' goal setting. Journal of Human Sciences, 15(4), 2454-2461. doi:10.14687/jhs.v15i4.5501
9. Kesilmis, I., Tastan, Z., & Toros, T. (2020). Comparison of the Perceived Motivational Climate and Rewarding Behavior of Football Players According to their Positions. Sports Educations Magazine 4(1), 115-122.
10. Konter, E. (1996). Investigation of the effects of some personal variables of professional football players on state anxiety and the effects of state anxiety on team relationships. Unpublished Master's Thesis, CU Institute of Social Sciences, Adana.
11. Koruc, Z. (1998). "CSAI-2 Turkey Adaptation. "5th International Congress of Sports Sciences Summary. Ankara: Hacettepe University. 5-7 November. 93.
12. Koker, S. (1991). Comparison of life satisfaction levels of normal and problematic adolescents. Unpublished Master's Thesis, Ankara University Institute of Social Sciences, Ankara.
13. Koknel, O. (2005). Personality from Anxiety to Happiness, Altın Books, İstanbul.
14. Meulemann, H. (2001). Life satisfaction from late adolescence to mid life. Journal of Happiness Studies 2(4), 445-465
15. Mosknes, U.K. & Espnes, G.A. (2014). Self-esteem and life satisfaction in adolescents gender and age as potential moderators. Quality Of Life Research, 22(10), 2921-2928.
16. Neugarten BL, Havighurst RJ, Tobin SS (1961) The measurement of life satisfaction. Journal of Gerontology 16:134-143.
17. Pavot, W., & Diener, E. (2009). Review of the satisfaction with life scale. In Assessing well-being (pp. 101-117). Springer, Dordrecht.
18. Proctor, C. L., Linley, P. A., & Maltby, J. (2009). Youth life satisfaction: A review of the literature. Journal of Happiness Studies, 10(5), 583-630.
19. Schultz, D.P. Ve Schultz, S.E. (2002), (translator: Yasemin Aslay), Modern History of Psychology, Kaknüs Publications, İstanbul.
20. Tastan, Z., Kesilmis, I., & Toros, T. (2020). Comparison of Democratic and Autocratic Behavior Perceived by Basketball Players from Coaches According to Their Positions. Gaziantep University Journal of Sport Sciences, 5(3), 219-230.
21. Tavacıoğlu L (1999). Sports Psychology Cognitive Assessments, Bağırhan Publisher, Ankara; s.54-55.
22. Tuzgol-Dost, M. (2007). Examining the life satisfaction of university students according to some variables. Pamukkale University Journal of Education, 22(2), 132-143.
23. Tümkaya, S., Celik, M. ve Aybek, B. (2011). Investigation of submissive behavior, automatic thoughts, hopelessness and life satisfaction in high school students. Çukurova University Journal of Social Sciences Institute, 20(2), 77-94.
24. Yetim, U. (1991). Life satisfaction in terms of the organization and pattern of personal projects. Unpublished doctoral dissertation, Ege University, Institute of Social Sciences, İzmir.
25. Yılmaz, E. ve Aslan, H. (2013). Examining the relationship between teachers' loneliness at work and life satisfaction. Pegem Education and Training Magazine, 3(3), 59-69.

INVESTIGATION OF NOMOPHOBIA LEVELS OF INDIVIDUALS CONTINUING TO YOUTH CENTER

Abdullah DOĞAN^{*1}, Hulusi BOKE²

1. PhD, Youth and Sports Provincial Directorate of Malatya, Malatya, Turkey,
 2. Ministry of Education, Yasar Oncan Secondary School, Malatya, Turkey
- Corresponding author:** abdullah_d46@hotmail.com.tr.

ABSTRACT

This research aims to examine the nomophobia levels of individuals who study sports in youth centers in terms of some variables. 106 individuals, 69 females and 47 males, voluntarily participated in the study. As a data collection tool in the research, it was developed by Yildirim and Correia (2015) and Yildirim et al. "Nomophobia Scale (NMP-Q)" and "Personal Information Form" developed by the researcher were used. As a result of the tests, a t-test was applied to binary data groups with normal distribution, and One -Way Anova test was used to analyze data sets with three or more groups. Descriptive statistical analyzes are also tabulated. SPSS package program was used in the analysis of the data obtained. As a result of the research, it was determined that the average score of the students on the nomophobia scale was medium. On the other hand, it was understood that variables such as age, gender, power bank carrying status, playing games and watching movies were not effective on students' nomophobia

KEYWORDS: Nomophobia, education, youth centers, sport.

INTRODUCTION

With the social change we live in, the technological development that is the locomotive of this change is moving at a dizzying speed. It can be said that the technologically developing communication sector has produced numerous products and equipment to improve the living standards of people. Today, internet-based smart devices developed in parallel with the changes in the technology field caused global transformations in the society¹. It can be predicted that this transformation directly affects the way people communicate and how they use technological products. Defining addiction to mobile phones as a new form of addiction, nomophobia is an abbreviation of the English word "No Mobile Phone Phobia" which means fear of staying away from the phone². Also nomophobia; It is frequently encountered as a disease of the age of technology that arises due to the lack of anxiety and restlessness caused by the lack of smart devices such as a tablet, mobile phone, computer³. The developments in the Internet, communication and information technologies have made mobile phones an important part of individuals' lives today. Today, the use of mobile phones, especially the use of smartphones, is becoming more and more widespread in both developed and developing countries⁴. Smartphones, which outperform mobile phones in terms of their advanced capacities, constantly updated operating systems and computing power, have become attractive to millions of people⁵. According to TÜİK data in 2019; the Internet usage rate of individuals aged 16-74 was found to be 75.3 percent. This rate was announced as 72.9 percent in 2018. While internet usage rates were 81.8 percent for men, this rate was 68.9 percent for women. According to the results of the household information technology use survey, 88.3 percent of the households had access to the internet from home. This rate was 83.8 percent in the previous year. The proportion of individuals in the 16-74 age group, who order or purchase goods or services for personal use over the Internet, was 34.1 percent in the 12 months months covering April 2018 and March 2019. This rate was 29.3 percent in the same period of the previous year⁶. Young people had the opportunity to realize new belongings on the internet with their search for innovation, their desire for freedom, the identity they could hide, and their identity they did not have to bear any responsibility away from social pressures⁷. A call for "stay at home" has been made by the people who are in charge of the coronavirus (Covid-19) epidemic, which took place recently and affected the world together with our country. Within the scope of these measures; In our country, restrictions were introduced for individuals aged 65 and over in the risk group. In addition to these measures, individuals under the age of 20 were restricted from going out onto the streets. As such, it is not sincere for young people to increase the amount of time they spend with their smartphones during their stay. In the continuation of this increasing period, it is thought that the homophobic tendencies that may occur in young people may have increased. Although studies on nomophobia are increasing day by day, when the studies that present possible relations are revealed, loneliness,⁸ decrease in academic success,⁹ excessive internet use¹⁰ It has been revealed that there is a relationship between nomophobia, low levels of self-esteem⁸ low self-esteem,¹¹ and low well-being.¹¹ Curiosity and interest in communication and information technologies of young people, which are easier to adapt to changes, increase the consumption of vehicles with higher functions such as smartphones.^{12,13} Considering the above studies, there are many types of research on nomophobia on adolescents and university students. It is seen that there is a need to determine the nomophobia levels of the youth center members who are in the scope of the research and evaluate their free time with sports activities. Considering the close interest of young people in technological development and recent research, it can be said that the level of nomophobia of individuals

studying in youth centers should be investigated. The aim of this study is to examine the nomophobia levels of individuals who study sports in youth centers in terms of some variables.

METHODS

Research model

The model of the research is the general screening model. The purpose of the general screening model is to describe an existing situation¹⁴. Screening model in terms of social sciences; The most common types of research are survey or subway, research models. They are also reviews that try to describe and explain what events, objects, assets, institutions, groups and various areas are. Also, researches aimed at determining the attitudes, beliefs, opinions, behaviors, expectations and characteristics of individuals in certain positions with the help of surveys are called screening research^{15,16}.

Research group

The study group of the research consisted of 120 volunteers who were carried out within the scope of Malatya Youth Centers in the 2019-2020 season and continue their sports activities. A total of 116 individuals were included in the study, including 69 women and 47 men who completed the surveys completely and seamlessly. A typical sampling method and a working group were formed with the typical situation¹⁷. Within the scope of Youth Centers, there are approximately 3000 people who continue their activities such as values education, innovation, personal development, social sciences, language education and fine arts along with sportive activities. Members participating in sports activities are evaluated within the scope of an individual (wrestling, traditional archery, court tennis) and team sports (table tennis, athletics and folk dances). In some of these branches, work is carried out every weekday, while in others, 2 or 3 days a week are carried out.

Data collection tools

Yildirim, Sumuer, Adnan, and Yildirim¹⁸, developed by Yildirim and Correia¹⁹, as a data collection tool to measure the nomophobia (telephone addiction) levels of members who continue sports activities at Malatya Youth Centers in terms of some variables. "Nomophobia Scale" made by. The "Nomophobia Scale" was developed to measure the level of dependence of individuals on the phone; It has a 7-point Likert-type structure with 20 items. Individuals evaluate the extent to which they agree with the statements in the items, on the seven-digit scales, and a single nomophobia score is obtained by summing the numerical values marked for the items. The lowest score that can be obtained from each item is 1 and the highest score is 7. The lowest points that can be obtained from the nomophobia scale are 20, the highest is 140 points, and the high scores are accepted as a strong dependency indicator. In the reliability calculation for this study, Cronbach Alpha "internal consistency coefficient was calculated as .92. In this case, the scale can be said to be "quite reliable"²⁰. Individuals get 20 to 140 points from the scale, 20 to 60 points indicate low-level nomophobia, 60-100 is medium, and 100-140 points to high-level nomophobia, while 20 points show that there is no homophobic behavior in the individual¹⁹.

Data analysis

After the data collection process has been completed, all the data obtained have been made ready for the necessary statistical procedures and a statistical package program has been used. Kolmogorov-Smirnov test was applied to test the normality of the data and it was determined that the data showed normal distribution. One-Way Variance Analysis (ANOVA) and Independent Samples t-test were used to analyze the data. To see the information distributions related to demographic features, percentage analyzes were made. For type I error, $\alpha = 0.05$ level was taken. Parametric test procedures were applied since the data obtained before performing statistical operations related to the data of the research were intermittent scale data, normal distribution and variance value were equal. To describe the data about the personal characteristics of the participants; standard deviation and frequency are used on the face. Independent groups t-test was used to determine whether the nomophobia levels of the members attending the youth centers differ according to the variables of gender, power bank transport, playing, movie-TV series, and ANOVA (One-Way Anova) test was used to determine whether the nomophobia levels of the members differ according to the age variable.

RESULTS

Table 1: Data on total scores from nomophobia scale

	N	XX	SS	Min.	Max.
Total	116	62,50	25,93	20	131

When Table 1 is analyzed, the average score of the 116 individuals who participated in the research was 62.50; the standard deviation is 25.93; the lowest score from the scale is 20 and the highest score is 131.

Table 2: Findings regarding demographic characteristics of individuals participating in the research

Variables	Grups	f	%
Age	15-20 age	89	76,7
	21-25 age	20	17,2
	26 and over	7	6
Total		116	100,0

Gender	Women	69	59,5
	Men	47	40,5
	Total	116	100,0
Powerbank Transport Case	Yes	28	24,1
	No	88	75,9
	Total	116	100,0
Game Playing Case From Mobile Phone	Yes	43	37,1
	No	73	62,9
	Total	116	100,0
Watching case movie- series Programs from Mobile Phone	Yes	63	54,3
	No	53	45,7
	Total	116	100,0

Looking at Table 2, it was determined that a large part of the individuals participating in the study were in the 15-20 (76.7%) age range. In addition, when the gender variable was examined, 69 participants (59.5%) were female and 47 participants (40.5%) were male; According to power bank carrying status, 28 of the participants (24.1) said yes and 88 (75.9) said no; When the game play on the mobile phone is examined, 43 (37.1) of the individuals participating in the research said yes, and 73 (62.9) said no; Considering the situation of watching movies and TV series on mobile phones, it is seen that 63 (54.3) of the participating individuals said yes and 53 (45.7) said no. In addition, normal distribution assumptions were taken into account for the analysis of groups and categories²¹.

Table 3: One-way analysis of variance (Anova) results of nomo-phobia points between groups in age variable

Source of Variance	Total of Squares	df	Average of Squares	F	p	Significant Difference
Between Groups	1421,710	2	710,855	1,058	,351	-
In Groups	75915,282	113	671,817			
Total	77336,991	115				

Thus, as a result of Kolmogorov-Smirnov and Shapiro-Wilk Tests ($p > .05$), it was determined that the data met the parametric test conditions. Thus, One Way Variance Analysis (ANOVA), one of the Parametric tests, was used for data analysis. Three different age groups consisting of 116 people; groups formed according to their ages and the averages of nomophobia scores were compared with one-way analysis of variance for unrelated samples. The average score of the individuals between the ages of 15-20 ($X_{15-20} = 62.48$), the average score of the individuals between the ages of 21-25 ($X_{21-25} = 58.30$) and no statistically significant difference was observed between the mean score ($X_{26-above} = 74.8571$) of individuals aged 26 and over [$F_{(2-113)} = 0.926$; $p > .05$].

Table 4: T-test analysis results of nomo-phobia points between groups in gender variable

Groups	N	XX	S	df	t	p
Women	69	62,08	27,34	114	,211	0,833
Men	47	63,12	23,98			

As a result of the normality test (Kolmogorov-Smirnov) ($p > .05$), it was understood that the data met the parametric test conditions. Therefore, Independent Samples t-test, one of the Parametric tests, was used for data analysis. In a group of 116 people consisting of 47 men and 69 women, according to the result of the t test performed to reveal whether there is a significant difference between the mean scores of women and men; No statistically significant difference was observed between women's scores ($X: 62.08$) and men's scores ($X: 63.12$) ($t_{(114)} = 0.211$, $p > .05$). It can be said that gender does not have a significant effect on nomophobia scores among the groups subject to the study.

Table 5: T- test analysis results of nomo-phobia points between groups according to powerbank carrying status

Groups	N	XX	S	df	t	p
Yes	28	64,9286	27,37	114	,565	0,573
No	88	61,7386	25,57			

As a result of the normality test (Kolmogorov-Smirnov) ($p > .05$), it was understood that the data met the parametric test conditions. Therefore, Independent Samples t-test, one of the parametric tests, was used for data analysis. According to Powerbank carrying status, there is a group of 116 people consisting of 88 who do not carry 28. No statistically significant difference was observed between the scores of those carrying ($X: 64,9286$) and those of those who did not ($X: 61,7386$) [$t_{(114)} = 0.565$, $p > .05$]. It can be said that Powerbank carrying status does not have a significant effect on nomophobia scores among the groups subject to the research.

Table 6: T-test analysis results of nomo-phobia points between groups according to playing status

Groups	N	Rank Average	Rank Total	U	p
Yes	43	64,28	2764	1321	0,155

No	73	55,10	4022

As a result of the normality test (Kolmogorov-Smirnov) ($p < .05$), it was understood that the data did not meet the parametric test conditions, so Mann Whitney U, one of the non-parametric tests, was used for data analysis. There is a group of 116 people who answer 43 yes 73 no depending on the situation of playing. According to the results of Mann Whitney U test conducted to reveal whether there is a significant difference between the nomophobia score averages of those who play and do not play; No statistically significant difference was observed between those who played (Median: 73) and those who did not (Median: 58) ($U = 1321$, $p > 0.05$). It can be said that the playing status in this group has no significant effect on the nomophobia scores of the research.

Table 7: T-test analysis results of nomophobia scores between groups according to movie-tv series status

Groups	N	XX	S	df	t	p
Yes	63	62,88	25,43	114	,171	,864
No	53	62,05	26,74			

As a result of the normality test (Kolmogorov-Smirnov) ($p > .05$), it was understood that the data met the parametric test conditions. Therefore, the Independent Samples t-test, one of the parametric tests, was used for data analysis. There is a group of 116 people consisting of 53 watching and 63 watching and not watching movie-series. According to the results of the t test performed to reveal whether there is a significant difference between the nomophobia score averages of those who watched and did not watch the movie-series; No statistically significant difference was observed between the scores of the followers (X : 62.88) and those of the non-followers (X : 62.05) [$t_{(114)}$; 0.171, $p > .05$]. It can be said that the situation of watching movies and series do not have a significant effect on nomophobia scores among the groups subject to the research.

DISCUSSION

In this study, it was aimed to examine the nomophobia levels of individuals attending the youth center in terms of some variables. In this section, the findings obtained in the research are discussed with the findings of the current studies in the literature. The nomophobia levels of the individuals attending the youth center were found to be moderate according to Yıldırım and Correia¹⁹ ($\bar{x} = 62.50$). Burucuoğlu²² found that the scores obtained from nomophobia levels were above the average of the scale in his study with vocational school students. Gezgin, Şumuer, Arslan, and Yıldırım²³ determined that their nomophobia level scores were above average in their research with prospective teachers. Akıllı and Gezgin²⁴ found that the nomophobia levels of the students were above average in their research. Having examined the nomophobia levels of social network users, Gezgin and Şahin²⁵ found that social network users' nomophobia levels were above the average according to the average score obtained from the nomophobia scale. In the light of current findings, it was found that there was no significant difference in nomophobia levels according to the age variable of the individuals participating in the study ($p < 0.05$). Öz and Tortop²⁶ found that there is no significant difference between the age variable and the homophobic tendency levels of the students in the scientific research they conducted on university students. This research finding supports the current research finding. Gezgin et al.²³ stated in a scientific study conducted by pre-service teachers to determine the nomophobic tendency levels, there was a significant difference according to the age variable and the nomophobic tendency levels decreased as the age variable increased. Ercan and Tekin²⁷ found that physical education and sports teachers' nomophobia levels were higher than that of older teachers. In their study, Bülbül and Tunç²⁸ obtained a conclusion that the age variable was effective on telephone addiction. In a study conducted by Park, Kim, Shon, and Shim²⁹, they stated that the nomophobic tendency levels of the participants differed according to the age variable. Kartal, İnan and Murathan³⁰ examined the nomophobia levels of physical education and sports school students and found a significant gender difference. These research findings contradict the current research finding. It was concluded that there was no significant difference in the nomophobia levels of the individuals participating in the study according to the gender variable ($p < 0.05$). Öz and Tortop²⁶ found that there was no significant difference between the gender variable and the nomophobic tendency levels of the students in their scientific research on university students. Adnan and Gezgin³¹, in a scientific study conducted on university students, concluded that there was no significant difference between students' gender status and nomophobia levels. Similarly, Dixit et al.² concluded that there is no significant difference between the nomophobic tendency levels of men and women in a study they conducted on medical students in India. Uysal, Özen and Madenoğlu³² stated that in a study they conducted on students, there was no significant difference between the students' gender status and nomophobic tendency levels. These research findings support the current research findings. In their scientific research, Ercan and Tekin²⁷ concluded that male physical education teachers have higher levels of nomophobia than female physical education teachers. Burucuoğlu²² concluded that female participants showed a higher level of homophobic tendency compared to male participants in a study conducted by vocational college students on their nomophobia levels. In a study conducted by Erdem et al.⁹ on university students and public transportation sector employees, they concluded that women participating in the study showed a higher level of homophobic tendency compared to male participants. Özdemir et al.¹¹, in their study on university students, concluded that male students show more homophobic tendency compared to female students, and there is a significant difference between gender variable and homophobic tendency level. It is possible to come across other studies in the literature that indicate that the nomophobic trend differs according to the gender variable^{18,25,30,33-38}. These research findings contradict the existing research findings. It was determined that there was no significant difference in nomophobia levels according to the powerbank transport status variable of the individuals participating in the study ($p < 0.05$). However, in the research, it was found that the individuals with powerbank had higher levels of homophobic tendency ($\bar{x} = 64.92$) than those who did not carry powerbank ($\bar{x} = 61.73$). Similarly, in a study conducted by Sarıkaya³⁹ on associate degree students, it was concluded that the nomofobi score averages ($\bar{x} = 58.55$) of the students carrying a charger were significantly higher than the average scores of the

students who did not ($\bar{x} = 48.16$). This research finding supports the current research finding. In this case, it can be said that individuals who need to have a power bank or a charger with them have a higher level of nomophobic tendency. It was determined that there was no significant difference in the levels of nomophobia according to the variables of gameplay and movie-series watching status of the individuals participating in the study ($p < 0.05$). However, the average of the nomophobic tendency levels of the individuals who play games ($\bar{x} = 64.28$) and watch the movie-series ($\bar{x} = 62.88$), do not play games ($\bar{x} = 55.10$) and do not watch the movies-series ($\bar{x} = 62.05$). It has been determined that it is higher than individuals. In a study conducted by Sarıkaya³⁹ on associate students, it was found that the students who use the smartphone to play games and use it to connect to social networks have high average nomophobic tendency levels. This research finding supports the current research finding, especially digital games and netflix etc. As a result of the adaptation of movie series applications to mobile platforms, it can be explained by the fact that it allows the use of movies, series, games and social media applications intensely on smart phones, thereby increasing the dependence on the phone even more. As a result, it was determined that the individuals who attend the youth center have moderate levels of nomophobia ($\bar{x} = 62.50$). These scores were examined within the variables such as age, gender, powerbank carrying status, playing games and watching movies and it was determined that there was no significant difference.

CONCLUSION

It can be said that the variables of age, gender, powerbank transport status, game play and movie series watching status are not effective at the nomophobic trend level.

Regarding the study;

- Educationals working in youth centers should raise the awareness of students about the use of smart phones,
- Educationals working in youth centers should guide students about smartphone addiction,
- Recommendations such as organizing presentation programs for parents for the use of smart phones of the relevant educationals and managers in youth centers can be made.

REFERENCES

1. Kaplan N. Investigation of the effects of internet addiction levels on health among secondary school students [Master]. [İzmir]: İzmir Katip Çelebi University; 2016.
2. Dixit S, Shukla H, Bhagwat A, Bindal A, Goyal A, Zaidi AK, et al. A study to evaluate mobile phone dependence among students of a medical college and associated hospital of central India. *Indian J Community Med.* 2010;35(2):339–341.
3. King ALS, Valença AM, Silva ACO, Baczynski T, Carvalho MR, Nardi AE. Nomophobia: Dependency on virtual environments or social phobia? *Comput Human Behav.* 2013;29(1):140–4.
4. Liu QQ, Zhou ZK, Yang XJ, Kong FC, Niu GF, Fan CY. Mobile phone addiction and sleep quality among chinese adolescents: A moderated mediation model. *Comput Human Behav.* 2017;72:108–14.
5. Bian M, Leung L. Linking loneliness, shyness, smartphone addiction symptoms, and patterns of smartphone use to social capital. *Soc Sci Comput Rev.* 2014;33(1):61–79.
6. TÜİK. Transport and communication [Internet]. 2019. Available from: <http://www.tuik.gov.tr>
7. Güzel M. Globalization, internet and youth culture. *Journal of Global Communication*, 2006;1(1):1–16.
8. Gezgin DM, Çakır O, Yıldırım S. The relationship between levels of nomophobia prevalence and internet addiction among high school students: The factors influencing nomophobia. *Int J Res Educ Sci.* 2018;4(1):215–25.
9. Erdem H, Türen U, Kalkın G. Mobile phone deprivation, fear (Nomophobia) spread: examples from Turkey my university students and public employees. *Journal of Informatics Technol.* 2017;10(1):1–12.
10. Gezgin DM, Çakır Ö. Analysis of nomofobic behaviors of adolescents regarding various factors. *J Hum Sci.* 2016;13(2):2504–19.
11. Özdemir B, Çakır Ö, Hussain I. Prevalence of nomophobia among university students: A comparative study of pakistani and turkish undergraduate students. *EURASIA J Math Sci Technol Educ.* 2018;14(4):1519–32.
12. Çakır F, Demir N. A research to determine university students' smartphone purchasing preferences. *Dokuz Eylül University Faculty of Economics and Administrative Science Journal.* 2014;29(1):213–43.
13. Pavithra MB, Madhukumar S. A study on nomophobia-mobile phone dependence, among students of a medical college in bangalore. *Natl J Community Med.* 2015;6(3):340–4.
14. Büyüköztürk Ş, Kılıç Çakmak E, Akgün ÖE, Karadeniz Ş, Demirel F. Scientific research methods. Pegem Academy Publications. Ankara; 2012.
15. Gürbüz S, Şahin F. Research methods in social sciences. Ankara: Seçkin Publishing; 2016.
16. Kaptan S. Scientific research and statistical methods. Ankara: Scientific Research Statistical Techniques; 1995.
17. Yıldırım A, Şimşek H. Qualitative research methods in the social sciences. 6th ed. Ankara: Seçkin Publishing; 2008.
18. Yıldırım Ç, Şumuer E, Adnan M, Yıldırım S. A growing fear: Prevalence of nomophobia among Turkish college students. *Inf Dev.* 2016;32(5):1322–1331.
19. Yıldırım Ç, Correia AP. Exploring the dimensions of nomophobia: Development ve validation of a self-reported questionnaire. *Comput Human Behav.* 2015;49:130–7.
20. Özdamar K. Statistical data analysis with package programs-2 (Statistical data analysis by custom softwares2). Eskisehir: Kaan Bookstore; 1999.
21. Can A. Quantitative data analysis in the scientific research process with SPSS. Ankara: Pegem Akademi; 2016.
22. Burucuoğlu M. A study on the nomophobia levels of vocational school students. *Karabuk Univ J Inst Soc Sci.* 2017;7:482–9.
23. Gezgin DM, Şumuer E, Arslan O, Yıldırım S. The prevalence of nomophobia among teacher candidates: Trakya University

- example. Trakya University Journal of Education Faculty. 2017;7(1):86–95.
24. Akıllı GK, Gezgin DM. Investigation of the relationships between university students' nomophobia levels and different behavioral patterns. Mehmet Akif Ersoy University Journal of Education Faculty,. 2016;1(140).
25. Gezgin DM, Şahin LY, Yıldırım S. Examining the nomophobia levels of social network users in terms of various factors. Educational Technology Theory and Applications, 2017;7(1).
26. Öz H, Tortop HS. Investigation of the relationship between the fear of mobile phone deprivation (nomophobia) and personality types of young adults studying at universities. E-Journal New Media– Ejnm. 2018;2(3):146–59.
27. Ercan Ö, Tekin N. Examination of nomophobia levels of physical education and sports teachers. J Glob Sport Educ Res. 2019;2(1):24–34.
28. Bülbül H, Tunç T. Phone and game addiction: Scale analysis, the starting age and its relationship with academic success. Vision E-Journal / Vizyoner Derg. 2018;9(21):1–13.
29. Park N, Kim Y-C, Shon HY, Shim H. Factors influencing smartphone use and dependency in south korea. Comput Human Behav. 2013;29:1763–70.
30. Kartal M, İnanc H, Murathan F. Examining the nomophobia levels of the school of physical education and sports students in terms of some variables. In: I Uluslararası Battalgazi Multidisipliner Kongresi. 2018. p. 1553–8.
31. Adnan M, Gezgin DM. The new phobia of the modern age: the prevalence of nomophobia among university students. Ankara University Journal of Education Science Faculty, 2016;49(1):141–58.
32. Uysal Ş, Özen H, Madenoğlu C. Social phobia in higher education: the influence of nomophobia on social phobia. Glob e-learning Journal,. 2016;5(2):1–8.
33. Hakkari F. Determination of Nomophobia Levels of Vocational School Students: The Case of Kırıkkhan Vocational School. Atlas International Ref J Social Sciences. 2018;10(4):786–97.
34. Kwon M, D.J. K, Cho H, Yang S. The smartphone addiction scale: development and validation of a short version for adolescents. PLoS One. 2013;8(12):1–7.
35. Öztunç M. Analysis of problematic mobile phone use, feelings of shyness and loneliness in accordance with several variables. Procedia-Social Behav Sci. 2013;106:456–466.
36. Takao M, Takahashi S, Kitamura M. Addictive personality and problematic mobile phone use. CyberPsychology Behav. 2009;12(5):501–7.
37. Tavolacci MP, Meyrignac G, Richard L, Dechelotte P, Ladner J. Problematic use of mobile phone and nomophobia among french college students. Eur J Public Heal. 2015;25:206.
38. Xu J, Shen LX, Yan CH, Hu H, Yang F, Wang L, et al. Personal characteristics related to the risk of adolescent internet addiction: a survey in shanghai, china. BMC Public Health. 2012;12(1):1106.
39. Sarıkaya M. Investigation of the nomophobia levels of undergraduate students according to their smartphone usage. Mersin University Journal of Education Faculty, 2018;14(2):714–27.

SP-21

THE EFFECT OF MOBILE PHONE ON THE FINGER MUSCLES IN SEDENTARY AND ATHLETES

BADE YAMAK¹, MUHAMMED YILDIZ^{2*}

¹Recreation Department, Yaşar Doğu Faculty of Sports Sciences, Ondokuz Mayıs University, Samsun, 55000, Turkey, badetekbas@gmail.com

²Vocational Schools of Health Services, Artvin Çoruh University, Artvin, 08000, Turkey

Corresponding author: fzt.myildiz@artvin.edu.tr

ABSTRACT

This study aims to investigate the effect of the fifth finger between adduction and abduction muscle strength according to the way athletes and sedentary mobile phones hold. 154 participants were included in the study. The participants were asked whether they were using mobile phones with one hand or both hands. The manual muscle test was performed by the physiotherapist. The statistical analysis of the data obtained was made with the SPSS 19.0 package program. A statistically significant difference was found between the abduction force of the fifth finger on the dominant side of the athlete and sedentary participants holding a mobile phone with one hand ($p < 0.05$). The abduction force of the dominant side fifth finger was compared according to the ways of sedentary cell phone holding, statistical significance was found ($p < 0.05$). When the strengths of the athletes were compared according to their way of holding the cell phone, no statistical significance was found ($p > 0.05$). When using sedentary mobile phones with one hand, the abduction force of the fifth finger was found to be higher than the athletes. Due to the exercise programs of athletes, strong similarities can be accepted bilaterally. However, the use of mobile phones with one hand as a result of mobile phones reveals the power difference. Sedentary people should turn to use phones with two hands. Besides, it is thought that they can eliminate force imbalance by doing bilateral exercises.

KEYWORDS: Mobile phone, sport, sedentary, muscle power, muscle test.

INTRODUCTION

Technological developments bringing innovations to human life are included with modernization. These technological developments have become an integral part of human life over time. It can be said that one of these developments is the internet. The Internet is defined as a globally expanding communication network that connects many large and small computers all over the world. The usage of the internet is increasing day by day because it facilitates our lives and helps us provide easy access to information. In addition to these facilities, it also brings with it many problems arising from its frequent use. In addition to facilitating communication, it has also led to internet addiction caused by its excessive use and which we can say as a new type of addiction.^{1,2} A network that can be easily accessed with only a computer or a phone from all over the world has provided information that every person can easily reach, and it is easier to communicate with each other.³⁻⁵ phones have become an indispensable part of our lives. These phones, which are in the hands of people from all walks of life in society and which can be considered as one of the most important inventions, provide an easy communication opportunity.^{5,6} The ages of smartphone users range from students to workers and the elderly.⁷ In parallel with the increase in smartphone use, concerns about the musculoskeletal system problems associated with smartphone use have also increased. An epidemiological study of smartphone users in the Republic of Korea found that 18.8% of smartphone users experience symptoms of the musculoskeletal system in at least one body part.⁸ Especially in the neck, upper body, and upper extremity. In another Korean study involving smartphone users, has been reported to be the neck of the most painful body region using a smartphone (55.8%).⁹ Similarly, showed that neck pain is the most common musculoskeletal disorder in people who use smartphones. Besides, cross-sectional studies have reported that neck and/or shoulder symptoms have the highest prevalence rates between 26.3% and 60% among mobile touch screen devices.^{10,11} It shows that the physical risk factors associated with neck musculoskeletal disorders include strange postures.^{12,13} Long-term use of the smartphone can cause various musculoskeletal problems.¹⁴ In particular, smartphone use can promote strange postures. A previous study in Thailand found that the majority of smartphone users reporting musculoskeletal disorders adopt upper body positions: neck flexion (82.74%), shoulder protrusion (56.61%), elbow flexion (65.16%), wrist during switching and hand flexion (22.40%) and wrist and hand supination (21.62%) to support the device. Researchers also reported upper back flexion (67.50%) and lower back flexion (43.23%) positions during smartphone use. These strange postures can affect soft tissues (for example, it can compress muscles and ligaments, irritated tendons, nerves) leading to musculoskeletal discomfort.⁴⁻¹⁰ Due to smartphones, it provides easy access to the internet from anywhere where there is an internet connection with the feature of wireless networks, and offers the opportunity to perform the operations performed on the computer via a smartphone. Since these advantages of smartphones make our lives easier and include the features of computers, the number of users is increasing day by day. Besides making smartphones an important communication tool by facilitating our lives, excessive use brings with it different disadvantages and new addictions.^{4,5,15} Too much use of smartphones brings to mind the term "addiction" and people who do not drop their phones around us are increasing day by day.¹⁴⁻¹⁶ Problems arising due to the increase in the frequency of using smartphones; headache, insomnia, fatigue, tension, dizziness, eye disorders, decreased face-to-face communication, and consequently reduced socialization and lack of concentration.^{15,17,18} It has been revealed by studies that it causes wrist and thumb pain, as well as musculoskeletal disorders such as head and neck pain with common

use.^{18,19} Joints, face physical loads such as repetitive thumb movements and neck flexion, depending on the use of the smartphone.²⁻⁴ Arthritis is defined in the forearm and thumb, especially tendinitis, tenosynovitis, and first joint.^{5,8,20} As the first cause of carpometacarpal joint arthritis, studies are showing that repeated use of the phone is loaded on one thumb using one hand.¹⁹⁻²¹ In studies conducted on young people, there were problems with the musculoskeletal system especially in the neck and upper extremities due to excessive use of smartphones. People with and without symptoms of musculoskeletal systems were compared and it was observed that there were differences in telephone messaging, posture, messaging style, and muscle activity. It has been determined that people with musculoskeletal problems have flexed the neck area without supporting their arms while using the telephone. This causes static loading on the neck and shoulders.^{5,6,9,20} Studies show the results of the pain in the neck, upper back, shoulder, hand, and thumb, as well as the symptoms of the musculoskeletal system due to the use of the smartphone. The reason for this is stated as static loading, wrong posture and excessive use caused by the devices being held for a long time. Due to poor and frequent use of the wrist, it has been associated with osteoarthritis and de Quervain tenosynovitis in the first joint, causing pain.^{5,6,21} Pain arises due to frequent use of the wrist and thumb. On the hands and thumb of the side where the users of the smartphones provide the use of keys, the activity-related pain is more. Besides, studies show that repeated thumb movements due to excessive phone usage cause thickening of the flexor pollicis longus (FPL) tendon, and this thickening is parallel to the number of messages sent monthly.^{11,12,22,23} Skeletal muscle has a remarkable ability to adapt to various physiological conditions. One of the main functions of the skeletal muscle is to produce mechanical force to support the body posture and facilitate a wide range of movements. Skeletal muscle shows high excitability and can adapt the contractile composition and metabolic properties in response to several physiological conditions, including exercise. These adaptations are reflected by changes in muscle size, fiber type distribution, contraction speed, strength production and endurance capacity, which are the result of the functional demands of contractile activity. Of course, some studies reveal that the side that provides rough and motor grip forces messaging is higher in the hand, while some studies show that there is no difference between both hands.^{18,22-24} Muscle strength is the data performed and revealed according to several test conditions according to the personality classification of functionality, disability, and health. Factors affecting muscle strength; nutritional, physical activity, aging, trauma, long periods of inactivity, repetitive work. It is thought that being able to do physical activity, which is one of these factors, may cause an increase in strength in the muscle group studied. Also, the muscles working in the same position for a long time show a decrease in the number of contractions after a while. Intracellular signaling mechanisms that alter skeletal muscle function in response to exercise are regulated by disruptions in muscle cell homeostasis, including changes in tissue perfusion, oxygen tension, redox status, calcium (Ca^{2+}) dynamics and changes in ATP. With the help of nerves, the motor is transmitted to the units. As a result of this impulse, acetylcholine is released and cation channels are opened and the muscle structure becomes depolarized. This depolarized condition is transmitted by the tubules of the T across the muscular membrane. As a result of this chain event, the dihydropyridine channels stimulate the ryanodine receptors in the sarcoplasmic reticulum and calcium channels open. Ca^{2+} adheres to troponin C, allowing the area where myosin will come into contact with actin. As a result of this event, actin-myosin combines, and contraction occurs. Energy and Ca^{2+} continuity is an important issue during this contraction. Muscles need to relax because there is no energy and Ca^{2+} in the muscle that can continue to be contracted for a long time.^{15,18,19,24,29,30,31} As a result of relaxation, time is needed to renew the energy spent in the muscle structure. Although muscle contraction takes place during this rest period, there will be no contraction at the full level and there will be a decrease in contraction force. Therefore, in the case of doing the same work for a long time, if the muscle strength is not preferred over time and different contraction positions are preferred, there may be injuries in the muscle structure and a decrease in strength. In this study, the physiological process shown by the muscle during and after contraction may be affected by the use of the phone. During the use of mobile phones, individuals exercise their muscles in the same position for a long time and continuously. However, the fingers used during the mobile phone vary according to the way the phone is held and the fingers used. It is the 5th Finger that remains in a particularly stiff state during use and is affected by exposure to a different position than the anatomical position of the muscles. As a result, it is thought that muscle strength may be affected while performing abduction and adduction movements. Muscle strength evaluation methods; There are manual muscle tests, field tests, hand-held dynamometer and hand-grip dynamometer, isokinetic and fixed dynamometers, and individuals' strength tests. These methods have their explanation and limitations. Manual muscle testing is a method that has been used for many years. To determine the strength of a movement is a method created by palpation within the framework of criteria such as gravity, position, and resistance. When the normal joint is completed throughout the range of motion, resistance is desired at the end of the movement, and it is desired to maintain this position. The criteria and groupings obtained by this method are related. (reference). In this force evaluation, scoring is taken according to the resistance and ability to move.^{5,9,12} As this score increases, the muscle becomes stronger. In the literature, the study involving muscle strength for these conditions has been very limited. Therefore, the main purpose of the study is to examine the way the mobile phone is held and the effect of sports on the force of the 5th Finger in hand while performing abduction and adduction movements.^{14,19,21-24}

MATERIALS AND METHODS

Participants consisting of 154 sports and sedentary people were noted according to the way they hold their phones. Then, the strength of the muscles that perform abduction and adduction movement of the 5th finger was performed bilaterally by the manual muscle test method. The participants were asked if they had any injury or surgical history. The manual muscle test method was done by the physiotherapist. It was also done when the participants were not tired. The test method is in the sitting position and hands are on the table, the elbow is in the normal position. Meanwhile, the individual is asked to move his 5th finger in the direction of abduction and is asked to maintain his position by applying resistance at the endpoint of the movement. The same process is done in the adduction movement. The values obtained from this bilateral test were noted. As the obtained muscle strength scoring increases, the analysis was made considering the muscle is stronger. The participants were divided into two groups of athletes and sedentary. The forces in the abduction and adduction movement of the fifth finger in the hand were measured. The way of holding the mobile phone was questioned. The study included double-handed and single-handed forms. A consent form was signed from the participants stating that they participated in the study voluntarily. Statistical analysis was done

using SPSS 19.0 package program. Descriptive criteria such as standard deviation and mean were analyzed in the analysis of the data. In statistical analysis, the Chi-Square test was used, and parametric tests (Student t, One Way ANOVA) were used for data that fit the normal distribution.

RESULTS

The number of athletes is 65, the average age is 22.78 ± 2.758 years, and their body weight is 71.45 ± 11.911 kg. There are 89 sedentary participants. Their average age is 21.61 ± 3.128 years and body weight is 64.64 ± 12.384 kg. (Table 1)

Table 1: Analysis of the statistical data of the participants

	Athlete (n = 65)	Sedentary (n = 89)
	Mean $\pm$ SD	Mean $\pm$ SD
Age	22,78 $\pm$ 2,758	21,61 $\pm$ 3,128
Height	175,00 $\pm$ 8,786	168,73 $\pm$ 8,674
Body weight	71,45 $\pm$ 11,911	64,64 $\pm$ 12,384

While the number of athletes using mobile phones with two hands is 24 people, 41 people are using mobile phones with one hand. While the number of sedentary people using mobile phones with two hands is 44, the number of people using mobile phones with one hand is 45. (Table 2)

Table 2: Analysis of the participants according to the way they hold the mobile phone

Holding The Mobile Phone	Athlete (n = 65)	Sedentary (n = 89)
One Hand	41	45
Two Hands	24	44

When the dominant side adduction force of the sportsmen and sedentary people holding the mobile phone with both hands was examined, no statistical significance was found between the groups ($p > 0.05$). When the dominant side abduction force was examined between the groups, no statistical significance was found between the groups ($p > 0.05$). Similar results, no statistical significance was found when analyzing the nondominant side abduction force between the groups ($p > 0.05$). When the non-dominant side adduction force was examined between the groups, no statistical significance was found ($p > 0.05$). (Table 3)

Table 3: Comparison of muscle strength of athletes and sedentary people holding the mobile phone with both hands

Muscle Strength	Athlete (n=24)	Sedentary (n=44)	P
	Mean $\pm$ SD	Mean $\pm$ SD	
Dominant abduction force	8,33 $\pm$ 1,435	7,95 $\pm$ 1,446	0,304
Non-dominant abduction force	7,58 $\pm$ 1,558	8,16 $\pm$ 1,311	0,110
Dominant adduction force	5,92 $\pm$ 1,792	5,52 $\pm$ 1,785	0,388
Non-dominant adduction force	5,67 $\pm$ 2,036	5,23 $\pm$ 1,553	0,322

$p < 0,05$

A statistically significant difference was found between the abduction force of the fifth finger on the dominant side of the athlete and sedentary participants holding a mobile phone with one hand ($p < 0.05$). Non-dominant side abduction force was found to be statistically significant between the two groups ($p < 0.05$). The fifth finger adduction force on the dominant side was found statistically significant between athletes and sedentary ($p < 0.05$). However, when the adduction force of the non-dominant side was examined, no statistical significance was found between the two groups ($p > 0.05$). (Table 4)

Table 4: Comparison of the muscle strength of athletes and sedentary people holding the mobile phone with one hand

Muscle Strength	Athlete (n=41)	Sedentary (n=45)	P
	Mean $\pm$ SD	Mean $\pm$ SD	
Dominant abduction force	7,73 $\pm$ 1,597	8,64 $\pm$ 1,401	0,006^a
Non-dominant abduction force	7,85 $\pm$ 1,621	8,69 $\pm$ 1,443	0,013^a
Dominant adduction force	6,32 $\pm$ 1,604	5,53 $\pm$ 1,841	0,039^a
Non-dominant adduction force	5,88 $\pm$ 1,887	5,16 $\pm$ 1,731	0,068

^a = $P < 0,05$

When the dominant fifth finger abduction movement force of the athletes was compared according to their way of holding the mobile phone, no statistical significance was found ($p > 0.05$). When the nondominant fifth finger abduction movement force was compared according to the way of holding the mobile phone, no statistical significance was found. When the nondominant fifth finger adduction movement force was compared according to the way of holding the mobile phone, no statistical significance was found ($p > 0.05$). When the dominant fifth finger abduction movement force was compared according to the way of holding the mobile phone, no statistical significance was found ($p > 0.05$). (Table 5)

Table 5: Comparison of muscle strength according to the way the athletes hold the mobile phone

Muscle Strength	Two Hands (n=24)	One Hand(n=41)	P
	Mean $\pm$ SD	Mean $\pm$ SD	
Dominant abduction force	8,33 $\pm$ 1,435	7,73 $\pm$ 1,597	0,133

Non-dominant abduction force	7,58±1,558	7,85±1,621	0,513
Dominant abduction force	5,92±1,792	6,32±1,604	0,356
Non-dominant adduction force	5,67±2,036	5,88±1,887	0,673

p<0,05

When the abduction force of the dominant side fifth finger was compared according to the ways of sedentary cell phone holding, statistical significance was found (p<0.05). When the non-dominant fifth finger abduction movement force was compared according to the way of holding the mobile phone, no statistical significance was found (p>0.05). There was no statistically significant difference between the comparison of the dominant adduction motive force according to the retention patterns (p>0.05). When the same result was compared with the non-dominant adduction movement force of the mobile phone, no statistical significance was found (p>0.05). (Table 6)

Table 6: Comparison of muscle strength according to the way sedentary mobile phones are held

Muscle Strength	Two Hands (n=44)	One Hand (n=45)	P
	Mean ± SD	Mean ± SD	
Dominant abduction force	7,95±1,446	8,64±1,401	0,025 ^a
Non-dominant abduction force	8,16±1,311	8,69±1,443	0,073
Dominant adduction force	5,52±1,785	5,53±1,841	0,978
Non-dominant adduction force	5,23±1,553	5,16±1,731	0,838

a= p<0,05

DISCUSSION

It was determined that the abduction force on the dominant side of those who use mobile phones with one hand in the sedentary side is stronger than those who use the mobile phone with two hands. Sedentary people using mobile phones with one hand are stronger in the abduction of the dominant and non-dominant sides compared to athletes. However, the sedentary people using a mobile phone with one hand were found to have a weaker strength of the dominant side than the athletes. Although the adduction force of the fifth finger of the dominant side of the athletes was not statistically significant between the use of both hands and one-handed mobile phone, it was found that those using both hands were stronger. The anxiety, sleep quality, and depression scales were compared with the use of 319 smartphones. The study also increases the value of depression as the use of the smartphone increases. Such negativities of the use of the smartphone may be an adverse effect of the individual.²⁴⁻²⁶ Individuals with type A personality are more likely to be more competitive, ambitious, impatient, anxious, aggressive, and workaholic. Individuals with type B personality, their equivalent. Type A behavior individuals are more likely to experience high-stress levels and have a higher risk of developing patient health, including cardiovascular disease and cancer, than type B behavior individuals. Our finding of an independent positive relationship between personality type A and smartphone addiction is consistent with the results of many other studies examining the link between personality traits and smartphone addiction. A survey among 448 Korean university students revealed that there was a significant positive relationship between neurotic personality traits and smartphone addiction severity. In another study investigating 353 Korean university students, both aggression and impulse scores emerged as significant independent positive predictors of smartphone addiction; impulse is stronger. In another survey of 274 adults (67.9% of students), the stress level showed a significant positive relationship with smart device addiction.²³⁻²⁷ As a result of these situations, because of the negative effects on physiological functions as a result of the use of mobile phones, the results in our study can be thought to be parallel to this process. In addition, as a result of the use of mobile phones, the body stays in a certain position for a long time, and some deterioration occurs. In this study, in the long-term use of one-handed mobile phones, in the fifth finger abduction, the weight of the mobile phone is more than holding both hands. Therefore, the length of the muscle that makes the abduction movement occurs, which can lead to easier and stronger contraction of the muscle. In this study, similar findings were found to be stronger when using one-handed cell phones compared to two-handed use.^{27,28} This leads to changes in hand and wrist circumference structures as cell phone usage intensity increases. Smartphone usage changes daily routines, habits, social behavior, emancipatory values, family relationships, and social interactions. Continuous control and/or use of smartphone applications 24 hours a day was associated with sleep disturbances, stress, anxiety, deprivation and deterioration in health, decreased academic performance, and decreased physical activity.^{24,25} This study also demonstrates decreased fifth finger adduction muscle strength. The main reason is to maintain optimal distance in the smallest contraction structure in the muscles. However, these results were obtained as the use of mobile phones decreased the interaction distance of the smallest contraction unit in the muscle structure as a result of the lengthening of the adduction muscle groups, especially as a result of one-handed use of the mobile phone, and these results were obtained. The blood flow in the muscle structure increases as you exercise. If there is overwork in the muscle structure after the exercises, the possibility of contraction of the muscle with the same force decreases as a result of injuries or lactic acid accumulation. Being in the same position for a long time may also affect the contraction length and strength of the muscle. In this study, it is normal for the athletes to have higher adduction strength of the fifth finger on the nondominant side compared to the sedentary ones. However, the fifth finger abduction movement force of the athletes is weak compared to the sedentary. The reason for this may be due to physiological reasons such as muscle stimulation and energy need when combined with continuous exercises and the use of mobile phones in athletes.

CONCLUSIONS

It is recommended that sedentary and athletes use their mobile phones with both hands to eliminate the negative changes in muscle strength. Besides, the differences in muscle strength are caused by the shortening and lengthening of the muscle that remains in the same position for a long time. Due to the changes in this muscle length, there is a difference in the abduction and adduction strength of the fifth finger. To prevent these imbalances, long-term use should be avoided while using the mobile phone. Besides, if it is mandatory to use the mobile phone for a long time, it should be prevented to stop in the same position

by taking a break. Athletes should avoid excessive compulsive movements and constantly staying in the same position while performing upper limb activities.

FUNDING SOURCE

This work was funded by the authors.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

ETHICS APPROVAL

The study was approved by the research ethics committee of University Artvin Çoruh (2018/5 karar no:4).

REFERENCES

- 1- Frangos CC, Frangos CC, & Sotiropoulos I. (2011). Problematic internet use among Greek university students: an ordinal logistic regression with risk factors of negative psychological beliefs, pornographic sites, and online games. *Cyberpsychology, Behavior, and Social Networking*, 14(1-2), 51-58.
- 2- Ybarra ML, & Mitchell KJ. (2005). Exposure to Internet pornography among children and adolescents: A national survey. *Cyberpsychology & behavior*, 8(5), 473-486.
- 3- Thomée S, Härenstam A, & Hagberg M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults-a prospective cohort study. *BMC public health*, 11(1), 66.
- 4- Walsh SP, White KM, Cox S, & Young RM. (2011). Keeping in constant touch: The predictors of young Australians' mobile phone involvement. *Computers in human behavior*, 27(1), 333-342.
- 5- Zulkefly SN, & Baharudin R. (2009). Mobile phone use amongst students in a university in Malaysia: its correlates and relationship to psychological health. *European Journal of Scientific Research*, 37(2), 206-218.
- 6- Abo-Jedi A. (2008). Cellphone addiction and its relation to self-closure in a sample of Jordanian university and Amman private university students. *The Jordanian Journal for Educational Sciences*, 4, 137-150.
- 7- Han YS, Choi JK, Bo HH, Go SM, Yoon SH, & Ji YG. (2014). A study on elderly for improvement of usability on smartphone. *Journal of Society for e-Business Studies*, 17(1).
- 8- Eom SH, Choi SY, & Park DH. (2013). An empirical study on relationship between symptoms of musculoskeletal disorders and amount of smartphone usage. *Journal of the Korea Safety Management and Science*, 15(2), 113-120.
- 9- Kim H J, & Kim J S. (2015). The relationship between smartphone use and subjective musculoskeletal symptoms and university students. *Journal of physical therapy science*, 27(3), 575-579.
- 10- Namwonga S, Puntumetakul R, Neubert MS, & Boucaut R. (2018). Factors associated with neck disorders among university student smartphone users. *Work*, 61(3), 367-378.
- 11- Toh SH, Coenen P, Howie EK, & Straker LM. (2017). The associations of mobile touch screen device use with musculoskeletal symptoms and exposures: A systematic review. *PloS one*, 12(8).
- 12- da Costa BR, & Vieira ER. (2010). Risk factors for work-related musculoskeletal disorders: a systematic review of recent longitudinal studies. *American journal of industrial medicine*, 53(3), 285-323.
- 13- Viikari-Juntura E, Martikainen R, Luukkainen R, Mutanen P, Takala EP, & Riihimäki H. (2001). Longitudinal study on work related and individual risk factors affecting radiating neck pain. *Occupational and environmental medicine*, 58(5), 345-352.
- 14- Kang JH, Park RY, Lee SJ, Kim JY, Yoon SR, & Jung KI. (2012). The effect of the forward head posture on postural balance in long time computer based worker. *Annals of rehabilitation medicine*, 36(1), 98.
- 15- Fowler J, & Noyes J. (2017). A study of the health implications of mobile phone use in 8-14s. *Dyna*, 84(200), 228-233.
- 16- Shaw M, & Black D W. (2008). Internet addiction. *CNS drugs*, 22(5), 353-365.
- 17- Young K S. (1999). Innovations in clinical practice: A source book. Edited by: Van de Creek L, Jackson X, 19-31.
- 18- Etzioni A. (2000). Debating the Social Effects of the Internet: Connecting with the World. *Public perspective*, 11(3), 42-43.
- 19- Divan HA, Kheifets L, Obel C, & Olsen J. (2012). Cell phone use and behavioural problems in young children. *J Epidemiol Community Health*, 66(6), 524-529.
- 20- Ferrara P, Infantino C, Franceschini G, & Sacco R. (2020). Smartphone and tablet addiction among children: a significant predictor of behavioral and physical alterations. *Minerva Psichiatrica*, 61(1), 20-4.
- 21- Lemola S, Perkinson-Gloor N, Brand S, Dewald-Kaufmann J F, & Grob A. (2015). Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. *Journal of youth and adolescence*, 44(2), 405-418.
- 22- Reiser PJ, & Janssen PM. (2020). 2020 Vision of Frontiers in Striated Muscle Physiology. *Frontiers in Physiology*, 11.
- 23- AlAbdulwahab SS, Kachanathu SJ, & AlMotairi MS. (2017). Smartphone use addiction can cause neck disability. *Musculoskeletal care*, 15(1), 10-12.
- 24- Hall JE. (2010). Guyton and Hall textbook of medical physiology e-Book. Elsevier Health Sciences.
- 25- Chiu SI. (2014). The relationship between life stress and smartphone addiction on Taiwanese university student: A mediation model of learning self-efficacy and social self-efficacy. *Computers in Human Behavior*, 34, 49-57.
- 26- Mok JY, Choi SW, Kim DJ, Choi J S, Lee J, Ahn H, ... & Song WY. (2014). Latent class analysis on internet and smartphone addiction in college students. *Neuropsychiatric disease and treatment*, 10, 817.

- 27- Kim MO, Kim H, Kim K, Ju S, Choi J, & Yu M. (2015). Smartphone addiction:(focused depression, aggression and impulsions) among college students. *Indian Journal of Science and Technology*, 8(25).
- 28- Harwood J, Dooley JJ, Scott AJ, & Joiner R. (2014). Constantly connected–The effects of smart-devices on mental health. *Computers in Human Behavior*, 34, 267-272.
- 29- Sariakcalı B, Ceylan L, Eliaz M. (2020). Evaluation of end-seasonal vitamin d, plasma lipid and other biochemical measurements in professional football players: The case of sivas province in turkey.. *Progress in Nutrition*. 22 (2): 5-17.
- 30- Sivrikaya K., Ziyagil MA, Çebi M. (2019). Relationship between Body Mass Index and Skinfold Thickness in Exercised and Sedentary Boys and Girls. *Universal Journal of Educational Research*, 7(1), 48-54.
- 31- Kucuk H. (2020). Comparison of static and dynamic balance in female footballers according to positions. *International Journal of Sport Exercise and Training Science*. Supp.(4): 53-56.

SP-22

THE EFFECT OF WRIST GRIP ANGLE ON TRAUMATIC SYMPTOMS IN BODY BUILDERS**BADEYAMAK¹, MUHAMMED YILDIZ^{2*}, MUSTAFA BERENT³, MEHMET ÇEBİ⁴, MURAT ELİÖZ**^{1-4,5} Yaşar Doğu Faculty of Sports Sciences, Ondokuz Mayıs University, Samsun, 55000, Turkey.
badetekbas@gmail.com²⁻³ Vocational Schools of Health Services Artvin Çoruh University, Artvin, 08000, Turkey.**Corresponding author:** fzt.myildiz@artvin.edu.tr**ABSTRACT**

The purpose of the study is to investigate the acute effect on the traumatic symptoms and angle of the wrist joint when lifting the weight. This study included three hundred males. The age range of the individuals was determined to be 18-40. After determining the aged $22,92 \pm 6,2$ years and bodyweight of $77,20 \pm 12,2$ kg (range, 55-113 kg) the participants, their angle of comprehension was examined. Before and after lifting weights, a visual pain scale was used for wrist pain level and the normal range of motion of the wrist was measured with a digital goniometer. When lifting weights, wrist joint angle was measured with a digital goniometer. It was determined that the participants did not have pre-test pain. There was no statistical difference in wrist joint limitation ($p > 0.05$). However, when the joint position of the wrist was 15° extension, it was found that there was statistically less pain than other wrist joint positions ($p < 0.05$). The findings of this study are to assist bodybuilders to work healthier and more consciously by providing less wrist injuries while lifting weights. As a result of this study, bodybuilders can be a guide in terms of continuing to be in a more successful and healthy sports life.

KEYWORDS: *Articular goniometry, trauma, wrist joint, body builds.***INTRODUCTION**

The positive effects of exercise on human health have been demonstrated by many scientific studies. Increasing technology in industrial societies, while making life easier, on the other hand, revealed the concept of negative effects of inactivity on human health. Thus, the popularity of jogging and fitness type studies has increased. In recent years, the slogan of sports for healthy living and publications related to this subject has started to take place in the media more and more, the number of sports centers will increase the number of people participating in sports activities. One of these sportive activities is bodybuilding. Bodybuilding is one of the popular types of recreational physical activity in our country as well as all over the world. Bodybuilding is a versatile sports branch that works to strengthen and improve the muscles and various systems of the body by carrying out scientific, programmed studies with certain weights, tools and machines, and gains aesthetics by keeping a person healthy, fit and fit at all ages. Also characteristic of bodybuilding; muscular volume and shape (definition) are in the foreground.^{1,2,15,16,17} There have been significant increases in the number of sports injuries as a result of unconscious and wrong technique exercises. Among these, overuse injuries, which are seen after repeated stress and micro-traumas, have an important place. Such injuries, including muscles, tendons, ligaments, bursae, and bones, lead to an acute and chronic response to the injury of anatomic structures that are particularly exposed to stress underweight. Sports ground, materials used, training technique, weather conditions and the anatomical structure of the athlete are also important. Bone fractures with a single macro trauma in athletes, while dislocations in the joints and tears in the muscles may occur, clinical pictures defined as overuse are formed as a result of repetitive micro-traumas and microscopic injuries and their accumulation.¹⁻³ this study aims to determine the relationship of the bodybuilding sports athletes position during the grip of the wrist joint while lifting weight, with pain, tenderness, swelling and redness, which are acutely traumatic symptoms.^{1,2,4,5}

MATERIALS AND METHODS

This study included three hundred males. These participants are those who regularly go to the fitness center and do bodybuilding for sports. The participants of the study consist of those who do not have upper limb injuries and sign the voluntary consent form. The age range of the individuals was determined to be 18-40. After determining the aged $22,92 \pm 6,2$ years and body weight of $77,20 \pm 12,2$ kg (range, 55-113 kg) the participants, their angle of comprehension was examined. The degree of a position of the wrist joint of the athlete, who holds the weight with the shape of the cylinder grip, was measured by the physiotherapist with a digital goniometer. When determining the flexion and extension angle of the wrist joint; The styloid protrusion of the digital goniometer pivot point ulna, the fixed arm stands parallel to the ulna, and the movable arm is made to follow the 5th metacarpal bone. While determining the angle of wrist joint position, individuals with flexion angle of about 90 degrees and extension angle of about 70 degrees were taken into consideration. Individuals with wrist motion limitation were excluded from the study.⁶⁻⁸ After lifting weights, it was questioned whether individuals had Micro-traumatic symptoms that are erythema, edema, joint limitation and pain. Joint limitation and pain symptoms were evaluated from these symptoms. Visual analog scale was applied before and after the test for pain. To determine the joint limitation, the wrist joint motion range was measured with digital goniometer before and after the test. The analysis of the data obtained was made with the SPSS 25.0 package version. The suitability of quantitative data for normal distribution was examined with the Kolmogorov-Smirnov test. Statistical significance

was determined as mean difference and standard deviation (SD). The accepted level of significance was set at $p < 0.05$. An informative consent form was sent to the candidates before the study. Those who read and signed this form were accepted as participants. Those who did not sign the declaration of Helsinki were excluded from the study.

RESULTS

The angle of grip of athletes when lifting weights is 45 degrees flexion (5%), 30 degrees flexions (12.7%), 15 degrees flexions (24%), Neutral position (33%), 15 degrees extensions (9%), 30 degrees extensions (12.3%) and 45 degrees extensions (4%). When the grip angles were examined, none of the limitation symptoms were observed in any range of joint motion before and after the test. But the same results cannot be said for pain. Table 1 compares the wrist range of motion with no symptoms and the effect on pain. In Table 1, considering the absence of symptoms in the extension position of the wrist joint 15 degrees, there was a statistically significant difference compared to other angles ($p < 0.001$). However, no statistically significant difference was found between other wrist angles ($p > 0.05$).

Table 1. Comparison of the traumatic symptom with the hand grip angle

Wrist Grip Angle		Mean difference (J-I)	SD	P
J	I			
15° Extension	45° Flexion	0.570	0.079	0.0001 ^a
	30° Flexion	0.625	0.062	0.0001 ^a
	15° Flexion	0.634	0.055	0.0001 ^a
	Neutral Position	0.694	0.053	0.0001 ^a
	30° Extension	0.650	0.062	0.0001 ^a
	45° Extension	0.704	0.085	0.0001 ^a

Values are presented as mean difference and standard deviation (SD).

^a = $p < 0.001$.

DISCUSSION AND CONCLUSIONS

The aim of this study was to find the relationship between the range of motion of the wrist joint and the joint limitation and acute pain, which is one of the traumatic symptoms, while those who are interested in bodybuilding sports with digital goniometer lift weights. There are several limited studies on people who do bodybuilding, since the work done is usually done for weightlifters. Generally, one-sided use is in question at the wrist grip angle and more shoulder joints are examined. While lifting the weight, the weight lifted on the body is added and the weight distribution is very important so that the extra weight does not cause damage to the body biomechanically. The joint that will determine the distribution of this weight and the first interaction with the weight is the wrist joint. Injury may occur when the normal range of motion during the wrist grip is incorrect. Hand and wrist injuries during sports have a frequency of 6 %. When looking at the reasons for this, it is generally seen as traumatic injury and soft tissue effect (50%).⁹⁻¹¹ As a result of these traumatic events, the individual stays away from sports for 2-3 months. When the wrist was at an angle of 15° extension, it was found statistically that the least traumatic symptom was encountered. In the literature, isokinetic force evaluations were made on bodybuilders. The range of motion of the wrist joint was determined in an anatomical position during force evaluation. In this study, it is shown that the wrist is in different positions during weight lifting with limited studies in the literature and contributes to the literature by examining the pain and joint limitation from traumatic symptoms within these positions.⁹ The bodybuilders neglected efforts to increase the range of motion. This may contribute to bodybuilders limiting their range of motion and strengthening, but the joints such as shoulders, elbows and wrists may need to be in an appropriate range of motion to properly distribute the excess load on the body while lifting the weight. This study was done by considering this issue.¹⁰⁻¹⁴ In this study, a suitable range of motion was determined for individuals trying to develop their bodies. According to these results, bodybuilders will be able to perform the normal joint position of the wrist while lifting weights, which may lead to less trauma. In this study part, the extension and flexion positions of the wrist normal joint with 1 level precision were measured with a digital goniometer. The values shown in the digital goniometer were noted and the relationship between the state when it was lifted was statistically evaluated.^{12,13}

As a result, it is necessary to ensure the correct distribution of the extra load on the body, the wrist to be in a certain range of motion so that bodybuilders can avoid traumatic symptoms. In this study, it was found that the position of the wrist joint was at 15° extension, and the symptoms of pain and limitation were minimal ($p < 0.05$). There was no statistically significant difference in other wrist motion range ($p > 0.05$). The findings of this study are specific, the sample group can be increased. This study can be compared with sports branches in which the wrist joint is used extensively, such as weightlifting, hammer throwing, golf.

ACKNOWLEDGMENT

The authors are grateful to the participating bodybuilders.

FUNDING SOURCE

This work was funded by the authors.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

REFERENCES

1. Barlow JC, et al. Shoulder strength and range-of-motion characteristics in bodybuilders. J Strength Cond Res, 2002. 16(3): p.

367-72.

2. Haskell WL, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc*, 2007. 39(8): p. 1423-34.
3. Van der Merwe, F.H., S.B. Burden, and P.S. Maulder, Comparison of gravity-resisted and gym-based core training on core endurance. *South African Journal for Research in Sport, Physical Education and Recreation*, 2017. 39(3): p. 179-188.
4. Heyward V. and A. Gibson, *Advanced fitness assessment and exercise prescription*. New Mexico: Human Kinetics; 2014 p: 138-172. 10-Nascimento DC, Neto FR, Santana FS, Silva RAS, Santos-Neto LD, Balsamo S. The interactions between hemostasis and resistance training: a review. *International Journal of General Medicine*, 2012. 5: p. 249-254.
5. Nikbakhsh R, et al, Somatotype and body composition of Iranian elite bodybuilders. *Ann Biol*, 2013. 4: p. 176-9.
6. Pitner M. Pathophysiology of overuse injuries in the hand and wrist. *Hand clinics*, 1990. 6(3): p. 355-364.
7. Blackwell JR, Kornatz KW, Heath EM. Effect of grip span on maximal grip force and fatigue of flexor digitorum superficialis. *Applied Ergonomics*, 1999. 30(5): p. 401-405.
8. Medicine ACoS, American College of Sports Medicine position stand. Progression models in resistance training for healthy adults. *Medicine and science in sports and exercise*, 2009. 41(3): p. 687.
9. Bowers AL, Baldwin KD, Sennett BJ. Athletic hand injuries in intercollegiate field hockey players. *Medicine and science in sports and exercise*, 2008. 40(12): p. 2022-2026.
10. Davis AM, et al. Measuring disability of the upper extremity: a rationale supporting the use of a regional outcome measure. *Journal of Hand Therapy*, 1999. 12(4): p. 269-274.
11. Noóbrega AC, Paula KC, Carvalho ACG. Interaction between resistance training and flexibility training in healthy young adults. *The Journal of Strength & Conditioning Research*, 2005. 19(4): p. 842-846.
12. Schmidt WD, Piencikowski CL, Vandervest RE. Effects of a competitive wrestling season on body composition, strength, and power in National Collegiate Athletic Association Division III college wrestlers. *Journal of Strength and Conditioning Research*, 2005. 19(3): p. 505.
13. Aritan S. Biomechanical Measurement Methods to Analyze the Mechanisms of Sport Injuries, in *Sports Injuries*. 2012, Springer. p. 19-26.
14. Fahey T, Insel P, Roth W. *Fit and well: Core concepts and labs in physical fitness and wellness*. 2014: McGraw-Hill Education.
15. Sariakcalı B, Ceylan L, Eliaz M. (2020). Evaluation of end-seasonal vitamin d, plasma lipid and other biochemical measurements in professional football players: The case of sivas province in turkey.. *Progress in Nutrition*. 22 (2): 5-17.
16. Kucuk H. (2020). Comparison of static and dynamic balance in female footballers according to positions. *International Journal of Sport Exercise and Training Science*. Supp.(4): 53-56.
17. Gundogdu C, Aygun Y, Ilkim M, Tufekci S. (2018). Explaining the Impact of Disabled Children's Engagement with Physical Activity on Their Parents' Smartphone Addiction Levels: A Sequential Explanatory Mixed Methods Research. *Journal of Education and Training Studies*, 6(2), 44-53.

SP-23

THE EFFECTS OF KINESIO TAPING APPLIED TO THE FOOT AREA ON THE SPEED, AGILITY AND BALANCE PERFORMANCE OF TABLE TENNIS ATHLETES

SAMET AKTAS^{*1} & FARUK GÜVEN²

1. Department of Coaching School of Physical Education and Sports, Batman University, Batman Türkiye

3. Recreation Division, School of Applied Sciences, Karamanoglu Mehmetbey University, Karaman, Türkiye, farukguven@kmu.edu.tr

Corresponding author: samet.aktas@batman.edu.tr

ABSTRACT

This study aims to reveal the effect of kinesio taping applied to the foot area of athletes interested in active table tennis sport on speed, agility and balance performance. Fifteen male individuals who practice table tennis for at least 4 days a week and have an average age of 11.13 ± 0.83 (years), a mean body weight of 42.53 ± 3.11 (kg), and a mean height of 149.60 ± 6.95 (cm) were included in the study. Measurements were limited to the Proagility agility test, 5-10-15m speed test and balance test. Each parameter measurement was applied 2 times by applying kinesio tape (KT) and as a colored tape to create a placebo effect (PT). The age, height and body weight values of the participants in the study were given as mean and standard deviation. Whether the data showed normal distribution was tested by the Shapiro-Wilks test. Paired Samples Test was used to determine the difference between the measurement averages of dependent groups. The significance level was accepted as 0.05. After PT and KT applications of the participants; A significant difference was found between the agility test PT and KT ($t = 4.97$; $p = 0.00$), between 5m PT and KT applications ($t = 5.79$; $p = 0.00$), and between 10m PT and KT applications ($t = 3.63$; $p = 0.00$). No significant difference was found between 15m PT and KT applications ($t = 1.10$; $p = 0.28$). On the other hand in the mean balance error scores, a statistically significant difference was detected between Eyes Open Balance Error Score (EOBES) and PT and KT applications ($t = 4.00$; $p = 0.00$) and between Eyes Closed Balance Error Score (ECBES) and PT and KT applications ($t = 4.25$; $p = 0.00$). The study showed that kinesio taping improved agility, speed, and balance performances in table tennis players. Researchers are recommended to conduct studies in different age groups, including other motor skill tests.

KEYWORDS: Agility, Balance, Kinesio taping, Sprint, Table tennis, Range of motion.

INTRODUCTION

Kinesio taping; The kinesio taping technique, which has taken place among the physiotherapy and rehabilitation modalities as an effective treatment approach in recent years, is the band having the ability to stretch, can adapt to the strain and relaxation of the skin with movement and imitates the thickness and flexibility of the skin. It is similar to the epidermis layer of the skin in terms of its thickness and weight, and it can remain on the epidermis between 24 hours and 3 days depending on the application technique.¹³⁻¹¹ It should be changed every 24 hours in children and lymphatic corrected tissue. The tape comes out only by sweating and in saltwater.²² Instead of a structurally supportive white athletic band, kinesio tape is like therapy in nature. It also increases efficiency in sports, accelerates lymph and venous turnover, increases awareness of the ankle 2 positions by stimulating the mechanoreceptors, reduces pain and increases muscle performance. It decreases delay in postural reflexes by increasing sensory input and improves dynamic balance by increasing stability.¹⁹ Techniques used in kinesio tape application; muscle techniques or mechanics, fascia, space, ligament/tendon, functional and lymphatic correction techniques. Kinesio taping is widely used in musculoskeletal injuries, improving sports performance, sports injuries, rehabilitation of orthopedic, neurological, oncological and pediatric patients.⁹⁻¹⁵ Although the mechanism of action is not clear, it is thought that the activation of skin receptors affects neuromuscular function. The use of kinesio tape reduces pain in many soft tissue pathologies. Long-term high-quality studies are needed to demonstrate the effects of kinesio tape on reducing pain, increasing circulation, and relieving muscle spasms.¹⁶ Lymphatic fluid flow is blocked due to inflammation in the injured tissue; Pain receptors under the skin are stimulated due to compression. Kinesio tape creates micro-folds in the skin, lifting the skin texture; Thus, the distance between the muscle and the interstitial area is increased. In this case, the pressure on the tense tissues is released and space is provided for lymphatic fluid movement.²³ It has been reported that the Kinesio taping method can reduce muscle strain and help with coordination, proprioception, and balance disorders.²⁵ It is known that the kinesio band applied to the ankle highly increases its effect on movement and agility by improving the dorsiflexion and plantarflexion values in the range of motion.⁶ Balance is examined in two subsections as static balance and dynamic balance. Static balance; It is defined as the ability to control posture during a motionless standing position. Dynamic balance; It is defined as predicting postural changes that occur during movement and giving appropriate responses to balance changes. Static balance can be examined by measuring the time to stand on one foot.²¹ This study aims at the effect of kinesio taping applied to the foot area of children who are interested in active table tennis sport on speed, agility and balance performance.

METHOD

Participants

Fifteen male individuals, with an average age of 11.13 ± 0.83 (years), a mean body weight of 42.53 ± 3.11 (kg), and a mean height of 149.60 ± 6.95 (cm), who trained table tennis for at least 4 days a week and did not experience any foot joint disorder were included in the study. Measurements are limited to the Proagility agility test, the 5-10-15m speed test and the balance test. Each parameter measurement was applied 2 times by applying kinesio tape (KT) and as a colored tape to create a placebo effect (PT).

Procedure

Kinesio Taping®

For the taping process, 5 cm wide Kinesio Taping® Tex Gold brand tapes were used. The application of Kinesio Taping® was technically applied to the dominant foot area by a physiotherapist with a Kinesio Taping® practitioner certificate. Dominant foot determination was determined with the question "Which foot will you hit the ball with?" And it was determined that all subjects' dominant feet were right. Taping was applied to the individuals in the sitting position. Before the application, attention was taken to avoid any factors (cream, sweat, hair, etc.) that would prevent the tape from sticking on the skin surface. In KT application, The first band (I band) was applied to individuals without tension on the forefoot, Then, It was extended to approximately 140% of its maximum length and attached just below the anterior tibial tuberosity over the tibialis anterior muscle. The second band (Y band) was applied to the lateral side of the ankle / lower leg without tension, Then, it was extended to approximately 140% of its maximum length and attached just below the head of the fibula over the peroneus longus and brevis muscle. The third band (Y band) was applied to the back of the ankle / lower leg (Nakajima and Baldrige 2013). PT application was carried out with the same instruction with colored plaster tape, a pharmaceutical product. The athletes were not informed about the effects of the tapes before the study, and they were not told which tape was kinesio and which was a plaster tape. All subjects were tested 30 minutes after taping.

ProAgility Test

The pro-agility test involved performing acceleration and deceleration during quick turning movements. The participant began in a 3-point stance with the legs across the start line and one hand on the start line; this pose was held for at least 1 s. After a signal was given, the participant immediately ran to the right (or left) and touched the right (or left) 5-yard line with the right (or left) hand, then quickly changed direction to the left (or right) and touched the left (or right) 5-yard line with the left (or right) hand, finally running through the finish line. Each participant was allowed two attempts. The assessor chose the direction in which the participant ran first (Yuasa et al 2018).

5-10-15m Sprint Test

Subjects were present behind the starting line, one foot ahead and just behind the line, leaning slightly forward,. Along with the starting signal, they ran to the finish line as quickly as possible. Their degrees were recorded in seconds .²⁴

Balance Error Scoring System

Balance performances of the subjects were made following the Balance Error Scoring System (BESS). The subjects were asked to maintain their test positions for 20 seconds, with eyes open and eyes closed, without any support on the dominant foot foam surface. The time of 20 seconds for each experimental condition was measured with a stopwatch. Each mistake made by the subjects within 20 seconds was recorded as 1 error point .⁷

Data Analysis

Age, height and body weight values of the participants in the study are given as mean and standard deviation. Whether the data showed normal distribution was tested by Shapiro-Wilks test. Paired Samples Test was used to determine the difference between the measurement averages of dependent groups. SPSS 22.0 statistical package program was used to analyze the data. The level of significance was accepted as 0.05.

RESULT & DISCUSSION

15 male athletes, aged 10-12 years who did table tennis training for at least 4 days a week and did not suffer from any foot joint disorder, were included in the study. The study was conducted to determine the effect of kinesio taping applied to the ankle on agility, 5-10-15m speed and balance performances.

Table 1: Descriptive Information of The Participants (N=15).

	Mean± SD	Minimum	Maximum
Age (Year)	11.13 ± 0.83	10.00	12.00
Height(cm)	149.60 ± 6.95	139.00	161.00
Weight(kg)	42.53 ± 3.11	37.00	50.00

The Mean (SD) Age Was 11.13 ± 0.83 Years, Height Was 149.60 ± 6.95 Cm, Weight Was 42.53 ± 3.11 Kg, For The 15 table Tennis Children (Table 1).

Table 2: KT and PT Measurement Results of the Subjects (N = 15).

Mean± SD	Difference (Mean± SD)

Agility	PT 5.44±0.10	—0.08±0.06
	KT 5.36±0.12	
5m Sprint	PT 1.10±0.03	—0.04±0.02
	KT 1.06±0.02	
10m Sprint	PT 1.73±0.13	—0.06±0.06
	KT 1.66±0.12	
15m Sprint	PT 2.59±0.14	—0.01±0.06
	KT 2.57±0.11	
EOBES	PT 17.73±1.27	1.06±1.03
	KT 16.66±1.34	
ECBES	PT 24.60±1.29	1.73±1.57
	KT 22.86±1.68	

EOBES= Eyes Open Balance Error Score, ECBES= Eyes Closed Balance Error Score PT=Plasebo Tape; KT=Kinesio Tape

After PT and KT applications of the participants in the study; A significant difference was found between the agility test PT and KT ($t = 4.97$; $p = 0.00$), between 5m PT and KT applications ($t = 5.79$; $p = 0.00$), and between 10m PT and KT applications ($t = 3.63$; $p = 0.00$). No significant difference was found between 15m PT and KT applications ($t = 1.10$; $p = 0.28$). On the other hand, in the mean balance error scores, Eyes Open Balance Error Score was ($t = 4.00$; $p = 0.00$) between PT and KT applications and Eyes Closed Balance Error Score was ($t = 4.25$; $p = 0.00$) between PT and KT applications. A statistically significant difference was determined. After PT and KT applications, 5m, 10m and 15m speed values of the participants in the study were determined. Comparing 5m PT and KT applications; Difference was determined between 5m PT and KT applications and 10m PT and KT applications, On the other hand, in the 15m speed test, it was determined that there was a slight improvement between the averages and this improvement was not important. In terms of Agility PT and KT applications, it can be said that kinesio taping improves postural swing in Eyes Open Balance Error Score and Eyes Closed Balance Error Score.

In the study conducted by Sarvestan and Svoboda (2018), they stated that Kinesio taping is an appropriate intervention for improving sports performance as it increases ankle ROM. In this study conducted by Bastürk et al. (2015), according to the statistical comparison results, it was determined that there was no a significant difference between vertical jump, wide jump, wide jump with dominant leg and , triple jump test, agility and the test performances of the subjects in agility. In a study in which Eom et al. (2014) examined the effects of kinesio taping on movement and agility in university students during movement, significant differences were observed in the dorsiflexion and plantarflexion values in the ankle range of motion of the kinesio tape. A significant difference was observed in agility values in the left and right ankles of all groups. It was concluded that kinesio tape increased range of motion and agility in university students. In their study, Karavelioglu and Ark (2014) investigated whether the kinesio taping technique applied to the upper leg and knee circumference of healthy athletes affected athletes' 10 m and 30 m speed values. The results of the study revealed that the kinesio taping technique applied to healthy athletes did not have a significant effect on 10 m and 30 m speed values. Özmen et al. (2016), in their study, stated that KT application just before the squatting exercise did not affect muscle pain and short sprint performance. In their study, De Hoyo et al (2013) stated that the KT application did not show a significant difference for any of the results analyzed between interventions.

In their study, Chaney et al. (2015) stated that the subjects did not show a statistical significance in general physical performance under taped conditions for a 20-meter sprint, but that the subjects' banding benefits per Mann-Whitney made a significant difference in terms of their perceptions of speed according to their perceptions. In the study of Sayaca (2011) in which they examined the immediate effects of different kinesio taping applications applied to the ankle of healthy young people on static balance, 60 participants were divided into three groups as a control of 20 people, kinesio taping-1 (KT-1) and kinesio taping-2 (KT-2). The range of motion of the individuals in the dominant ankle joint and their length of stay in the GA and GK stand stork test, respectively, were measured. Later, muscle fasciation technique was applied to the KT-1 group on the peroneal muscles. In the KT-2 group, besides the muscle fasciation technique, the correction technique was applied on the ankle ligaments. After the application, the duration of stay of the individuals in the GA and GK stand stork test position was measured again. There was no statistically significant difference between different kinesio tape application methods. In the KT-1 group, a significant difference was found between the duration of stay of the individuals in the GK stand stork test position before and after the application. Also, when the researcher compared the length of stay of the individuals in the stand stork test position according to gender, it was found that the length of time that girls' time to be able to maintain the test position was shorter than boys'. After kinesio tape application, an increase was observed in the average values of the individuals' durations of standing balance. When their durations of standing balance in the GA and GK positions were compared, their durations of staying in balance in the GA position were found longer.

Bayraktar (2017) found a significant difference in OSI and AP values of women with the application of kinesio tape. When all subjects were examined, he observed that there was a significant difference in AP values.

In the study conducted by Bicici et al. (2012), they found that neither KT ® nor athletic tape had a statistically significant effect on performance on dynamic balance and SEBT tests. Breim et al. by performing dynamic balance tests on 51 players, received a total of 30 players in to the work who scored the best and worst among them.

They subjected football players to shaking tests 3 times with kinesiological tape, non-elastic tape and without tape and evaluated the activity of the peroneus longus muscle during this test. As a result, they concluded that non-elastic tape application might affect the peroneus longus while kinesiology tape application was not effective.

CONCLUSION

Although the movement actions are limited in table tennis, it is necessary to have high level motor skills such as agility, speed and balance in order to achieve success. The study has showed that kinesio taping improved agility, speed, and balance performance in table tennis players. Researchers are recommended to conduct studies in different age groups and including other motor skill tests.

REFERENCES

1. Bastürk D, Gökdemir K, Kaya M, Ünüvar Bs, Taskın H, Erkmén N, 2015. Effect of Kinesio Taping On Functional Performance In Football Players .Sport Spa Vol. 12, Issue 2: 39-44
2. Biciçi S , Karatas N, Baltacı G, 2012 Effect Of Athletic Taping And Kinesio Taping On Measurements of Functional Performance In Basketball Players With Chronic Inversion Ankle Sprains.Int J Sports Phys Ther. 7 (2): 154-166.
3. Briem K, Eythörðsdóttir H, Magnúsdóttir Rg, Palmarsson R, Runarsdóttir T, Sveinsson T. 2011. Effects of Kinesio Tape Compared With Nonelastic Sports Tape And The Untaped Ankle During A Sudden Inversion Perturbation In Male Athletes. J Orthop Sports Phys Ther;41:328-35
4. Chaney C, Hiramaya Gm, Mendoza Te, Schmitt Dm, Janini S, 2015. Effects of Kinesio™ Tape On Vertical Jump, 20-M Sprint, And Self-Perception of Performance In High School Basketball Players. Cur Ort Pra, July/Aug, Vol 26, Iss 4, P 420-4.
5. De Hoyo, M., Álvarez-Mesa, A., Sañudo, B., Carrasco, L. and Domínguez, S. 2013.The Immediate Effect of Kinesio Taping On Muscle Response In Young Elite Football Players. Journal of Sports Rehabilitation, 22 (1), 53-58.
6. Eom Sy, Lee Wj, Lee Ji, Lee Eh, Lee Hy, Chung Ej, 2014. The Effect of Ankle Kinesio Taping On Range of Motion And Agility During Exercise In University Students. Phys Ther Rehabil. Sci, 3(1), 63- 8.
7. Erkmén, N, Taskın H, Sanioglu A, Kaplan T. (2009). Effects of Fatigue In Football Players On Balance Performance. Sport Sciences, 4(4), 289-299.
8. Gonzalez-Iglesias J, Fernandez-De-Las-Perias C, Cleland Ja, Huijbregts P, Del Rosario Gutierrez-Vega M. (2009). Short-Term Effects of Cervical Kinesio Taping On Pain And Cervical Range of Motion In Patients With Acute Whiplash Injury: A Randomized Clinical Trial. J Orthop Sports Phys Ther 39(7):515-21.
9. Ilkim, M., & Akyol, B. (2018). Effect of Table Tennis Training on Reaction Times of Down-Syndrome Children. *Universal Journal of Educational Research*, 6(11), 2399-2403.
10. J Sarvestan, Z Svoboda, 2018. Acute Effect of Ankle Kinesio And Athletic Taping On Ankle Range of Motion During Various Agility Tests In Athletes With Chronic Ankle Sprain. J Sport Rehabil, Vol 29, Issue 5, P. 527-32
11. Kahanov L. (2007). Kinesio Taping®: Part I. An Overview of Its Use In Athletes. Ath Ther Today;12(3):17-8.
12. Karavelioglu Mb, Harmancı H, Altınok B, Sentürk A, Gülaç M, Yüksel O, Kalkavan A, 2014. The Effect of Kinesio Tape Application On Speed. Ijsr Volume 4 Issue 1.
13. Kase K, Wallis J, Kase T. (2003). Clinical Therapeutic Applications of The Kinesio Taping Method, 2nd Ed. Tokyo, Japan: Ken Ikai Co. Ltd.
14. Lim Ec, Tay Mg. (2015). Kinesio Taping In Musculoskeletal Pain and Disability That Lasts For More Than 4 Weeks: Is It Time To Peel off The Tape And Throw It Out With The Sweat? A Systematic Review With Meta-Analysis Focused On Pain And Also Methods of Tape Application. Br J Sports Med 49(24):1558-66.
15. Montalvo Am, Cara El, Myer Gd. Effect Of Kinesiology Taping On Pain In Individuals With Musculoskeletal Injuries: Systematic Review And Meta-Analysis. Phys Sports Med. 42(2):48-57.
16. Morris D, Jones D, Ryan H, Ryan Cg. (2013). The Clinical Effects of Kinesio® Tex Taping: A Systematic Review. Physiother Theory Pract 29(4):259-70.
17. Nakajima, M. A., & Baldrige, C. (2013). The Effect of Kinesio® Tape On Vertical Jump And Dynamic Postural Control. International Journal Of Sports Physical Therapy, 8(4), 393.
18. Özmen T, Aydogmus M, Dogan H, Acar D, Zoroglu T, Mark W, 2016. The Effect of Kinesio Taping On Muscle Pain, Sprint Performance, And Flexibility In Recovery From Squat Exercise On Young Adult Women. J Sport Rehabil. 25 (1): 7-12.
19. Riemann Bl, Myers Jb, Lephart Sm, (2002). Sensorimotor System Measurement Techniques. Journal of Athletic Training, 37(1), 85-89.
20. Sayaca C. (2011). The effects of different kinesio tape applications to the ankle of healthy young people on static balance. Master's Thesis, Halic University Institute of Health Sciences, Istanbul.
21. Sevimay Özer D, Özer M. (2007). Motor Development in Children. Nobel Publication Distribution, Ankara, 125-26.
22. Williams S, Whatman C, Hume Pa, Sheerin K. (2012). Kinesio Taping In Treatment And Prevention of Sports Injuries: A Metaanalysis Of The Evidence For Its Effectiveness. Sports Med;42(2):153-64.
23. Wu Wt, Hong Cz, Chou Lw. (2015). The Kinesio Taping Method For Myofascial Pain Control. Evid Based Complement Alternative Med;2015:950519.
24. Yan Y. (2007). The Effect of Socio-Economic Structure on Physical Activity and Physical Fitness Level in Children aged 10-13, Marmara University, Institute of Health Sciences, Master's Thesis, İstanbul;6-7-25-2.
25. Yasukawa A, Patel P, Sisung C, (2006). Pilot Study: Investigating The Effects of Kinesio Taping In Anacute Pediatric Rehabilitation Setting. Am J Occup Ther, 60(1), 104-10. Bayraktar Y, 2017.The Effect of Kinesio Taping Applied to the Ankle on Postural Oscillation. Master's Thesis, Selcuk University, Institute of Health Sciences, Konya.

SP-24

PRELIMINARY ASSESSMENT OF SERUM WNT1 INDUCIBLE SIGNALING PATHWAY PROTEIN 1 (WISPI) AS CAN BE USED TUMOR BIOMARKER FOR ACROMEGALY?

SARIAKCALI B^{1*}, DUMAN G²

^{1*} Assistant Professor, Medical Doctor ² Assistant Professor, Medical Doctor. Division of Endocrinology and Metabolism, Department of Internal Medicine, Sivas Cumhuriyet University Faculty of Medicine, 58140 Sivas, Turkey.

Corresponding author: Sariakcalı B <https://avesis.cumhuriyet.edu.tr/10037>

ABSTRACT

Serum WNT1 inducible signaling pathway protein 1 (WISPI) may be a tumor biomarker for acromegaly. The aim of this study was to investigate the value of serum WISPI level as a tumor biomarker in acromegaly. In 34 patients (14 male/20 female) with acromegaly. Controls included 43 healthy participants (28 females and 15 males). Their serum WISPI levels were measured by an ELISA method. 34 patients with acromegaly and 43 control groups were included in the study. 14 of the patients were male (31.2%), 20 were female (58.8%), whereas 15 of the patients in the control group were male (34.9%) and 28 were female (65.1%). The WISPI value of the patients with acromegaly was significantly higher than in the control group ($p < 0.001$). There were no differences between the WISPI values of 14 patients with a high IGF-I value and 14 patients with normal or low IGF-I values ($p < 0.345$). There was no difference between the WISPI values for 24 patients receiving SSA treatment and 10 patients not receiving that treatment ($p < 0.555$). Today, the biochemical biomarkers used in the diagnosis and treatment of acromegaly are GH and IGF-I. IGF-I is more specific and is affected by conditions such as age, pregnancy and puberty. In our study, we found that WISPI molecule was significantly higher in patients with acromegaly than in the control group. In conclusion, we suggest that WISPI may be used as a tumor biomarker in patients with acromegaly.

KEYWORDS: Acromegaly, WNT1 Inducible Signaling Pathway Protein 1 (WISPI), IGF-I, GH, Cancer

INTRODUCTION

Acromegaly is a chronic disease caused by excessive secretion of GH (Growth hormone)¹ Generally by a pituitary GH-secreting adenoma %95.² Its prevalence is estimated at 40-130 cases per million inhabitants.³ The diagnosis is confirmed by elevated serum GH concentrations that cannot be suppressed by an oral glucose load, and by increased levels of insulin-like growth factor 1 (IGF-I). Due to insidious onset and slow progression, acromegaly is often diagnosed four to more than ten years after its onset. The clinical manifestations of acromegaly include enlarged hands, feet and face, headaches, arthralgias, fatigue and hyperhidrosis.^{4,5} Metabolic effects caused by excessive secretion of GH and the mass effect depending on the pressure applied by the pituitary adenoma cause an increase in mortality.³ The mortality has been reported to increase 2-4 times due to cardiovascular diseases, respiratory diseases and cancer.⁶ The incidence of thyroid cancer in patients has been reported to be in the range of 1.2-10.6% and to increase 8 times. to be in the range of 1.2-10.6% and to increase 8 times.^{7,8} An increased frequency was found in the disease-dependent colorectal polyp and colon cancer.⁹ GH binds to the extracellular domain of the GH receptor (GHR). GH receptor (GHR) Activation of the GHR triggers tyrosine phosphorylation of receptor-associated Janus kinase-2 and other substrates, such as signal transducer and patients has activator of transcription (STAT) which are mediators of genomic GH actions and might be involved in oncogenesis.^{10,12} GH activates other mitogenic pathways, such as MAPK/ERK, Ras-like GTPases, and insulin (INS) receptor substrate/phosphoinositide 3-kinase (PI3K)/protein kinase B (Akt), and it interacts with focal adhesion kinases that permits the GH signal to be propagated through multiple alternate intracellular transduction pathways.^{13,14} GH increases IGF-I production in the liver.¹⁵ Ghrelin, adipokines, free fatty acids, estrogen, thyroid hormones, and glucocorticoids, also influence pituitary GH secretion and hepatic IGF-I output.¹⁶ IGF-I starts to be produced from the liver postpartum and reduces with age after puberty.^{17,19} The IGF signaling mechanisms involve a complex system formed by three ligands (IGF-I, IGF-II, and INS), six membrane receptors [IGF-IR, IGF-IIR, INS receptor (INS-R), and the IGF-I/INS hybrid receptors], six high-affinity binding proteins [IGF-binding protein (IGFBP)-1 to IGFBP-6], a family of lower affinity IGFBP-related proteins, and several proteases.^{19,21} Upon binding to IGFs, IGF-IR undergoes autophosphorylation, followed by binding and phosphorylation of INS-R substrate proteins and recruitment of other effectors responsible to ultimately activate MAPK and PI3K/Akt signaling cascades. The MAPK pathway involves Ras/ERK activity and is mainly associated with the mitogenic effects of IGFs and INS, whereas PI3K/Akt mediates metabolic and cell growth responses, the latter via the mammalian target of the rapamycin pathway.^{19,21,23} Growth factors do not directly lead to malignant transformation, but they can help to increase the risk of mutation by reducing time for DNA repair during rapid progression of the cell cycle. In rodents, GH/IGF-I influences cellular DNA repair capacity during a critical period during early life, presumably by transcriptional control of genes involved in DNA repair.²⁴ When surgery, the usual first-line treatment, fails to correct GH/IGF-I hypersecretion, medical treatment with somatostatin analogues (SSA) and/or radiotherapy can be used. The GH-receptor antagonist (pegvisomant) is helpful in patients

who are resistant to somatostatin analogs.^{25,26} Thanks to this multistep therapeutic strategy, adequate hormonal disease control is achieved in most cases, allowing a normal life expectancy.⁴ Radiotherapy is applied in patients who are not in remission despite an adequate medical treatment after surgical treatment, and mostly a gamma knife treatment is preferred.^{27,28}

GH and IGF-I are used as biochemical markers in the diagnosis of acromegaly. There is no marker used other than these biochemical markers.³ Among the potential signal transduction growth factors, WNT1 inducible signaling pathway protein 1 (WISPI), also known as CCN4, is a member of the connective tissue growth factor/cysteine-rich 61/nephroblastoma overexpressed (CCN) family. It is a secreted extracellular matrix protein found in the extracellular matrix plays a key role in many cellular functions in a highly tissue-specific manner, including cell survival and proliferation. Interestingly, elevated WISPI expression has also been observed in a variety of cancers such as gastric, colon, lung, liver and breast cancers and melanoma further confound the role of WISPI in carcinogenesis.^{29,30} Our purpose in this study was to investigate the correlation of acromegaly which is a type of benign tumor, with WISPI based on the positive correlation of WISPI with several types of cancer. Also we aimed to investigate the utilization of WISPI as a tumor marker in acromegaly patients.

MATERIALS AND METHODS

Patients

The Human Research Ethics Committee of our institution (Registry No: 2019-04/06) approved this study. All patients provided their informed consent before diagnostic procedures. Sera of 34 patients with acromegaly who were being followed up in our clinic were taken and stored at -40°C.

Measurement of WISPI

After overnight fasting, blood samples were collected from all participants into red top tubes (Becton Dickinson, Oxford, UK). Samples were taken on the day of admission to the hospital. The serum sample tubes were allowed to clot before centrifugation. After centrifugation at 4°C for 15 min at 3,500 rpm, the serum was aliquoted and immediately frozen at -40°C.

Serum WISPI levels measured by Abbkine ELISA kit (China). According to the ELISA kit procedure, the following operations were carried out respectively: standard working solutions were prepared in 5 Eppendorf tubes with concentrations of 480, 240, 120, 60, 30, 15 pg/mL, respectively. 50 µL standards were added to the ELISA plate and 40 µL sample diluent was added to the remaining parts. Ten µL samples were added to the wells with sample diluents. The plate was covered and incubated at 37°C for 45 min. The plate was washed 5 times with a washing solution. Then 50 µL of HRP-conjugate was added to all wells. Plate was incubated at 37°C for 30 min. Plate was washed 5 times with washing solution and 50 µL chromogen solution A and 50 µL chromogen solution B was added. It was incubated for 15 min at 37°C, protected from light. 50 µL of stop solution was added to each well. Absorbance values were read at 450 nm. Concentrations of samples were calculated according to the absorbance values of the standards. WISPI unit of measurement given in pg/mL.

Ethical Approval

The study protocol was approved by the Human Research Ethics Committee of Sivas Cumhuriyet University, Sivas, Turkey (Registry No: 2019-04/06).

STATISTICAL ANALYSIS

SPSS 22.0 software was used for statistical analysis. Counts were expressed as numbers (percentages) and compared using chi-square test. Measurements were represented as mean with standard deviation and compared using independent samples t test. Statistical significance was accepted with a two-tailed P value < 0.05.

RESULTS AND DISCUSSION

34 patients with acromegaly and 43 control groups were included in the study. 14 of the patients were male (31.2%), 20 were female (58.8%), whereas 15 of the patients in the control group were male (34.9%) and 28 were female (65.1%). Shows the patient group, the control group, the patient group with a high – normal-low IGF-I value, and the patient group with and without SSA treatment. (Table I).

Table I: Acromagaly, control patient; IGF-I value hig, normally, low; SSA therapy patient numbers

Variable	Category	Count (%)
Patient	Female	20 (58.8%)
	Male	14 (41.2%)
Control	Female	28 (65.1%)
	Male	15 (34.9%)
IGF-I	High	17 (50%)
	Normally-Low	17 (50%)
SSA therapy	Yes	20 (58.8%)
	No	14 (41.25%)

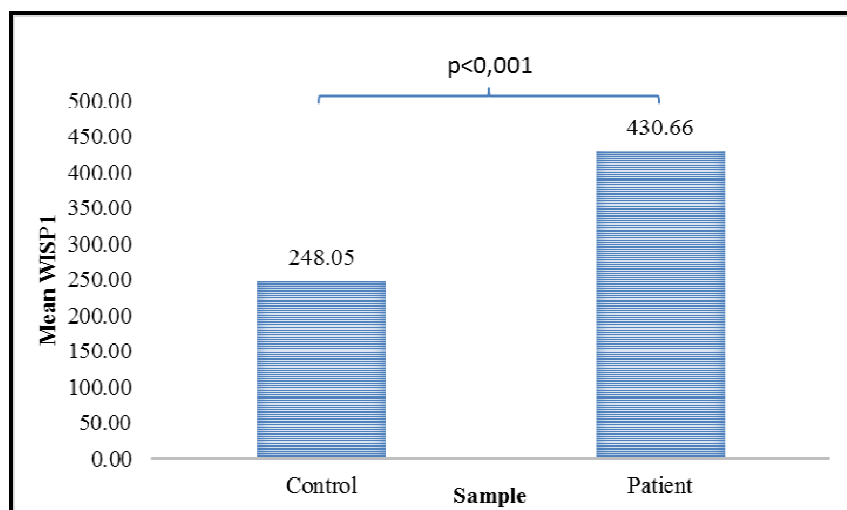


Fig 1: Control and patient WISPI distribution

The WISPI value of the patients with acromegaly was significantly higher than in the control group ($p<0.001$) (Figure 1).

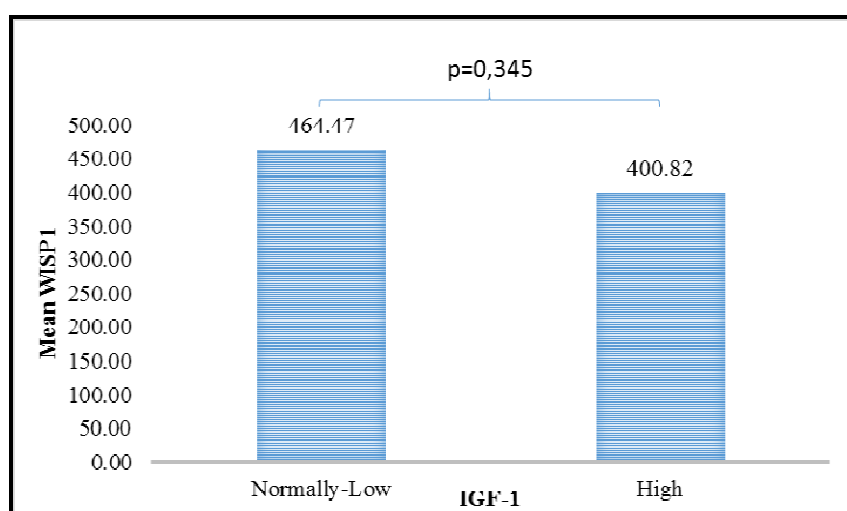


Fig 2: IGF-I and WISPI the differences between

There were no differences between the WISPI values of 14 patients with a high IGF-I value and 14 patients with normal or low IGF-I values ($p=0.345$) (Figure 2).

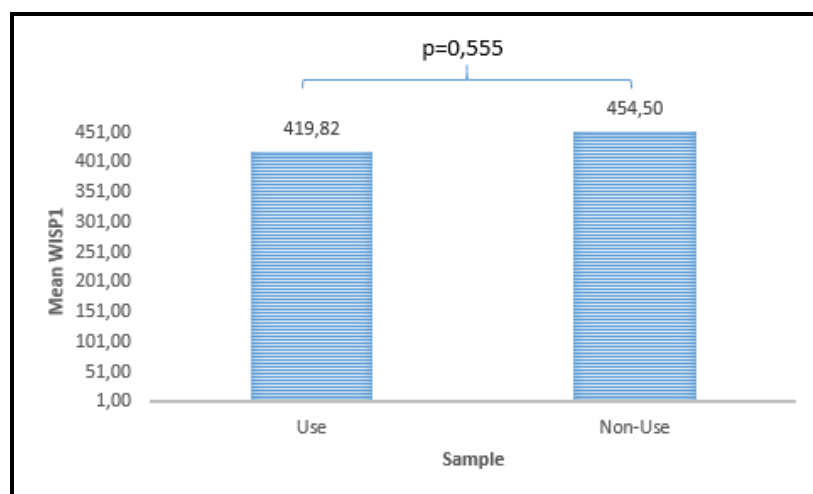


Fig 3: SSA treatment and non-treatment patient and WISPI distribution

There was no difference between the WISPI values for 24 patients receiving SSA treatment and 10 patients not receiving that treatment ($p=0.555$) (Figure 3). One male patient was diagnosed with prostate adenocarcinoma and one female patient diagnosed with thyroid papillary carcinoma. The diagnosis of acromegaly is made by measuring the serum GH and IGF-I together with the clinical evaluation. As GH release is pulsatile, the IGF-I measurement is more valuable. Also, GH measurement during

OGTT (oral glucose tolerance test) is a standard test used in the diagnosis of acromegaly. A GH value of <1 Mc/L during OGTT is an important indicator for excluding the diagnosis of acromegaly. There is currently no other biochemical test used in the diagnosis of acromegaly.³ The first treatment of patients with acromegaly is surgery. Drug therapy is applied in patients who are not in remission after surgery. In the follow-up, IGF-I is measured as a biochemical marker. The drug dose is adjusted according to the IGF-I measurement. The half-life of IGF-I is 15 hours, and an evaluation is made according to the age and gender. IGF-I may be higher than normal during pregnancy and puberty.^{3,5} Expression disorder of WISPI has been reported in diabetic retinopathy and cancer diseases. WISPI was originally detected as a target of WNT1 and β -catenin, and contributes to β -catenin-mediated tumorigenesis.^{30,31} studies are associating WISPI with tumor development. WISPI makes different arrangements in different cancer types. WISPI is linked to multiple signal transduction pathways that include Akt, MAP kinases, JNK, caspases, PI 3-K, c-myc, GSK-3 β , β -catenin, miRNAs and mTOR. WISPI signal may cause changes in programmed cell death pathways, such as apoptosis, autophagy and cell repair.³²

Excessive expression of WISPI has shown a bad prognosis in patients with rectal and colon cancer. esophageal squamous cell carcinoma, WISPI regulates tumor cell radio-sensitivity and is recognized as a marker suggestive of a poor prognosis.³³ WISPI is contribute to a regulator of glioblastoma cell apoptosis, invasion proliferation and chemotherapeutic resistance.³⁴ High levels of WISPI are showed poor prognosis in esophageal, breast, whereas in melanoma, lower than normal WISPI levels were found in patients with a poor prognosis.^{35,39} As a result of injecting the mice with WISPI, tumor formation was observed. The conclusion drawn from this study is that WISPI is effective on the growth and progress of tumors with the effect of paracrine.³¹ A study comparing silent fibroblast cells with activated melanoma fibroblast cells, showed that WISPI had a negative regulatory paracrine effect in melanoma cells.³⁹WISPI, downstream mediator of canonical WNT signaling, and its functions as one of the soluble signals that reshape their microenvironment, tumor expansion and metastasis of malignant tumor can be reduced by finding of new ways to bloc their functions. Growth factors that cancer cells release, contribute to tumor growth by affecting stromal cells surrounding the tumor.⁴⁰ Carcinoma-associated fibroblasts (CAFs) regulate a tumor surrounding by releasing extracellular matrix proteins and matrix-degrading enzymes.⁴⁰ WISPI is upregulated in CAFs compared with fibroblasts in the adjacent normal tissue in colon cancer and in breast cancer.^{41,42} In the majority of cancers, WISPI nestles in the stroma surrounding the tumor tissue.^{30,41,44} In the human prostate, WISPI levels are higher in serum and tissue. Studies on animals have demonstrated that disease progression and metastasis rate decrease with WISPI inhibitor antibodies. This study suggests that WISPI can be used as a tumor marker in patients with prostate cancer.⁴⁴To this end, serum WISPI values of 34 patients with acromegaly and 43 control groups were measured. The WISPI value of the patients with acromegaly was significantly higher than in the control group. There was no difference in terms of WISPI between patients with acromegaly who received SSA treatment and those who did not. There was no difference between the patient group with a high IGF-I value and the patient group with a normal or low value of WISPI. In our study, we think that there could be no difference in WISPI values due to the low number of cases, and we believe that more significant results may be obtained with studies in larger series. However, we think that the high level of WISPI in the patient group with acromegaly compared to the control group is an important finding. An increased incidence of thyroid papillary cancer and colon adenocarcinoma has been reported in patients with acromegaly.^{8,9} The studies conducted by the 2017 Italy and 2018 Denmark groups with acromegaly patients, found an increase in cancer incidence.⁴⁵ Tumor markers are used in the follow-up of some cancer types. For example, PSA (prostate-specific antigen) is used in prostate adenocarcinoma.⁴⁶ CA 19.9 (carbohydrate antigen) in colon adenocarcinoma⁴⁷ and AFP (Alpha-fetoprotein) in hepatocellular carcinoma.⁴⁸ Our study found WISPI value to be higher in patients with acromegaly, which is a benign tumor. This makes us think that it can be used as a tumor marker. It may also light the way for future studies in acromegaly-cancer correlation. In our study, 1 female patient was diagnosed with papillary cancer (WISPI 508) and 1 male patient diagnosed with prostate adenocarcinoma (WISPI 207). Especially the WISP value of our papillary cancer case was more than twice the average value. However, we could not provide sufficient information on this subject due to the insufficient number of patients with acromegaly and cancer. We suggest measuring WISPI in acromegaly and cancer cases in larger case series. We think that WISPI may be used as a cancer screening test in cases where WISPI is higher in patients with acromegaly and cancer than in cases with acromegaly and without cancer. In our study, WISPI was significantly higher in patients with acromegaly than in the control group. The lack of a similar study in the literature makes our study unique. We suggest that WISPI measurement can be used as a tumor indicator in acromegaly patients. However, we believe that WISPI might be used as a cancer screening test if WISPI measurement comes out to be significantly higher in large patient series and patients suffering from both acromegaly and cancer compared to acromegaly patients without cancer.

CONCLUSION

In our study, WISPI was significantly higher in patients with acromegaly than in the control group. The lack of a similar study in the literature makes our study unique. We suggest that WISPI measurement can be used as a tumor indicator in acromegaly patients. However, we believe that WISPI might be used as a cancer screening test if WISPI measurement comes out to be significantly higher in large patient series and patients suffering from both acromegaly and cancer compared to acromegaly patients without cancer.

Financial support

The authors received no financial support for the research, authorship, and/or publication of this article.

Conflict of interest

The authors declare that they have no potential conflicts of interest with the contents of this article.

Author Contributions

GD and BS conceived and designed the experiments. GD wrote the first draft of the manuscript. BS and HOD contributed to the writing of the manuscript and agreed with manuscript results and conclusions. GD made critical revisions and approved final version. All authors reviewed and approved the final manuscript.

Ethical Approval

The study protocol was approved by the Human Research Ethics Committee of Sivas Cumhuriyet University, Sivas, Turkey (Registry No: 2019-04/06).

REFERENCES

1. Lavrentaki A, Paluzzi A, Wass JA ve ark. Epidemiology of acromegaly: review of population studies. *Pituitary*. 2017; 20:4-9
2. Vilar L, Vilar CF, Lyra R ve ark. Acromegaly: clinical features at diagnosis. *Pituitary*. 2017; 20:22-32
3. Casanueva FF, Barkan AL, Buchfelder M ve ark. Pituitary Society, Expert Group on Pituitary Tumors. Criteria for the definition of Pituitary Tumor Centers of Excellence (PTCOE): A Pituitary Society Statement. *Pituitary*. 2017; 20:489-498
4. Katznelson L, Atkinson JL, Cook DM ve ark. American Association of Clinical Endocrinologists. American Association of Clinical Endocrinologists medical guidelines for clinical practice for the diagnosis and treatment of acromegaly-2011 update. *Endocr Pract*. 2011; 17 Suppl 4:1-44
5. Katznelson L, Laws ER Jr, Melmed S ve ark. Endocrine Society. Acromegaly: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab*. 2014; 99:3933-3951
6. Maione L, Brue T, Beckers A, Delemer B, Petrossians P, BorsonChazot F, et al. Changes in the management and comorbidities of acromegaly over three decades: the French acromegaly registry. *Eur J Endocrinol*. 2017 May;176(5):645-55.
7. Dagdelen S, Cinar N, Erbas T. Increased thyroid cancer risk in acromegaly. *Pituitary*. 2014; 17:299-306
8. Gullu BE, Celik O, Gazioglu N ve ark. Thyroid cancer is the most common cancer associated with acromegaly. *Pituitary*. 2010; 13:242-248
9. Cairns SR, Scholefield JH, Steele RJ ve ark. British Society of Gastroenterology; Association of Coloproctology for Great Britain and Ireland. Guidelines for colorectal cancer screening and surveillance in moderate and high risk groups (update from 2002). *Gut*. 2010; 59:666-689.
10. Brooks AJ, Dai W, O'Mara ML, Abankwa D, Chhabra Y, Pelekanos RA, Gardon O, Tunny KA, Blucher KM, Morton CJ, Parker MW, Sieracki E, Gambin Y, Gomez GA, Alexandrov K, Wilson IA, Doxastakis M, Mark AE, Waters MJ. Mechanism of activation of protein kinase JAK2 by the growth hormone receptor. *Science*. 2014;344(6185):1249783
11. De Vos AM, Ultsch M, Kossiakoff AA. Human growth hormone and extracellular domain of its receptor: crystal structure of the complex. *Science*. 1992;255(5042):306-312
12. Waters MJ. The growth hormone receptor. *Growth Horm IGF Res*. 2016;28:6-10
13. Bergan-Roller HE, Sheridan MA. The growth hormone signaling system: insights into coordinating the anabolic and catabolic actions of growth hormone. *Gen Comp Endocrinol*. 2018;258:119-133
14. Zhu T, Goh EL, Graichen R, Ling L, Lobie PE. Signal transduction via the growth hormone receptor. *Cell Signal*. 2001;13(9):599-616
15. Steyn FJ, Tolle V, Chen C, Epelbaum J. Neuroendocrine regulation of growth hormone secretion. *Compr Physiol*. 2016;6(2):687-735
16. Vázquez-Borrego MC, Gahete MD, MartínezFuentes AJ, Fuentes-Fayos AC, Castaño JP, Kineman RD, Luque RM. Multiple signaling pathways convey central and peripheral signals to regulate pituitary function: lessons from human and non-human primate models. *Mol Cell Endocrinol*. 2018;463:4-22.
17. Bergman D, Halje M, Nordin M, Engstrom W. Insulin-like growth factor 2 in development and disease: a mini-review. *Gerontology*. 2013;59(3)
18. Milman S, Huffman DM, Barzilai N. The somatotrophic axis in human aging: framework for the current state of knowledge and future research. *Cell Metab*. 2016;23(6):980-989.
19. Samani AA, Yakar S, LeRoith D, Brodt P. The role of the IGF system in cancer growth and metastasis: overview and recent insights. *Endocr Rev*. 2007; 28(1):20-47
20. Annunziata M, Granata R, Ghigo E. The IGF system. *Acta Diabetol*. 2011;48(1):1-9.
21. Brahmkhatri VP, Prasanna C, Atreya HS. Insulin-like growth factor system in cancer: novel targeted therapies. *BioMed Res Int*. 2015;2015:538019
22. Bowers LW, Rossi EL, O'Flanagan CH, deGraffenried LA, Hursting SD. The role of the insulin/IGF system in cancer: lessons learned from clinical trials and the energy balance-cancer link. *Front Endocrinol (Lausanne)*. 2015;6:77.
23. Veroha SJ, Haluska P. The insulin-like growth factor system in cancer. *Endocrinol Metab Clin North Am*. 2012;41(2):335-350, vi
24. Brittain AL, Basu R, Qian Y, Kopchick JJ. Growth hormone and the epithelial-to-mesenchymal transition. *J Clin Endocrinol Metab*. 2017;102(10): 3662-3673.
25. Gadelha MR, Wildemberg LE, Bronstein MD ve ark. Somatostatin receptor ligands in the treatment of acromegaly. *Pituitary*. 2017; 20:100-108.
26. Guistina A, Arnaldi G, Bogazzi F; Acromegaly at Pegvisomant, *J Endocrinol Invest* 2017; 40 (6) :577-589
27. Ding D, Mehta GU, Patibandla MR, Lee C-C, Liscak R, Kano H, et al. Stereotactic radiosurgery for acromegaly: an international multicenter retrospective cohort study. *Neurosurgery*. 2019 Mar 1;84(3):717-25.
28. Erdur MF, Kilic T, Peker S, Gamma Knife Radiosurgery in Patients with Acromegaly *J Clin Neurosci*, 18 (129) 1616-20, Dec 2011.
29. Chiang KC1, Yeh CN2, Chung LC3, Feng TH4, Sun CC5, Chen MF2, Jan YY2, Yeh TS2, Chen SC2, Juang HH3. WNT-1 inducible signaling pathway protein-1 enhances growth and tumorigenesis in human breast cancer. *Sci Rep*. 2015 Mar 3;5: 8686. doi: 10.1038/srep08686

30. Jia S, Qu T, Feng M, Ji K, Li Z, Jiang W, Ji J. Association of Wnt1-inducible signaling pathway protein-1 with the proliferation, migration and invasion in gastric cancer cells. *Tumour Biol.* 2017 Jun;39(6):1010428317699755. doi: 10.1177/1010428317699755
31. Pennica D, Swanson TA, Welsh JW, Roy MA, Lawrence DA, Lee J, Brush J et al. WISP genes are members of the connective tissue growth factor family that are up-regulated in wnt-1-transformed cells and aberrantly expressed in human colon tumors. *Proc Natl Acad Sci U S A.* 1998 Dec 8;95(25):14717-22. DOI:10.1073/pnas.95.25.14717
32. Xu L, Corcoran RB, Welsh JW, Pennica D, Levine AJ. WISP-1 is a Wnt-1- and beta-catenin-responsive oncogene. *Genes Dev.* 2000 Mar 1;14(5):585-95. PMID:10716946
33. Kenneth M. WISPI: Clinical Insights for a Proliferative and Restorative Member of the CCN Family. *Curr Neurovasc Res.* 2014; 11(4): 378–389. DOI: 10.2174/1567202611666140912115107. 142–146. <http://dx.doi.org/10.1016/j.biocel.2015.03.007>
34. Irem G, Ruth Chiquet E. CCN4/WISPI (WNT1 inducible signaling pathway protein 1) :A focus on its role in cancer. *The International Journal of Biochemistry & Cell Biology* 62 (2015)
35. Jianghong W, , Ziwen L. Hong C, Chunyan D, Xiaowen L. Identification of WISPI as a novel oncogene in glioblastoma. *Oncotarget*, Vol. 7, No. 31 (49834-49847). DOI:10.18632/oncotarget.10486
36. Taghavi A, Akbari ME, Hashemi-Bahremani M, Nafissi N, Khalilnezhad A, Poorhosseini SM, et al. Gene expression profiling of the 8q22-24 position in human breast cancer: TSPYL5, MTDH, ATAD2 and CCNE2 genes are implicated in oncogenesis, while WISPI and EXT1 genes may predict a risk of metastasis. *Oncol Lett [Internet].* 2016 Nov;12(5):3845–55. Available from: <https://www.spandidos-publications.com/10.3892/ol.2016.5218>
37. Nagai Y, Watanabe M, Ishikawa S, Karashima R, Kurashige J, Iwagami S, et al. Clinical significance of Wnt-induced secreted protein-1 (WISP-1/CCN4) in esophageal squamous cell carcinoma. *Anticancer Res [Internet].* 2011 Mar;31(3):991–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2149872>
38. Davies SR, Davies ML, Sanders A, Parr C, Torkington J, Jiang WG. Differential expression of the CCN family member WISP-1, WISP-2 and WISP-3 in human colorectal cancer and the prognostic implications. *Int J Oncol* 2010; 36:1129–36. DOI: 10.3892/ijo.00000595
39. Shao H, Cai L, Grichnik JM, Livingstone AS, Velazquez OC, Liu ZJ. Activation of Notch1 signaling in stromal fibroblasts inhibits melanoma growth by upregulating WISP-1. *Oncogene* 2011; 30:4316–26. DOI:10.1038/onc.2011.142
40. Mueller MM, Fusenig NE. Friends or foes – bipolar effects of the tumour stroma in cancer. *Nat Rev Cancer* 2004; 4:839–49
41. Rupp C, Scherzer M, Rudisch A, Unger C, Haslinger C, Schweifer N, et al. IGFBP7, a novel tumor stroma marker, with growth-promoting effects in colon cancer through a paracrine tumor-stroma interaction. *Oncogene Adv Online Publ* 2014. <http://dx.doi.org/10.1038/onc.2014.18>
42. Bauer M, Su G, Casper C, He R, Rehrauer W, Friedl A. Heterogeneity of gene expression in stromal fibroblasts of human breast carcinomas and normal breast. *Oncogene* 2010; 29:1732–40. doi: 10.1038/onc.2009.463
43. Tanaka S, Sugimachi K, Kameyama T, Maehara S, Shirabe K, Shimada M, et al. Human WISPIv, a member of the CCN family, is associated with invasive cholangiocarcinoma. *Hepatology* 2003; 37:1122–9.
44. Ono M, Inkson CA, Sonn R, Kilts TM, de Castro LF, Maeda A, et al. WISPI/CCN4: a potential target for inhibiting prostate cancer growth and spread to bone. *PLoS ONE* 2013;8:e71709. <https://doi.org/10.1371/journal.pone.0071709>
45. Cesar LB, Margeret SB. Growth hormone's links to cancer June 2018 review
46. Greene KL, Albertsen PC, Babaian RJ et al. Prostate specific antigen best practice statement: 2009 update. *J Urol* 2009; 182: 2232–4
47. Labianca R, Nordlinger B, Beretta GD, Brouquet A, Cervantes A. Primary colon cancer: ESMO Clinical Practice Guidelines for diagnosis, adjuvant treatment and follow-up. *Ann Oncol* 2010; 21 Suppl 5: v70-v77 [PMID: 20555107 DOI: 10.1093/annonc/mdq168]
48. Sauzay C, Petit A, Bourgeois AM, Barbare JC, Chauffert B, Galmiche A, Houessinon A. Alpha-fetoprotein (AFP): A multi-purpose marker in hepatocellular carcinoma *Clin Chim Acta.* 2016 Dec 1;463:39-44. doi: 10.1016/j.cca.2016.10.006. Epub 2016 Oct 11

INVESTIGATION OF STATIC AND DYNAMIC BALANCE CAPACITY OF 5-9 YEAR-OLD CHILDREN IN GYMNASTICS EDUCATION

MUSTAFA ALTINKOK^{1*}, BUKET SERAN², MERT KURNAZ³ & BAHADIR DEMIR⁴

^{1*}Associate Professor; Akdeniz University, Faculty of Sport Sciences, Department of Physical Education and Sports, Antalya-Turkey.

²Ph.D. Student; Gazi University, Institute of Health Sciences, Department of Training and Movement Science, Ankara-Turkey.

³M.Sc.Student; Akdeniz University, Institute of Education Sciences, Department of Physical Education and Sports Education, Antalya-Turkey,

⁴PE Teacher; 15 Temmuz Şehitleri Secondary School, Ministry of National Education, Antalya-Turkey.

Corresponding author: mustafaaltinkok@akdeniz.edu.tr

ABSTRACT

The research aims to examine the static and dynamic balance capacities of 5-9-year-old children who receive gymnastics training. The research group consists of 101 children, 21 boys and 80 girls, between the ages of 5-9 who are trained in gymnastics. Static balance (Flamingo balance test) and dynamic balance (Y balance test) tests, which are among the basic motor movement performance tests, were applied to examine the balance ability, one of the basic motor capacities of children aged 5-9. Arithmetic average and standard deviation, frequency and percentage distribution from general distribution statistics were obtained as data and Independent T test and One Way Anova tests were used to determine the significance levels between variables. With this research, it was concluded that the static and dynamic balance capacities of children who received gymnastics training at the age of 5-9 differ according to the age variable.

KEYWORDS: *Movement education, Gymnastics education, Basic motor capacity, Dynamic balance, Static balance*

INTRODUCTION

It is known that participation in a physical activity from an early age supports healthy growth and the development of both motor skills and motor capacities of children. Also, with early motor development, children can discover the movement potential of their body through trial and error. While children are discovering, they also contribute to the development of fundamental movement skills and, depending on their motor development potential, sufficient physical activity participation forms the basis of long-term psychological and physiological health.¹ Balance, one of the basic motor capacities, is an important prerequisite for learning complex motor skills in childhood and forms the basis for the successful performance of daily and sports-related activities from youth to adulthood.² Balance is the ability to stabilize the body to maintain posture in both static and dynamic situations.³ Static and dynamic balance capacities, which are among the mechanical factors that affect motor development, are known to be very important for participation in games and physical activities from infancy. Balance capacities, posture and balance control, are crucial in daily life to safely accomplish every movement and motor task involving the displacement of body parts or the whole body.⁴ Each sport includes certain motor skills that require the completion of certain postures and movements.⁵ The development of balance skills begins at an early age. Previous studies show that children's balance matures gradually from the age of 7; however, development is individual and balance control does not reflect adult ability until the age of 16 yet.⁶ The most important transitions in motor development usually occur in the first decade of life with balance control established between the ages of 7-10.³ Dynamic and static balance capacity and skills are critical components of basic motor capacity and fundamental movement skills. The study aims to examine the static and dynamic balance capacities of 5-9-year-old children who receive gymnastics training.

MATERIALS AND METHODS

The research was organized following the post-test model with a non-equivalent control group, which is one of the quasi-experimental design types. Experimental and control groups were randomly selected and baseline levels are unknown.

Research group

The research group was formed by adhering to the volunteerism principle after providing necessary information to the institution administrators and parents, out of a total of 101 children between the ages of 5 and 9, including 21 boys and 80 girls, who received gymnastics training.

Data collection tools

The static balance capacity of children between the ages of 5-9 was measured with flamingo balance test and the dynamic balance capacity Y balance test (YBT).

Flamingo balance test

The flamingo balance test was used in the static balance measurements of the children participating in the study. The child tries to balance for 1 minute by getting on the balance beam. Each decrease in this period is recorded as an error, and the number of errors at the end of the period is recorded as the test score^{7,8}.

Y balance test (YBT)

YBT allows the athlete to balance on one foot while extending in three directions with the other foot at the same time as possible. Anterior (Anterior), posterolateral (posterior lateral / diagonal) and posteromedial (posterior medially). It should be ensured that they try 6 times in all directions. After the test trials are completed, each participant should be given a 2-minute rest period and then 3 stretches in each direction should be made⁹.

STATISTICAL ANALYSIS

Arithmetic average and standard deviation, frequency and percentage distribution from general distribution statistics were obtained as data and Independent T test and One Way Anova tests were used to determine the significance levels between variables.

RESULTS AND DISCUSSION

In this research, it is aimed to examine the static and dynamic balance capacity of 5-9-year-old children who receive gymnastics training. In the research conducted by Biswas and Kar in 2018, there was no significant difference in the static balance between 5-6 and 6-7 age groups, while a significant difference was observed in 7-8, 8-9 and 9-10 age groups¹⁰. In the research conducted by Altinkök et al. in 2020, as a result of the flamingo static balance test applied to 223 preschool children, no statistically significant difference was found between the ages of 3-4-5-6, although the average test results were higher in 6-year-old children¹¹. In the research conducted by Fotiadou et al. in 2010, it is aimed to examine the effect of rhythmic gymnastics program on dynamic balance by applying a 16-week rhythmic gymnastics program to 29 children with hearing loss. In the findings of this research, it was observed that the specific rhythmic gymnastics program had a significant improvement in the dynamic balance ability of this deaf sample¹². In the research conducted by Rudd et al. in 2017, Gymnastics was found to be effective in developing stability skills and object control skills without hindering the development of locomotor skills or general coordination¹³. In the research conducted by Pujianto in 2018, It was reported that physical activity has an increasing effect on static and dynamic balance ability in early childhood. The results of the research are similar to the result that both static and dynamic balance development with the age reached in the research¹⁴. According to the gender variable in the research, although static balance arithmetic averages are in favor of girls and dynamic balance arithmetic averages in favor of boys, no statistically significant difference was found.

Table 1: Frequency percentage distributions of gymnastics training children in the 5–9 age group by demographic characteristics, age and gender variable

Age	f	%	Gender	f	%
5 Age	12	11,9	Boy	21	20,8
6 Age	24	23,8			
7 Age	23	22,8	Girl	80	79,2
8 Age	22	21,8			
9 Age	20	19,8	Total	101	100
Total	101	100,0			

In table 1, the highest value in frequency distribution according to the age variable of children is 6 years 24 people 23.8%, 7 years 23 people 22.8%, 8 years 22 people 21.8%, 9 years 20 people 19.8% and 5 years of age 12 people are 11.9%, according to the gender variable, the highest value is 79.2% for girls and 21 for boys 20.8%.

Table 2: One way anova test analysis results according to the age variable of the right lower extremity flamingo balance test applied to determine the static balance capacity of 5–9-year-old children who receive gymnastics training

Basic Motor Capacity					Variable	N	$\bar{X}$	ss	Var. K.	KT	ANOVA Results		
					Age						KO	F	p
Static Balance Capacity The Right Lower Extremity Flamingo Balance Test	5 Age	12	11,58	2,23	G.Between	434,110	108,528	7,958	,000				
	6 Age	24	8,04	3,34									
	7 Age	23	6,65	3,99									
	8 Age	22	5,27	4,50	G. Inside	1309,256	13,638						
	9 Age	20	4,90	3,40									
	Total	101	6,92	4,17	Total	1743,366							

In table 2, a statistically significant difference was found according to the results of the flamingo balance test right lower extremity one-way anova test according to the age variable of the children participating in the research ($f = 7.958$; $p < 0.001$).

Basic Motor Capacity	Variable	N	$\bar{X}$	ss	Var. K.	KT	ANOVA Results		
	Age						KO	F	p
Static Balance Capacity The Left Lower Extremity Flamingo Balance Test	5 Age	12	12,41	3,50	G.Between	466,885	116,721	6,551	,000
	6 Age	24	8,50	3,91					
	7 Age	23	6,47	4,55	G. Inside	1710,560	17,818		

8 Age	22	6,04	4,50
9 Age	20	5,45	4,23
Total	101	7,36	4,66
Total	2177,446		

Table 3: One-way anova test analysis results according to the age variable of the left lower extremity flamingo balance test applied to determine the static balance capacity of 5–9 age group children who receive gymnastics training

In table 3, a statistically significant difference was found according to the flamingo balance test left lower extremity one-way anova test results according to the age variable of the children participating in the research ($f = 6.551$; $p < 0.001$).

Table 4: One way anova test analysis results according to the age variable of the right lower extremity total YBT applied to determine the dynamic balance capacity of 5–9 year- old children who receive gymnastics training

In table 4, a statistically significant difference was found according to the YBT right lower extremity total one-way anova test

Basic Motor Capacity					Variable	N	$\bar{X}$	ss	Var. K.	KT	ANOVA Results		
					Age						KO	F	p
Dynamic Balance Capacity The Right Lower Extremity YBT	Total	5 Yaş	12	60,08	10,79	G.Between	7498,769	1874,692	9,856	,000			
		6 Yaş	24	71,00	14,07								
		7 Yaş	23	81,00	14,49	G. Inside	18260,558	190,214					
		8 Yaş	22	83,63	14,35								
		9 Yaş	20	86,85	13,51								
		Total		101	77,87	16,04	Total	25759,327					

results according to the age variable of the children participating in the research ($f = 9.856$; $p < 0.001$).

Table 5: One-way anova test analysis results according to the age variable of the left lower extremity total YBT applied to determine the dynamic balance capacity of 5–9 years old children who receive gymnastics training

In table 5, a statistically significant difference was found according to the YBT left lower extremity total one-way anova test

Basic Motor Capacity	Variable	N	$\bar{X}$	ss	Var. K.	KT	ANOVA Results		
	Age						KO	F	p
Dynamic Balance Capacity The Left Lower Extremity Total YBT	5 Age	12	63,08	10,41	G.Between	10436,460	2609,115	13,555	,000
	6 Age	24	70,41	13,88					
	7 Age	23	82,04	15,63	G. Inside	18478,075	192,480		
	8 Age	22	89,90	13,81					
	9 Age	20	91,35	13,50					
		Total	101	80,58	17,00	Total	28914,535		

results according to the age variable of the children participating in the research ($f = 13,555$; $p < 0.001$).

Table 6: Independent t test analysis results according to the gender variable of the right lower extremity flamingo balance test applied to determine the static balance capacity of 5–9 year-old children who receive gymnastics training

Basic Motor Capacity	Variable	N	$\bar{X}$	ss	se	t test		
	Gender					t	Sd	p
Static Balance Capacity The Right Lower Extremity Flamingo Balance Test	Boys	21	6,93	4,183	,467	-0,78	99	,938
	Girls	80	6,85	4,246	,926			

In table 6, no statistically significant difference was found according to the results of the flamingo balance test right lower extremity independent t test according to the gender variable of the children participating in the research ($t = -0,78$; $p > 0.005$).

Table 7: Independent t test analysis results according to the gender variable of the left lower extremity flamingo balance test applied to determine the static balance capacity of 5–9-year-old children who receive gymnastics training

Basic Motor Capacity	Variable	N	$\bar{X}$	ss	se	t test		
	Gender					t	Sd	p
Static Balance Capacity The Left Lower Extremity Flamingo Balance Test	Boys	21	7,43	4,762	,532	-298	99	,766
	Girls	80	7,09	4,380	,955			

In table 7, no statistically significant difference was found according to the results of the flamingo balance test left lower extremity independent t test according to the gender variable of the children participating in the research ($t = -298$; $p > 0.005$).

Table 8: Independent t test analysis results according to the gender variable of the right lower extremity total YBT applied to determine the dynamic balance capacity of 5–9 year-old children who receive gymnastics training

Basic Motor Capacity	Variable	N	$\bar{X}$	ss	se	t test

	Gender					t	Sd	p
Dynamic Balance Capacity The Right Lower Extremity Total YBT	Boys	21	81,09	16,01	3,49	1,035	99	,308
	Girls	80	77,02	16,05	1,79			

In table 8, no statistically significant difference was found according to the results of the total YBT right lower extremity independent t test according to the gender variable of the children participating in the research ($t=1,035$; $p>0.005$).

Table 9: Independent t test analysis results according to the gender variable of the left lower extremity total YBT applied to determine the dynamic balance capacity of 5–9-year-old children who receive gymnastics training

Basic Motor Capacity	Variable	N	$\bar{X}$	ss	se	t test		
	Gender					t	Sd	p
Dynamic Balance Capacity The Left Lower Extremity Total YBT	Boys	21	86,14	16,29	3,55	1,699	99	,091
	Girls	80	79,12	16,98	1,89			

In table 9, no statistically significant difference was found according to the results of the total YBT left lower extremity independent t test according to the gender variable of the children participating in the research ($t=1,699$; $p>0.005$).

CONCLUSION

In conclusion, when the static and dynamic balance capacities of 5-9 years old children who receive gymnastics training are examined by age variable, it is thought that while static and dynamic balance control improves with age, gymnastics training has an important effect on the development of balance capacity.

REFERENCES

- Schmutz, E.A., Leeger-Aschmann, C.S., Kakebeeke, T.H., Zysset, A.E., Messerli-Bürgy, N., Stülz, K., Arhab, A., Meyer, A.H., Munsch, S., Puder, J.J., Jenni, O.G., Kriemler, S. (2020). Motor competence and physical activity in early childhood: stability and relationship. *Front Public Health*, 8(39). Published online 2020 Feb 21. doi: 10.3389/fpubh.2020.00039
- Gebel, A., Lesinski, M., Behm, D.G., Granacher, U. (2018). effects and dose–response relationship of balance training on balance performance in youth: a systematic review and meta-analysis. *Sports, Med* 48, 2067–2089. <https://doi.org/10.1007/s40279-018-0926-0>
- Mickle, K.J., Munro, B.J., Steele, J.R. (2011). Gender and age affect balance performance in primary school-aged children. *Journal of Science and Medicine in Sport*. 14(3), 243–248.
- Brachman, A., Kamieniarz, A., Michalska, J., Pawłowski, M., Słomka, K. J., & Juras, G. (2017). Balance training programs in athletes – a systematic review, *Journal of Human Kinetics*, 58(1), 45–64. doi: <https://doi.org/10.1515/hukin-2017-0088>
- Schedler, S., Brueckner, D., Kiss, R. & Muehlbauer, T. (2020). Effect of practice on learning to maintain balance under dynamic conditions in children: are there sex differences?. *BMC Sports Sci Med Rehabil* 12, 15. <https://doi.org/10.1186/s13102-020-00166-z>
- Kolic, J., O'Brien, K., Bowles, K., Iles, R., Williams, C.M. (2020). Understanding the impact of age, gender, height and body mass index on children's balance. *Acta Paediatr.* 2020; 109: 175– 182. <https://doi.org/10.1111/apa.14933>
- Niessner, C., Utesch, T., Oriwoll, D., Hanssen-Doose, A., Schmidt, S.C. Woll, A., Bös, K. and Worth, A. (2020). Representative percentile curves of physical fitness from early childhood to early adulthood. The Momo Study. *Front. Public Health*, <https://doi.org/10.3389/fpubh.2020.00458>
- Folletto, J.C., Pereira, K. R.G., and Valentini, N.C. (2016). The effects of yoga practice in school physical education on children's motor abilities and social behavior. *Int J Yoga*, (2): 156–162.
- Engquist, K.D., Smith, C.A., Chimera, N.J. (2015). Performance comparison of student-athletes and general college students on the functional movement screen and the Y balance test. *J Strength Cond. Res.* 29(8), 2296–2303.
- Biswas, T. and Kar, R. (2018). A cross-sectional study of static and dynamic balance among school children. *International Journal of Physiology, Nutrition and Physical Education*, 3(2), 1190–1192.
- Altinkok, M., Esen H.T., Eraslan, M., Gurbuz, C., Seran, B., Kurnaz, M., Eravsar, H. (2020). Farklı hareket eğitimi alan okulöncesi çocukların denge ve esneklik kapasitelerinin incelenmesi. *Sportive*, 3 (1), 41–52.
- Fotiadou, E., Giagazoglou, P., Kokaridas Angelopoulou, D.N. Tsimaras, V. & Tsorbatzoudis, C. (2010). Effect of rhythmic gymnastics on the dynamic balance of children with deafness. *European Journal of Special Needs Education*, 17:3, 301–309, DOI: 10.1080/08856250210162211
- Rudd, J.R., Barnett, L.M., Farrow, D., Berry, J., Barkoles, E., Polman, R. (2017). Effectiveness of a 16 week gymnastics curriculum at developing movement competence in children. *Journal of Science and Medicine in Sport*, 20(2), 164–169.
- Pujianto, D. (2018). Physical activity and static balance on early childhood. *Journal of Physical Education, Sport, Health and Recreation*. 7(2).

WILL MY SENSATIONS AFFECT THE RESULT OF THE COMPETITION? ALEXITHYMIC BEHAVIOR OF TURKISH REFEREES

Murat Şentuna^{*1}, Güçlü Özen², Esin Kıratlı³, Kaan Serter⁴, Arda Çaylı⁵

^{1*}Department of Sports Management Faculty of Sport Sciences, Aydın Adnan Menderes University, Aydın-Türkiye

²Department of Exercise and Sport Sciences, Faculty of Health Sciences, Demokrasi University, İzmir-Türkiye

³Ministry of Youth and Sports, Istanbul Youth and Sports Provincial Directorate, İstanbul-Türkiye

⁴Küçükçekmece Munis Faik Ozansoy Secondary School, Ministry of National Education, İstanbul-Türkiye

⁵Temelli Toki Secondary School, Ministry of National Education, Ankara-Türkiye

Corresponding author: murat.sentuna@adu.edu.tr

ABSTRACT

This study was conducted to determine the alexithymic behavior differences of Turkish referees who manage sports competitions according to some variables. The sample of the study, carried out leagues and championships in Turkey, selected by the simple random sampling model, which arbitrates in 10 sports branches (n=560) candidates, national and international referees. Toronto Alexithymia Scale (TAS-26) was used to determine the referees' alexithymic characteristics. The responses of the referees to the scale were tested with factor analysis and collected under four sub-dimensions. The gender, age, marital status and referee levels of the referees were taken into account as independent variables. The means of these four sub-dimensions were compared using independent samples t-test and analysis of variance (ANOVA). In the statistical analysis performed by gender, the referees differed in the Difficulty to Identify and to Distinguish between Feelings and Bodily Sensations and Reduced Daydreaming ($p < 0.05$), by marital status the referees differed in the Externally Oriented Thinking ($p < 0.01$), by ages the referees, differed in Reduced Daydreaming and Externally Oriented Thinking ($p < 0.05$) and by referee levels the referees differed in Reduced Daydreaming, Externally Oriented Thinking and Difficulty Describing Feelings ($p < 0.05$). The findings showed that the referees' alexithymic characteristics had emotional behaviors that would affect the result in a sports competition.

KEYWORDS: Alexithymia, sports, referee, sensation, daydreaming.

I. INTRODUCTION

The concept of alexithymia, which means "no words for emotions" in Greek and is a concept that has been accepted very quickly by psychiatrists.¹ It is mainly known as difficulty in identifying and expressing emotions and difficulty in distinguishing between emotions and physical sensations.² Taylor (1994) states that these features create a deficiency in the cognitive processing and regulation of emotions.³ To prove the existence of alexithymia, clinical observations and answers by which individuals can express themselves are required and the first scientific research in this area was conducted by Taylor et al.⁴ Alexithymia, a concept that can be used for innovative clinical developments has started to spread over a wide area.⁵ Pennebaker states that the emotional stimulation of the individual focuses on his bodily elements due to the inadequacy of his emotions while in the cognitive process. Based on this, Pennebaker suggests that alexithymic traits are associated with a lack of self-reflection and emotional inhibition.⁶ Lazarus defined emotion as a result of cognitive evaluations of the individual's interaction with the environment.⁷ At the same time, the concept of alexithymia has been associated with "mental state understanding" due to the very limited capacity of individuals to symbolize their own emotions, to describe and express emotional experiences in detail.⁸ In the researches it is known that sociopaths defined as an antisocial personality disorder in the social environment and some people in the society show alexithymic features.⁹⁻¹⁰⁻¹¹ Alexithymic people experience confusion when trying to define their emotions and this situation negatively affects their ability to organize their emotions appropriately.¹² Since alexithymic people have insufficient emotional experiences, they have difficulty putting themselves in other people's and understanding their emotional state.¹³ It has been observed that they have difficulty defining the sad, fearful or angry facial expression of the other person.¹² In addition to being cold and distant in their interpersonal relationships, these people are not empathic and have insufficient self-esteem.¹⁴ In fact, alexithymic people cannot use appropriate facial expressions.¹⁵ These people also find it difficult to give appropriate social responses because they are not sufficiently aware of social norms.¹² Because of their operational thinking tendency, they focus on finding fast and concrete solutions to the problems encountered.¹⁶ They also don't get to the root of the problems, they only deal with superficial causes.¹⁷ If sports activities are supported with physiological, social and psycho-genetic concepts, they make a significant contribution to individual and social development. This situation makes it inevitable to follow up and investigate alexithymic features in athletes.¹⁸ The referee's world is interesting. Generally, whether they manage the competition well or badly, they cannot make anyone happy, they get reaction. For this reason, the psychology of the referees and the emotions they feel in the competition are very important. During the competition, they can directly affect the result with their decisions and their gender, age, marital status, and referee experiences affect their emotional behaviors.²⁶ this study aimed to determine the alexithymic behaviors of the referees who manage and make decisions in sports competitions.

2. METHODOLOGY

This study is an experimental study to investigate the effects of personal sensations of sports referees on the results of the competitions. The present study used a descriptive and correlational research design.

2.1. Sample

The sample of the study, carried out leagues and championships in Turkey, selected by the simple random sampling model, which arbitrates in 10 sports branches (n=560) candidates, national and international referees. The sports branches selected and the number of participants are shown in Table 1.

Table 1. Number and percentage of participants by sport branches		
	N	%
Athletics	33	5.9
Badminton	29	5.2
Basketball	74	13.2
Football	72	12.9
Handball	50	8.9
Table Tennis	40	7.1
Taekwondo	48	8.6
Tennis	34	6.1
Volleyball	111	19.8
Swimming	69	12.3
Total	560	100

2.2. Measures

In this study, Toronto Alexithymia Scale (TAS-26) developed by Taylor et al. (1985) was used. To determine the presence of alexithymia, the TAS-26 scale seeks to find the inability to distinguish between physical sensations and feelings, and the inability to describe emotions. The scale consists of 26 questions and 4 dimensions. Some of the questions are reverse coded (1, 5, 6, 9, 11, 12, 13, 15, 16, 21 and 24). The first dimension explains Difficulty to Identify and Distinguish between Feelings and Bodily Sensations, the second dimension Reduced Daydreaming, the third dimension Externally Oriented Thinking and the fourth dimension Difficulty Describing Feelings. In TAS-26 each item is responded to using a five-point Likert scale: (1) strongly disagree, (2) somewhat disagree, (3) neither agree nor disagree, (4) somewhat agree, (5) strongly agree.

3. STATISTICAL ANALYSIS

Factor analysis was applied to 26 questions on the TAS-26 scale. The results of the factor analysis revealed 4 factors consistent with the structure of alexithymia, by the TAS-26 scale. These 4 dimensions mentioned in this study explain 51.63% of the total variance. The first factor explains 21.35% of the total variance, the second factor explains 16.95% of the total variance, the third factor explains 8.86% of the total variance, and the fourth factor explains 4.46% of the total variance. Among the average of these factors, the differences between the genders and marital status of the referees were measured with the t-test, and the differences between their ages and the level of refereeing were measured by the ANOVA test method. To determine among which groups the differences in ANOVA test results, Post hoc (Tukey HSD) test was used.

4. RESULTS

According to the answers given by the participants, the Cronbach alpha coefficient of the TAS-26 scale was found 0.85. The questions in the TAS-26 scale were evaluated with factor analysis according to the responses given by the participating referees. The results found are shown in Table 2.

Table 2. TAS-26 rotated factor matrix						
Factor 1 - Difficulty to Identify and to Distinguish between Feelings and Bodily Sensations		Factors				
		1	2	3	4	
25	I don't know what's going on inside me	0.77				
22	I find it hard to describe how I feel about people	0.73				
20	I have feelings that I can't quite identify	0.72				
26	I often don't know why I am angry	0.70				
4	I am often confused about what emotion I am feeling	0.69				
14	When I am upset, I don't know if I am sad, frightened, or angry	0.68				
10	I have physical sensations that even doctors don't understand	0.67				
19	I prefer just let things happen rather than to understand why they turned out that way	0.62				
8	It is difficult for me to find the right words for my feelings	0.59				
23	People tell me to describe my feelings more	0.49				

Factor 2 - Reduced Daydreaming		
11*	It's not enough for me that something gets the job done; I need to know why and how it works	0.82
13*	I prefer to analyse problems rather than just to describe them	0.76
1*	When I cry I always know why	0.68
24*	One should look for deeper explanations	0.67
9*	I like to let people know where I stand on things	0.65
12*	I am able to describe my feelings easily	0.64
21*	Being in touch with emotions is essential	-0.57
Factor 3 - Externally Oriented Thinking		
18	I daydream rarely	0.73
15*	I use my imagination a great deal	0.71
2	Daydreaming is a waste of time	0.65
16*	I spend much time daydreaming whenever I have nothing else to do	0.63
5*	I often daydream about the future	0.61
17	I am often puzzled by sensations in my body	-0.57
Factor 4 - Difficulty Describing Feelings		
3	I wish I were not so shy	-0.59
7	Knowing the answers to problems is more important than knowing the reasons for the answers	0.51
6*	I seem to make friends as easily as others do	-0.50

* Negatively keyed items.

According to the factor analysis, 4 factors were determined following the original of scale. These factors were Factor 1 - Difficulty to Identify and Distinguish between Feelings and Bodily Sensations, Factor 2 - Reduced Daydreaming, Factor 3 - Externally Oriented Thinking and Factor 4 - Difficulty Describing Feelings. 10 questions (4, 8, 10, 14, 19, 20, 22, 23, 25 and 26) explained Factor 1, 7 questions (1, 9, 11, 12, 13, 21 and 24) explain Factor 2, 6 questions (2, 5, 15, 17 and 18) explain Factor 3 and 3 questions (3, 6 and 7) explain Factor 4.

Table 3. Independent samples test (T-test) results according to the gender and marital status of the referees

Dimensions			N	X	SS	t test		
						t	sd	p
Gender	Factor 1	Male	351	2.24	0.80	2.443	558	.015
		Female	209	2.08	0.65			
	Factor 2	Male	351	2.32	0.60	2.021	558	.044
		Female	209	2.22	0.53			
	Factor 3	Male	351	2.59	0.56	1.525	558	.128
		Female	209	2.51	0.63			
	Factor 4	Male	351	2.67	0.69	1.787	558	.074
		Female	209	2.56	0.73			
Marital Status	Factor 1	Single	335	2.17	0.74	-.466	558	.641
		Married	225	2.20	0.77			
	Factor 2	Single	335	2.28	0.55	-.305	558	.760
		Married	225	2.29	0.63			
	Factor 3	Single	335	2.48	0.60	-4.219	558	.000
		Married	225	2.69	0.54			
	Factor 4	Single	335	2.60	0.72	-1.202	558	.230
		Married	225	2.67	0.68			

A independent samples test (T-test) was calculated on referees' gender and marital status. Significant differences were found between the genders of the participants in Factors 1 [$t(558)=2.443$; $p<0.05$] and 2 [$t(558)=2.021$; $p<0.05$]. Male referees' results were more positive in Factor 1 (Difficulty to Identify and to Distinguish between Feelings and Bodily Sensations; $X=2.24$) and Factor 2 (Reduced Daydreaming; $X=2.32$) than female referees. A significant difference was found between the marital status of the participants in Factors 3 [$t(558)=4.219$; $p<0.01$]. Married referees' results were more positive in Factor 3 (Externally Oriented Thinking; $X=2.67$).

Table 4. ANOVA test results according to the ages and referee levels of the referees

	Dimensions	N	X	SS	ANOVA		
					F	p	Tukey HSD
Age	Factor 1	Age 18-24	181	2.21	0.75	2.700	.055
		Age 25-34	179	2.28	0.80		
		Age 35-44	116	2.05	0.68		
		Above Age 45	84	2.08	0.72		
	Factor 2	Age 18-24	181	2.25	0.55	3.797	.010
		Age 25-34	179	2.27	0.51		Above Age 45-Age 18-24 0.225
		Age 35-44	116	2.22	0.55		Above Age 45- Age 35-44 0.201
		Above Age 45	84	2.47	0.76		
	Factor 3	Age 18-24	181	2.40	0.61	11.053	.000
		Age 25-34	179	2.55	0.57		Age 35-44-Age 18-24 0.254
		Age 35-44	116	2.65	0.56		Above Age 45-Age 18-24 0.407
		Above Age 45	84	2.81	0.50		Above Age 45-Age 25-34 0.256
	Factor 4	Age 18-24	181	2.65	0.70	.221	.882
		Age 25-34	179	2.60	0.75		
		Age 35-44	116	2.62	0.71		
		Above Age 45	84	2.67	0.61		
Referee Level	Factor 1	Candidate	315	2.20	0.76	1.020	.361
		National	211	2.16	0.72		
		International	34	2.02	0.80		
	Factor 2	Candidate	315	2.23	0.53	3.168	.043
		National	211	2.35	0.61		National-Candidate 0.123
		International	34	2.36	0.78		
	Factor 3	Candidate	315	2.49	0.61	5.446	.005
		National	211	2.66	0.55		National-Candidate 0.170
		International	34	2.58	0.55		
	Factor 4	Candidate	315	2.60	0.73	4.075	.018
		National	211	2.72	0.69		National-International 0.328
		International	34	2.39	0.48		

A one-way analysis of variance (ANOVA) was calculated on referees' ages and referee levels. Significant differences were found between the ages of the participants in Factors 2 and 3 [$F_{\text{FACTOR}_2}(3,556)=3.797, p<0.01$ / $F_{\text{FACTOR}_3}(3,556)=11.053, p<0.01$]. A Tukey post hoc test revealed that the time to complete the problem was statistically significant. The difference was found for Factor 2, from Above Age 45 to Age 18-24 ($X_{\text{difference}}=0.225$), and Above Age 45 to Age 35-44 ($X_{\text{difference}}=0.201$) and toward Above Age 45. The difference was found for Factor 3, from Age 35-44 to Age 18-24 ($X_{\text{difference}}=0.254$) toward Age 35-44, from Above Age 45 to Age 18-24 ($X_{\text{difference}}=0.407$), and Above Age 45 to Age 25-34 ($X_{\text{difference}}=0.256$) and toward Above Age 45. Also significant differences were found between the Referee Level of the participants in Factors 2, 3 and 4 [$F_{\text{FACTOR}_2}(2,557)=3.168, p<0.05$ / $F_{\text{FACTOR}_3}(2,557)=5.446, p<0.01$ / $F_{\text{FACTOR}_4}(2,557)=4.075, p<0.05$]. A Tukey post hoc test revealed that the time to complete the problem was statistically significant. The difference was found for Factor 2, from National to Candidate ($X_{\text{difference}}=0.123$) toward National, for Factor 3, from National to Candidate ($X_{\text{difference}}=0.170$) toward National and for Factor 4, from National to International ($X_{\text{difference}}=0.328$) toward National.

5. DISCUSSION

The aim of this study was to determine the alexithymic behaviors of the referees who manage and make decisions in sports competitions. Today, sports is one of the most important environments where people can communicate and interact with each other. People participate in sports activities with different identities as participants or audience in their daily lives. Referees are the most authoritative persons who objectively manage sports events and are responsible for enforcing the rules with their decisions. For the game to be played fairly or to enforce penalties, they must have a thorough knowledge of the rules. Referees should be able to resolve the emotional, cognitive, behavioral, social and health needs of the players as quickly as possible.¹⁹⁻²⁰ Referees also have to control their emotions. Because it helps eliminate personal emotions and prejudices. The emotional response of the referees to everything that happens on the field must be the same. However, it is very difficult to always focus on the game very well. One of the reasons for this can be alexithymia. Alexithymic people have emotional difficulties in interpersonal relationships. For this reason, these people are static and distant in their social relationships. Whereas, referees interact with athletes, coaches and spectators in a sporting event. To make the right decision, it is not enough just to apply the

rules. Sometimes they may need to behave according to the atmosphere. They may even have to explain their decisions to athletes and coaches. Therefore, they must be able to communicate with them. If a referee has alexithymic characteristics, it is very difficult to do this. This situation may vary depending on whether it is a man or a woman. In our study, it was determined that male referees had more difficulty identifying and to distinguish between feelings and bodily sensations than female referees. It is also understood that men reduced daydreaming less than women. In some previous studies, it was investigated whether there is a difference in alexithymic behavior between the genders.²¹⁻²¹ In these studies, it was determined that men can express their emotions less than women on average. No study on alexithymia with referees has been found. One study found differences between men and women in terms of life satisfaction and dreaming.²³ It has been determined that women dream more than men. These findings support the results of this study. In a study conducted among Finnish people, it was found that married women are less alexithymic than single women, and there is no significant relationship between married and single men.²⁴ However, no study was found among married and single people in the field of sports. Another study on alexithymia found that the prevalence of Alexithymia increased steadily with increasing age.²⁵ In this study, it was found that older referees were less daydreaming and externally oriented. When alexithymic differences were examined according to the level of refereeing, it was found that national referees reduced daydreaming and thought externally oriented compared to candidate referees, and they had more difficulty describing their feelings than international referees.

6. CONCLUSION

According to the statistical analysis results of this study, it was understood that the referees experienced difficulty to identify and to distinguish between feelings and bodily sensations, reduced daydreaming, externally oriented thinking, difficulty describing feelings at their age, gender, marital status and refereeing levels.

7. ACKNOWLEDGEMENT

We sincerely thank all the referees who participated in this research and all the federations for their great support in answering our scale.

8. AUTHORS CONTRIBUTION STATEMENT

Murat Şentuna devised the project, made conceptualization and numerical calculations to this study. Kaan Serter, Esin Kıratlı and Arda Çaylı gathered the data and entered it for statistical interpretation. Güçlü Özen analyzed these data and necessary inputs were given towards the designing of the manuscript. All authors discussed the results and commented on the manuscript.

9. CONFLICT OF INTEREST

Conflict of interest declared none.

10. REFERENCES

1. Sifneos PE. The prevalence of "alexithymic" characteristics in psychosomatic patients. *Psychotherapy and Psychosomatics*, 1973; 22, 255-262.
2. Zimmermann G, Rossier J, Stadelhofen FM, Gaillard F. Alexithymia Assessment and Relations with Dimensions of Personality. *European Journal of Psychological Assessment*. 2005; 21(1):23-33.
3. Taylor GJ. The alexithymia construct: Conceptualization, validation, and relationship with basic dimensions of personality. *New Trends in Experimental and Clinical Psychiatry*. 1994; 10, 61-74.
4. Taylor GJ, Ryan D, Bagby RM. Toward the development of a new self-report alexithymia scale. *Psychotherapy & Psychosomatics*. 1985; 44, 191-199.
5. Şaşıoğlu M, Gülol Ç, Tosun A. The Concept of Alexithymia. *Current Approaches in Psychiatry*. 2013; 5(4):507-527.
6. Pennebaker JW. Confession Inhibition and Disease. *Adv Exp Soc Psychol*. 1989; 22: 211-244.
7. Lazarus RS. Cognitive-motivational-relational theory of emotion. In *Emotions in sport*. 2000: 39-63.
8. Ogrodniczuk JS, Piper WE, Joyce AS. Effect of alexithymia on the process and outcome of psychotherapy: a programmatic review. *Psychiatry Res*. 2011; 190: 43-48.
9. Tolmunen T, Heliste M, Lehto SM, Hintikka J, Honkalampi K, Kauhanen J. Stability of alexithymia in the general population: an 11-year follow-up. *Comprehensive Psychiatry*. 2011; 52: 536-541.
10. Henry JD, Phillips LH, Maylor EA, Hosie J, Milne AB, Meyer C. A new conceptualization of alexithymia in the general adult population: Implications for research involving older adults. *Journal of Psychosomatic Research*. 2006; 60: 535-543.
11. Mattila AK, Salminen JK, Nummi T, Joukamaa M. Age is strongly associated with alexithymia in the general population. *Journal of Psychosomatic Research*. 2006; 61: 629-635.
12. Timoney LR, Holder MD. Emotional Processing Deficits and Happiness Assessing the Measurement, Correlates, and Well-Being of People with Alexithymia. 2013. Canada: Springer.
13. Sifneos PE. Short-term Psychotherapy and Emotional Crisis. 1972. Cambridge: Harvard University Press.
14. Montebanacci O, Codispoti M, Baldaro B, Rossi N. Adult attachment style and alexithymia. *Personality and Individual Differences*. 2004;36, 499-507.
15. Lesser IM. Current Concepts In Psychiatry: Alexithymia. *The New England Journal of Medicine*. 1985; 312(11), 690-692

16. Taylor GJ, Bagby RM, Parker JD. Disorders of affect regulation: Alexithymia in medical and psychiatric illness. 1999. Cambridge, UK: Cambridge University Press.
17. Epözdemir H. Aleksitimi: Psikolojik Bir Semptom Mu, Yoksa Bir Kişilik Özelliği Mi? Türk Psikoloji Yazıları. 2012; 15(30), 25-33.
18. Zekioğlu A, Türkmen M, Tatar A, Göral M. Spor Yapan Kişilerin Aleksitimi Ve Duygusal Zeka Düzeylerinin Karşılaştırılması. Akademik Spor Sağlık ve Tıp Bilimleri Dergisi. 2014; 12(4), 121-128.
19. Berkowitz MW, Grych JH. Fostering goodness: Teaching parents to facilitate children's moral development. Journal of Moral Education. 1998; 27, 371-391.
20. Arthur-Banning SG, Paisley K, Wells MS. Promoting Sportsmanship in Youth Basketball Players: The Effect of Referees' Prosocial Behavior Techniques. Journal of Park and Recreation Administration. 2007; 25, 96-114.
21. Heesacker M, Wester SR, Vogel DL, Wentzel JT, Mejia-Millan CM, Goodholm CR. Gender-based emotional stereotyping. Journal of Counseling Psychology. 1999;46, 483-495.
22. Wester SR, Vogel DL, Pressly PK, Heesacker M. Sex differences in emotion. The Counseling Psychologist. 2002; 30, 630-652.
23. Mar RA, Malia FM, Litvack A. How daydreaming relates to life satisfaction, loneliness, and social support: The importance of gender and daydream content. Consciousness and Cognition. 2012; 21, 401-407.
24. Salminen JK, Saarijärvi S, Äärelä E, Toikka T, Kauhanen J. Prevalence of alexithymia and its association with sociodemographic variables in the general population of Finland. Journal of Psychosomatic Research. 1999; 46(1), 75-82.
25. Mattila AK, Salminen JK, T, Joukamaa M. Age is strongly associated with alexithymia in the general population. Journal of Psychosomatic Research. 2006; 61(5), 629-635.
26. Guillén F, Feltz DL. A Conceptual Model of Referee Efficacy. Frontiers in Psychology. 2011; 2, 1-5.

THE INVESTIGATION OF THE EFFECT OF BASIC FOOTBALL EDUCATION ON PULMONARY FUNCTION TEST AND CARDIOPULMONARY EXERCISE TEST PARAMETERS IN SMOKER HEARING-IMPAIRED ATHLETES

Mustafa KAYA^{1*} & Yaşar KÖROĞLU²

1. Assoc Professor, Department of Teaching, Faculty of Sport Science Erciyes University Kayseri/Turkey

2.PhD, Ministry of Education, Kayseri/Turkey

Corresponding author: mustafakayaerciyes@gmail.com

ABSTRACT

In this study, our aim was to examine the pulmonary function tests and cardiopulmonary exercise tests parameters after an 8-week basic football education of hearing-impaired athletes who smoke. The experimental group included 12 volunteers who were in the age range of 18-22, smoked one package of cigarettes a day and attended basic football education for 45 min 3 days a week for 8 weeks, and the control group included 12 nonsmokers hearing-impaired volunteers. A significant difference was found between Forced Expiratory Volume in 1 Second, vital capacity and maximum voluntary ventilation values in the pre-test and post test values of the pulmonary function test parameters in the experimental and control groups. A significant difference was found in maximal oxygen consumption, carbon dioxide production and respiratory rate values in the pre test and post test values of the cardiopulmonary exercise test parameters in experimental and control groups. Only a significant difference was found in oxygen consumption values in the pre test. Consequently, although an increase occurred in the pulmonary and cardiopulmonary exercise values of both groups, the significant difference that was found when the pulmonary and cardiopulmonary exercise values of the smoker participants were compared with the test values of the nonsmoker group suggests that smoking causes a restraint in the values of pulmonary and cardiopulmonary exercise tests.

KEYWORDS: Pulmonary function test, cardiopulmonary exercise test, Hearing-Impaired.

INTRODUCTION

Football is a sport in which aerobic and anaerobic efforts are used respectively and a series of actions are performed coordinately and requiring muscular and cardiorespiratory conditions.¹ Smoking through long ages causes the occurrence of many clinical situations from the impairment of some physiological functions in the pulmonary system and the effect on lung volume and capacities, to cancer.² The effects of smoking on lungs are directly proportionate to the amount and time of the smoking. Pulmonary function tests (PFT), a method ensuring lung functions to be measured, is a simple and useful measurement technique to diagnose the diseases related to lungs, notably COPD.³ There is increased resistance due to obstruction and inflammation in the airways in lung diseases. Accordingly, alterations are determined in pulmonary function tests. While FEV1(l), FVC(l) and FEV1/FVC rates decrease, functional residual capacity, residual volume and total lung capacity increase.⁴ Cardiopulmonary exercise tests (CPET) are important tests used to search exercise tolerance mechanisms and the reasons of the intolerance. It helps to find out the factors restricting the exercise as well as to determine the functional reserves of all organs playing role in the exercise.⁵ Today, chemicals in the content of cigarettes are closely related to many diseases. Exhaustive epidemiologic studies emphasize that smoking is an important risk factor related to almost all non-communicable chronic degenerative diseases. COPD comes first among these diseases. Exercise tests in KOAH can be performed for the purposes such as determining exercise capacity, revealing the pathologies causing exercise restriction, planning the exercise training in pulmonary rehabilitation, determining the specific treatments to increase exercise tolerance and evaluating the response to the treatment. Exercise tests can be performed by using devices such as bicycle ergometer or treadmill, thus exercise capacity can be determined by showing maximum oxygen consumption ($\dot{V}O_{2max}$, %) value.⁶ The fact that smoking is common in hearing-impaired individuals and that there is not enough knowledge of the pulmonary test and cardiopulmonary exercise test parameters about hearing-impaired individuals led this study to be conducted. In this study, it was objected to examine the pulmonary function tests and cardiopulmonary exercise tests parameters after an 8-week basic football education of smoker hearing-impaired athletes.

METHODOLOGY

Study Group

Total 24 male volunteers participated in the study. The experimental group included 12 volunteers who were at the age range of 18-22, smoked one package of cigarette a day and attended basic football education for 45 min 3 days a week for 8 weeks, and the control group included 12 nonsmokers hearing-impaired volunteers. Pretest and posttest values of the participants were obtained, and the test values of the smoker and nonsmoker hearing-impaired individuals were compared.

Research Model

Measurement of height and weight

The heights of the athletes were measured by the height measurement scale (0.1 cm accuracy), with bare feet or socks, and the body weights were measured with a scale (0.1 kg accuracy) while the athletes were wearing shorts. Body mass indexes were determined by dividing the body weights by the square of the heights.⁷ All cases were questioned for smoking history, presence

of comorbidities, the medical treatment they were undergoing and the presence of oxygen concentrator and nebulizer before the physical examination.

Pulmonary function (PFT) and Cardiopulmonary exercise tests (CPET)

The measurement of the pulmonary parameters was performed by the Cosmed Pony FX device. Before the measurement, the device was calibrated. The subjects sat on a chair. They were fitted with spirometer mouthpiece snugly and a nose clip was worn to keep them from breathing air out through their noses. The measurements were repeated three times with 5 min intervals, and the best value was recorded. Among the pulmonary function tests, forced expiratory volume in 1 second (FEV1) (l), vital capacity (VC) (l), forced vital capacity (FVC) (l) and maximum voluntary ventilation (MVV) (l/min) values were measured. All cases were undergone cardio pulmonary exercise test with symptom-limited and increasing level bicycle ergometer via 1999 ZAN 500 device. After providing mask and other attachments, the procedure was performed under electrocardiography, blood pressure and oxygen saturation monitoring. After the basal evaluation, warm-up exercises were done at the speed of 50-60 rpm for 3 minutes. Then, the graded increasing workload was performed. The workload increased 15 watt per minute by practicing Wasserman protocol. In symptom-limited CPET practice, the reasons for the exercise test termination were stated. Heart rate (HR/min), oxygen consumption (VO_2 l/min), carbon dioxide production VCO_2 (l/min), maximal oxygen consumption VO_2 max (%) and Respiratory rate VE (l/min) was evaluated by CPET.

STATISTICAL ANALYSIS

A normality test was performed for measurement values, and it was determined that the measurement values of the participants were consonant with the normal distribution. The homogeneity of the variances was controlled by Levene's test statistics. In the comparison of in-group pretest and posttest measurement values, paired sample t-test was used. In the comparison of between-groups, the change and significance of the measurement values was controlled by Repeated Measures Analysis of Variance. The analysis of the data was performed via IBM Statistics SPSS 25.0 software.

RESULT & DISCUSSION

In this part of the research, statistical analysis and interpretation of the data obtained are given.

Table: 1. The Descriptive Statistics of the Demographic Characteristics of the Experimental and Control Groups

		Experimental Group (n= 12)	Control Group (n= 12)
Variables		$\bar{X} \pm SD$	$\bar{X} \pm SD$
Age (Year)	Pre test	20,1 $\pm$ 1,8	19,6 $\pm$ 1,8
	Post test	20,1 $\pm$ 1,8	19,6 $\pm$ 1,8
Height (cm)	Pre test	170,7 $\pm$ 9,5	167,1 $\pm$ 9,5
	Post test	170,7 $\pm$ 9,5	167,1 $\pm$ 9,5
Body weight (kg)	Pre test	63,5 $\pm$ 10,4	61,2 $\pm$ 10,2
	Post test	63,3 $\pm$ 9,8	60,1 $\pm$ 9,3

In Table 1, age, height and body weight means and standard deviations of the experimental and control group are given. The age average of the experimental group was calculated as 20,1 $\pm$ 1,8 years, and the height average as 170,7 $\pm$ 9,5 cm. Pretest body weight was determined as 63,5 $\pm$ 10,4 kg, and posttest body weight as 63,3 $\pm$ 9,8 kg. The age average of the control group was found as 19,6 $\pm$ 1,8 years, and the height average as 167,1 $\pm$ 9,5 cm. Pretest body weight was determined as 61,2 $\pm$ 10,2 kg, and posttest body weight as 60,1 $\pm$ 9,3 kg.

Table: 2. The Comparison of the PFT Parameters of the Experimental and Control Group

		Experimental Group (n= 12)	Control Group (n= 12)	Group*Measurement			
Variables	Test	$\bar{X} \pm SD$	$\bar{X} \pm SD$	t	p	F	P
FEV1 (l)	Pre test	3,7 $\pm$ 0,4	4,4 $\pm$ 0,4	-4,264	0,000[#]	5,395	0,030⁺
	Post test	4,0 $\pm$ 0,5	4,9 $\pm$ 0,6	-4,309	0,000[#]		
	t	-4,341	-5,303				
	p	0,001[*]	0,000[*]				
VC (l)	Pre test	3,6 $\pm$ 0,19	4,0 $\pm$ 0,1	-3,763	0,001[#]	2,555	0,124
	Post test	3,6 $\pm$ 0,4	4,5 $\pm$ 0,1	-5,383	0,000[#]		
	t	-0,018	-3,239				
	p	0,986	0,008[*]				
FVC (l)	Pre test	3,6 $\pm$ 0,4	3,9 $\pm$ 0,5	-1,632	0,117	1,003	0,328
	Post test	3,8 $\pm$ 0,4	4,2 $\pm$ 0,7	-2,001	0,058		
	t	-2,167	-2,538				
	p	0,053	0,028[*]				
MVV (l/min)	Pre test	141,2 $\pm$ 10,0	155,3 $\pm$ 15,8	-2,620	0,016[#]		

Post test	143,1±8,3	163,5±14,1	-4,321	0,000[#]	4,115	0,054
t	-0,702	-5,718				
p	0,497	0,000[*]				

FEV1: Forced Expiratory Volume in 1 Second, VC: vital capacity, FVC: forced vital capacity, MVV: maximum voluntary ventilation

* $p < .05$ Paired Sample t-Test [#] $p < .05$ Unpaired Two-Sample t-Test.

In Table 2, the analysis results of the comparison of PFT parameters of the experimental and control groups were presented. When the experimental and control group values were examined, the FEV (l), VC (l) and MVV (l / min) pre-test and post-test values were found to be significant, while the FVC (l) value pre-test and post-test values were not found significant (Table 2).

Table: 3. The Comparison of the Cardiopulmonary Exercise Test Parameters of the Experimental and Control Groups

		Experimental Group (n= 12)	Control Group (n= 12)	Group*Measurement			
Variables	Test	$\bar{X} \pm SD$	$\bar{X} \pm SD$	t	p	F	p
HR (p/min)	Pre test	76,6±4,4	75,9±7,2	0,275	0,786	0,001	0,999
	Post test	76,6±4,4	75,9±7,2	0,275	0,786		
	t	.	.				
	p	.	.				
VO2 (l/min)	Pre test	1,4±0,04	1,5±0,3	-3,082	0,005[#]	0,001	0,999
	Post test	1,5±0,05	1,6±0,8	-1,722	0,099		
	t	-5,405	-2,787				
	p	0,000[*]	0,018[*]				
VO2 max (%)	Pre test	59,7±3,2	68,0±1,9	-7,772	0,000[#]	0,001	0,971
	Post test	61,9±5,9	70,2±1,6	-4,784	0,000[#]		
	t	-1,967	-10,110				
	p	0,075	0,000[*]				
VCO2 (l/min)	Pre test	1,4±0,5	1,4±0,3	-2,476	0,021[#]	0,852	0,366
	Post test	1,5±0,3	1,5±0,4	-3,869	0,001[#]		
	t	-5,946	-4,417				
	p	0,000[*]	0,001[*]				
VE (l/min)	Pre test	44,4±1,3	46,8±1,3	-4,506	0,000[#]	0,134	0,718
	Post test	44,7±1,4	48,4±1,2	-4,961	0,000[#]		
	t	-6,009	-4,530				
	p	0,000[*]	0,001[*]				

Hr: Heart rate per minute, VO₂: oxygen consumption, VO₂(max): maximal oxygen consumption VCO₂: carbon dioxide production, VE: respiratory rate

* $p < .05$ Paired Sample T-Test [#] $p < .05$ Unpaired Two-Sample T-Test

In Table 3, the analysis results of the comparison of exercise test parameters of the experimental and control groups are presented. While VO₂ max (%), VCO₂ (l / min), VE (l / min) pre-test and post-test values were found to be significant in the Experimental and Control groups, HR (p / min) values were not significant. In the experimental and control groups, only the pre-test values were found to be significant in VO₂ (l / min) value. (Table 3). Almost all scientific studies conducted for ages have stated the negative effects of tobacco and tobacco products on public health. Despite a great number of scientific studies, the production and consumption of tobacco and tobacco products continue today. Unless an efficient control mechanism is applied to tobacco and tobacco products, it is estimated that they will be responsible for the death of approximately 8 million people annually, and about 1 billion people by 2030. ⁸ Smoking hurts forced expiratory volume in 1 second FEV (l). ⁹ Most of those exposed to tobacco and tobacco products meet these products at adolescent period. ¹⁰ The age range of the volunteers participating in this study is 18-22 years. Being exposed to tobacco smoke actively or passively at this period in which cells, tissues, organs and systems develop can create problems in terms of health in the future. ¹¹ Our young research group is the ideal group to reveal the results of their active addictions to tobacco products. The effect of different pieces of training in many sports branches on the pulmonary functions of athletes has been investigated. ¹² In this study, it has been aimed to investigate the effect of basic football education on pulmonary functions and cardiopulmonary exercise test values of hearing-impaired athletes who smoke. In the study, a significant difference was found between the pretest and posttest values of the pulmonary function test parameters of the experimental and control group, between FEV1 (l), VC and MVV (l/m) values. While a significant

difference was found only in FEV1 (l) value when the pretest and posttest values of the experimental group were examined, a significant difference was found in FEV1 (l), VC, FVC (l), MVV (l/min) values in the pretest and posttest values of the control group. The organs exposed to tobacco and tobacco products' smoke and most harmed are undoubtedly the respiratory tract and lungs. Some restrictions can occur in smokers' lung capacities in direct proportion to time. Especially, if smoking starts from adolescence and goes on over the age of 35, various problems related to the respiratory system arise.¹³ In this study, FEV1 (l), VC and MVV (l/min) values of the experimental group were lower than the control group and they were found statistically significant; and it is believed that the result is supported by this information. It was observed that, as a result of long-term use of tobacco and tobacco products, FEV1 (l) values were lower and the rate of decrease was higher in users than those who did not smoke.¹⁴ In another study conducted on the smoker, quitted smoking and nonsmoker males in Korea, FEV1 (l) value was found significantly different between the 3 groups.¹⁵ In a multicenter study conducted to compare the spirometric measurements in smokers and nonsmokers in Japan, it was found that FEV1 and FEV1/FVC values were lower in smoker patients at all age groups than nonsmokers.¹⁶ In this study, it is thought that the low rate of decrease in FEV1 (l) values in the experimental group is due to smoking. Inflammation and oxidative stress formed in the respiratory tract or lungs may cause the FVC (l) parameter to decrease.^{17; 18} It is thought that the low FVC (l) values of smoking volunteers may be due to inflammation in the lungs related to smoking. In the literature, exposure to smoke of tobacco and tobacco products is thought to cause oxidative stress in the respiratory system¹⁹ and trigger inflammatory reactions.²⁰ In many similar studies conducted on smoker and nonsmoker patients, pulmonary function tests were found lower in smokers when compared to nonsmokers.^{21; 22} In a study conducted by Tüzün on female handball player students in 1988 stated that VC, MVV and total lung capacity (TLC) were higher than the control group and that there was also an increase in the pulmonary functions in parallel with the increase in physical strength convenience of the athletes.²³ In this study, the fact that the increase in the experimental group was higher than the control group is supported by this information. According to the literature data, MVV value in football players varies from 108.3 to 170 l/min.²⁴ The fact that the MVV l/min values are in these ranges corresponds to the literature. In this study, a significant difference was found between the pretest and posttest values of the cardiopulmonary exercise test parameters of the experimental and control group in VO_2 (l/min), $\text{VO}_{2\text{max}}$ (%), VCO_2 (l/min) and VE (l/min) values. When the pretest and posttest values of the experimental group were examined, while VO_2 (l/min), VCO_2 (l/min) and VE (l/min) values were found significant, in the control group, a significant difference was found in VO_2 (l/min), $\text{VO}_{2\text{max}}$, VCO_2 (l/min) and VE (l/min) values. In a study conducted by Yazıcı et al, a treadmill exercise test and pulmonary function test was performed on 45 patients with COPD, and arterial blood gases of the patients were evaluated. A significant relationship was determined between $\text{VO}_{2\text{max}}$ (%) and FEV1 (l) in the patients with 3rd and 4th phase COPD.²⁵ In the study conducted by Ortega et al, it was determined that there was no significant relationship between $\text{VO}_{2\text{max}}$ (%), VCO_2 (l/min) and PaO_2 , PaCO_2 .²⁶

In the study conducted by Parspur, a statistically significant difference was found in FEV1 (l), VC (l), FVC (l) ve MVV (l/min). Parspur also reported that there was no statistically significant difference in HR (p), VO_2 (l/min), $\text{VO}_{2\text{max}}$ (%), VCO_2 (l/min) and VE (l/min) values.⁴ When the values found in our study were examined, while the fact that there was a significant difference in FEV1 (l), VC (l), FVC (l) and MVV (l/min) values is supported by this study, the significant difference also found in $\text{VO}_{2\text{max}}$ (%), VCO_2 (l/min) and VE (l/min) does not show similarity. It is believed that this difference arises from that the individuals in the experimental group in this study had more habit of cigarette smoking. In another study conducted on 38 sedentary volunteers doing biking by Markov et al, it was aimed to find whether there was any increase in the endurance rate of the bikers after the respiratory muscle training. Total 38 sedentary bikers participated in the study, as 18 in the control group, 15 in the endurance group and 15 in the RMT (respiratory muscle training) group. Lung functions, maximum oxygen consumption and maximum aerobic strength tests were performed on the participants before and after the training. The training included 40 sessions, and each session was 30 minutes. After the RMT lasted for 15 weeks, while a significant increase in biking and respiratory endurance in the experimental group, it was stated that no difference occurred in the maxVO_2 of the sedentary individuals participated in the study.²⁷ In future studies, it can be aimed to investigate what the effect of respiratory muscle training will be.

CONCLUSION

In this study in which pulmonary functions and cardiopulmonary exercise test values of the football education in smoker and nonsmoker hearing-impaired individuals were compared, an increase was found in the pulmonary and cardiopulmonary exercise values of both groups. However, the fact that there was a significant difference between the pulmonary and cardiopulmonary exercise values of the smoker participants and those of the nonsmokers suggests that smoking causes a restriction on pulmonary and cardiopulmonary exercise values.

REFERENCES

1. Akgün, N. (1994). Exercise physiology. İzmir: Ege University Press,
2. Clotet, J., Gomez-Arbonas, X., Ciria, & C. (2004). Spirometry is a good method for detecting and monitoring chronic obstructive pulmonary disease in high-risk smokers in primary healthcare. *Arch Bronconeumol*, 40:155-159.
3. Salepçi, BM., Havan, A., Fidan, A., Kiral, N., & Saraç, G (2013). Contribution of Smoking Quitting Outpatient Clinics to Early Diagnosis of Chronic Obstructive Pulmonary Disease and Small Airways Disease. *Respiratory*, 15:100-104.
4. Parspur, Ş. E. (2008). Examination of respiratory function tests and parameters in patients with COPD and asthma, Üniversty of Osmangazi Eskişehir.
5. Weber, KT. (1998). Principles and applications of cardiopulmonary exercise testing. In Fishman, AP (ed.), *Pulmonary Diseases and Disorders*, 3rd ed. New York, McGraw Hill, pp. 575-588.
6. Umut, S. (2008). Chronic obstructive pulmonary disease. Thorax books. Umut S, Erdinç E, eds. İstanbul, Özgün Ofset Tic Ltd Şti, 177-82.
7. Zorba, E., and Ziyagil, M.A. (1995). Body composition and measurement methods. Gen Printing, Trabzon, P18-20.

8. Eriksen, M., Mackay, J., H. and Ross H, (2011). The tobacco atlas. American Cancer Society.
9. Scanlon, PD., Connett, JE., Waller, LA., Altose, MD., Bailey, WC., Buist, AS., et al. (2000). Smoking cessation and lung function in mild-to-moderate chronic obstructive pulmonary disease. The Lung Health Study. *Am J Respir Crit Care Med*, 161:381-390. DOI: [10.1164/ajrccm.161.2.9901044](https://doi.org/10.1164/ajrccm.161.2.9901044)
10. DiFranza, JR., Aligne, CA., & Weitzman, M (2004). Prenatal and postnatal environmental tobacco smoke exposure and children n's health. *Pediatrics*, 113(Supplement 3), 1007-1015. PMID: 15060193
11. Yoltan, K., Dietrich, K., Auinger, P., Lanphear, BP., & Hornung, R.(2005). Exposure to environmental tobacco smoke and cognitive abilities among US children and adolescents. *Environ. Health Perspect*, 113, (1) 98-103. DOI: [10.1289/ehp.7210](https://doi.org/10.1289/ehp.7210)
12. Koc, M., & Saritas, N (2019). The effect of respiratory muscle training on aerobic and anaerobic strength in adolescent taekwondo athletes. *Journal of Education and Training Studies*, 7(2), 103-110. DOI: <https://doi.org/10.11114/jets.v7i2.3764>
13. Su, H. (1996). ATS statement--cigarette smoking and health. *Am. J. Respir. Crit. Care Med*. 154(5), 1579-1580. DOI: [10.1164/ajrccm.154.5.8912785](https://doi.org/10.1164/ajrccm.154.5.8912785)
14. Haustein, KO., and Groneberg, D. (2009). Tobacco or health? physiological and social damages caused by tobacco smoking. Springer Science & Business Media. P101-104
15. Oh, HY., Lee, HS., Lee, SW., Shim, KW., Chun, H., & Kim, JY. (2014). The association of lung age with smoking status in Korean men. *Korean J Fam Med*. 35:35-41. DOI: [10.4082/kjfm.2014.35.1.35](https://doi.org/10.4082/kjfm.2014.35.1.35).
16. Yamaguchi, K., Omori, H., Onoue, A., Katoh, T., Ogata, Y., Kawashima, H., et al. (2012). Novel regression equations predicting lung age from varied spirometric parameters. *Respir Physiol Neurobiol*, 18:108-114.
17. Repine, JE., Bast, AALT., & Lankhorst, IDA.(1997). Oxidative Stress Study Group, Oxidative stress in chronic obstructive pulmonary disease. *Am. J. Respir. Crit. Care Med*. 156 (2), 341-357. DOI: [10.1164/ajrccm.156.2.9611013](https://doi.org/10.1164/ajrccm.156.2.9611013)
18. Montuschi, P., Collins, JV., Ciabattini, G., Lazzeri, N., Corradi, M., Kharitonov, SA., & Barnes, PJ. (2000). Exhaled 8-isoprostane as an in vivo biomarker of lung oxidative stress in patients with COPD and healthy smokers. *Am. J. Respir. Crit. Care Med*, 162(3), 1175-1177. DOI: [10.1164/ajrccm.162.3.2001063](https://doi.org/10.1164/ajrccm.162.3.2001063)
19. Fabbri LM, Luppi F, Beghe B, and Rabe KF. (2011). The multiple components of COPD. In COPD. Humana Press.
20. Saetta, M., Di Stefano, A., Turato, G., Facchini, FM., Corbino, L., Mapp, CE, & Fabbri, LM.(1998). CD8+ T-lymphocytes in peripheral airways of smokers with chronic obstructive pulmonary disease. *Am. J. Respir. Crit. Care Med*, 157 (3) 822-826. DOI: [10.1164/ajrccm.157.3.9709027](https://doi.org/10.1164/ajrccm.157.3.9709027)
21. Özkurt, S., Bostancı, M., Altın, R., Özşahin, A., & Akdağ B. (2000). Smoking Prevalence, Nicotine Addiction and Respiratory Function Tests in Medical Faculty Employees. *Journal of Tuberculosis and Thorax* 2000;48:140-7.
22. Kaminsky, DA., Marcy, T., Dorwaldt, A., Pinckney, R., DeSarno, M., Solomon, L., & JR. Hughes (2011). Motivating smokers in the hospital pulmonary function laboratory to quit smoking by use of the lung age concept. *Nicotine Tob Res*.13:1161-1166. DOI: [10.1093/ntr/ntr096](https://doi.org/10.1093/ntr/ntr096)
23. Tüzün, M., Durusoy, F., Yalaz, G., & İşleğen, Ç. (1988). Physical strength and breathing capacity of handball female students. *J. sports medicine*, 23: 33-38.
24. Raven, P., Gettman, L., Pollock, M., & Cooper, K. (1976). A physiological evaluation of professional soccer players. *Brit. J SportsMed*. 109-209.
25. Yazıcı, M., Arbak, P., Balbay, O and et al. (2004). Relationship between arterial blood gas value, pulmonary function tests and treadmill exercise testing parameters in patients with COPD. *Respirology*, 9: 320-325. DOI: [10.1111/j.1440-1843.2004.00619.x](https://doi.org/10.1111/j.1440-1843.2004.00619.x)
26. Ortega, F., Montemayor, T., Sanchez, A., Cabello, F., & Castillo, J. (1994). Role of cardiopulmonary exercise testing and the criteria used to determine disability in patients with severe chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*, 150: 747-751. doi: [10.1164/ajrccm.150.3.8087347](https://doi.org/10.1164/ajrccm.150.3.8087347).
27. Markov, G., Spengler, CM., Knöpfli-Lenzin, C., Stuessi, C., & Boutellier, U. (2001). Respiratory muscle training increases cycling endurance without affecting cardiovascular responses to exercise. *European Journal of Applied Physiology*, 85, 233-239. doi.org/10.1007/s004210100450

COMPARISON OF PHYSICAL CHARACTERISTICS, SPEED, AGILITY, MUSCULAR ENDURANCE, AEROBIC POWER AND RECOVERY ABILITIES BETWEEN FEMALE VOLLEYBALL AND BASKETBALL PLAYERS

Emre SERİN^{*1}, Mehmet Akif ZİYAGİL²

^{*}Mersin University, Faculty of Sports Sciences-Mersin/Türkiye

Corresponding author: emreserin@mersin.edu.tr

ABSTRACT

Assessments of athletes can be used for talent selection and standardized training programs. Thus, this study aims to compare the physical characteristics and speed, agility, aerobic power, muscular endurance and recovery abilities of female volleyball and basketball players. The data were collected from a total of 26-second league athletes including 14 volleyball and 12 basketball players in July 2019. After physical characteristics were determined by Tanita, speed tests with 5 and 10 meters acceleration sprints, agility with t-test, muscular endurance with push-ups and sit-ups, aerobic power predicted from Yoyo test and rest and recovery heart rates using exercise polar clock were measured. For comparisons between two groups were performed by independent t-test due to normal distribution of data. This study showed that basketball players are older, taller and heavier than volleyball players. Again, there was no significant difference between the groups in 5 m speed test while the average velocity of volleyball players had significantly highest mean sprint speed in 10 m, the average push-ups and sit-ups of basketball players were significantly higher than volleyball players. The maxVO₂ values calculated by the average distance covered in the yoyo test were significantly higher than those of basketball players. While warm-up heart rate of basketball players is higher than volleyball players, after the speed tests and Yoyo test, the heart rate of volleyball players was higher than basketball players. In conclusion, the number and intensity of maximum intermittent efforts in volleyball competitions and workouts and the increase in aerobic metabolism in recovery lead to the differentiation between volleyball and basketball players concerning speed and aerobic power. Finally, it can be thought that the physical fitness components were differentiated depending on the character of the game, and the age and level of the athlete.

Key words: Volleyball, basketball, sprint speed, muscular endurance, agility, aerobic power and recovery heart rates.

INTRODUCTION

Determining physical fitness profiles specific to the sports branch does not only assist coaches in organizing training programs for elite athletes, but also guides coaches and sports scientists ineffective talent selection processes.⁴⁻³⁸ In recent years, it has become common to create reference physical fitness profiles for each sports branch. It will be not only useful in comparing the physical fitness profiles of the two sports branches but also in defining similarities and differences as well as in determining the general characteristics of the sports branches. Sprint performance is thought to play an important role in the basketball success of strength and muscular power components. Generally, the body height of basketball players is noticeably higher than other athletes.² Again, because of the need for quick stop-and-go, changing direction and effective maneuvers in the game, anaerobic power is considered to be critical for success in basketball. Volleyball physical fitness profiles are similar to basketball. Sheppard et al. (2012) has defined volleyball as a sport characterized by short and frequent explosive activities such as volleyball jumping, diving and ball play. It also includes vertical jump activities include blocks, spikes with movements with or without a horizontal approach. Fontani et al. (200) defined an average 96.5 times vertical jump made by a senior volleyball player, usually throughout the match. The tolerance to the loads caused by eccentric-concentric contractions in the stretch-shortening cycle that occurs following the vertical jumps, high body weight and body height, high lean body weight and low body fat ratio are the most outstanding features of the volleyball players' physical fitness. So, this study aims to compare the physical characteristics and neuromotor fitness of female volleyball and basketball players to create a scientific database for coaches to organize their training programs and evaluate the effective management of talent selection processes as well as the transfer of athletes to upper leagues and more successful teams.

MATERIALS AND METHODS

Participants: Data were collected from 26-second league female athletes in July 2019. The physical properties of the participants were determined by bioelectrical impedance. The speed characteristics of the participants with 5, 10 and 20 meters acceleration runs, agility with t-test, muscular endurance with 30 seconds of push-ups and sit-ups, aerobic powers with the Yoyo test, and their resting and post-exercise heart rate with polar were measured. Participants were informed before the study, and an "Informed Approval Form" was taken from each of them and their participation was ensured. The principles stated in the Helsinki Declaration have been applied. Measurements of body weight and height: Bodyweight and height measurements of the participants were taken in a standing position while they were wearing shorts and a T-shirt without shoes before breakfast. Bodyweight was measured in kilograms to the nearest 0.1 kg using a SecaTM digital weighing scale (Seca, Germany). Body height was measured in centimeters to the nearest 0.1 cm using a metal stick of this scale. Body weight of the participant was measured in kilograms to the nearest 0.1 kg with a SecaTM digital weighing scale (Seca, Germany) while body height measurement was taken in centimeters to the nearest 0.1 cm using a metal stick of this scale.

Calculation of Body Mass Index (BMI)

BMI was computed by using the following formula: weight (kg) divided by height (m) squared.

Speed Tests

A two-door photocell electronic chronometer (microgate witty brand system) with an accuracy of 0.01 seconds was used to measure First gate is located at the beginning while the second gate was placed at the end of the 5m ve 10m distances. Participants started the sprint with high standing position 50 cm behind the starting line, two trials were made and the best grade was recorded in seconds .⁶

Measurement of Agility

T test was used to measure agility. This test was applied to determine the speed of the athletes to change their direction such as forward sprinting, right-left side galloping and running back and forth. Each subject repeated the test twice and the best time was recorded by stopwatch in seconds as the person's degree. ⁷⁻⁸

Sit Ups in 30 Seconds

The athletes were placed on their back, knees bent, hands on the back of the neck and soles of the feet touching the ground, with the start command, as much as they could repeat for 30 seconds. The number of sit ups that the subject could repeat in 30 seconds was recorded as a score by a hand chronometer with an accuracy of 1/1000 .⁹

Push-Up in 30 Seconds

The subject performed as possible as to repeat push-ups for 30 seconds with the start command. The athletes were lying on the ground with their facing the ground, from hip to the knees and the ankles, legs were stretched without touching the ground, while the body weight was on the soles of the toes and raising and lowering their whole body by arms. The number of pushups that the subject could repeat in 30 seconds was recorded as a score by a hand chronometer with an accuracy of 1/1000 .⁹

Yo-Yo Test

The subject runs from cone A to cone B. During the runs, when one comes from cone A to cone B, a signal sounds and the line is stepped on and back to cone A is run. When the subject comes to cone A, the signal is heard again and it is jogged from cone A to cone C and it has waited until the starting point cone A is heard again. Running speed increases according to the test protocol. If the athlete cannot catch the signal for the first time when he comes to cone A, he or she receives an error and the second time in a row, if the signal is heard and, the subject is not on the point of A, the test is ended. Each time the subject arrives at cone A, the test distance is marked on the sheet and recorded. The test conditions to be performed should always be in the same field and weather conditions (such as not hot or cold, the ground not being wet to prevent the subjects from slipping). The subjects participating in the test should be asked to wear the same type of football shoes (crampons) so that they do not fall during running, and the running area should be made on the natural grass area. Test running speed will start at 10 km / h. At the end of every 40 meters, the running speed will increase by 0.5 km / h or 1 km / h depending on the test protocol.¹¹

Measurement of Recovery Heart Rate (RHR)

Before and after the warm-up, the subjects' RHR were recorded with a heart rate monitor (RS 800, Polar Vantage NV, Polar Electro Oy, Finland) at intervals of 5 seconds with 6 intervals after the speed, agility and aerobic endurance performances. Before measurement of RHR, the chest band of the heart rate monitor was placed on the subject's chest, and MUSC was recorded from the monitor.

Statistical Analysis

Due to the normal distribution of the data, independent t-test analyzes were used for paired comparisons. Results were evaluated according to the "0.05" significance level.

Results

The findings of this study are presented in tables 1, 2, 3 and 4.

Table 1. Comparison of physical characteristics between female volleyball and basketball players.

Variables	Group	N	M.	t value	Diff.	Sig.
Age (years)	Volleyball	14	19,57	-6,178	-2,35	,000**
	Basketball	12	21,92			
Body Height (cm)	Volleyball	14	169,71	-2,074	-7,20	,049*
	Basketball	12	176,92			
Body Weight (kg)	Volleyball	14	57,93	-2,405	-6,40	,024*
	Basketball	12	64,33			
Body Mass Index (BMI=w/h ²)	Volleyball	14	20,08	-,846	-,47	,406
	Basketball	12	20,54			

*p<.05; **p<.01

Table 2. Comparison of speed, agility, aerobic power and recovery ability between female volleyball and basketball players.

Variables	Group	N	M.	S.D.	t value	Diff.	Sig.
5 m Speed (m/sec)	Volleyball	14	3,24	0,24	-1,490	-,38	,149
	Basketball	12	3,62	0,92			
10 m Speed (m/sec)	Volleyball	14	4,06	0,24	5,570	,48	,000**
	Basketball	12	3,58	0,19			
T Test (m/sec)	Volleyball	14	3,62	0,20	1,973	,18	,060
	Basketball	12	3,44	0,28			
Push ups (30 sec reps)	Volleyball	14	17,64	6,48	-3,935	-11,10	,001**
	Basketball	12	28,75	7,92			
Sit up (30 sec reps)	Volleyball	14	16,50	2,98	-4,313	-13,91	,000**
	Basketball	12	30,42	11,67			
Yoyo test (m)	Volleyball	14	1098,57	513,00	2,440	421,90	,022*
	Basketball	12	676,67	332,25			
Estimated Max VO ₂	Volleyball	14	60,24	6,98	2,440	5,74	,022*
	Basketball	12	54,50	4,52			

*p<.05; **p<.01

Table 3. Comparison of resting and exercise heart rates after warm up, speed, agility, aerobic power and Yoyo tests between female volleyball and basketball players.

Variables	Group	N	M.	S.D.	t value	Diff.	Sig.
Resting Heart Rate (bpm)	Volleyball	14	76,50	13,81	-,756	-4,16	,457
	Basketball	12	80,67	14,25			
Heart Rate After Warm up (bpm)	Volleyball	14	92,43	15,09	-4,588	-40,90	,000**
	Basketball	12	133,33	29,18			
Heart Rate After Speed Tests (bpm)	Volleyball	14	140,71	18,27	5,481	44,29	,000**
	Basketball	12	96,42	22,94			
Heart Rate After T Test (bpm)	Volleyball	14	138,64	35,82	-,980	-11,27	,337
	Basketball	12	149,92	18,69			
Heart Rate After Yoyo Test (bpm)	Volleyball	14	150,43	41,14	2,360	29,01	,027**
	Basketball	12	121,42	11,41			

*p<.05; **p<.01

Table 4. Correlations among speed, agility, aerobic power and recovery heart rates (RHR) and sport branches.

Variables	Mean 5 m	Mean 10 m	Mean Agility Speed	Push Up	Sit Up	Max VO ₂	Group
Mean 5 m	1						
Mean 10 m	-,070	1					
Mean Agility Speed	,104	,670**	1				
Push Ups	,166	-,415*	-,227	1			
Sit Ups	,239	-,417*	-,174	,167	1		
MaxVO ₂	,033	,397*	,319	-,476*	-,294	1	
Group	,291	-,751**	-,374	,626**	,661**	-,446*	1
Warm Up RHR	,501**	-,518**	-,249	,633**	,215	-,402*	,684**
Speed Tests RHR	-,273	,603**	,203	-,533**	-,612**	,491*	-,746**
Agility Test RHR	,382	-,021	-,007	-,136	,242	,061	,196
Yoyo Test RHR	-,094	,421*	,202	-,369	-,307	,776**	-,434*
Age	,219	-,577**	-,517**	,423*	,632**	-,336	,784**
Body height	,508**	-,275	-,032	,143	,351	-,186	,390*
Body weight	,327	-,264	-,023	,269	,396*	-,367	,441*
BMI	-,202	-,013	,016	,269	,161	-,359	,170

*There is significant correlation at p<.05 level; **There is significant correlation at p<.01 level.

Group=1 (Volleyball), 2 (basketball)

DISCUSSION

This study aims to compare the physical characteristics and speed, agility, muscular endurance, aerobic strength and recovery abilities between female volleyball and basketball players. In volleyball, strength, speed and vertical jumping ability associated with height are the most important characteristics that determine the performance of the athlete.¹⁴ In our study, the

average body height and weight of the volleyball players participating were 169.71 ± 7.64 cm and 57.93 ± 6.73 kg, respectively. In the study of,¹⁵ it was reported that the averages of age, body height and weight for elite female volleyball players are 18.6 years, 175 cm and a body 62.3 kg, respectively. In the same study, the shuttle test, evaluating the muscular strength and endurance, among the physical fitness parameters, was determined to be 25.9 times for 40 seconds. The values of the participants in the study of the Gelecek and others (2000) appear to be stronger than the athletes in our study in terms of both physical and motor characteristics. Ergun et al. in their study on elite male volleyball players, the average values reported were 26.85 ± 5.4 years for age, 189.23 ± 5.09 cm for body height and 82.25 ± 5.41 kg for body weight, respectively. On the other hand, Yorukoglu and Koz (2007) reported average values for 8 cadet basketball players from the infrastructure of Ankara University Sports Club were 165.7 ± 8.21 cm for body height and 58.13 ± 14.27 kg for body weight, respectively. Savucu et al. (2004) reported the average values for 30 cadet basketball players from the infrastructure of the Fenerbahçe basketball team were 187.89 ± 0.04 cm for body height and 79.66 ± 8.73 kg. for body weight, respectively. Similarly, Kuter and Ozturk (1992) in their study determined the averages for 13 cadet basketball players were 181.62 ± 6.74 cm for body height and 69.93 ± 6.37 kg for body weight, respectively. In his study, Bayramoglu (1998) reported the mean values of 60 basketball players aged 13-16 were 176.36 ± 7.94 cm for average height and 66.82 ± 7.67 kg for body weight, respectively. Also, the average age of the participants was determined as 21.92 ± 1.16 years for age, 176.92 ± 10.05 cm for body height, and 64.33 ± 6.81 kg for body weight in our study. The results reported in sport literature are close to our study in terms of physical properties. Volleyball players require sudden acceleration and deceleration movements to increase their efficiency and skills during the match. Also, it is necessary to change direction quickly to be able to defend in volleyball. In the study on female volleyball players by,³⁴ there was a statistically significant difference in the agility T-test before, during and after season. Molenaar (2009) observed that there was a very significant difference in the results of agility T-test between pre-season and in-season periods. On the other hand, Güler (2016) reported T-test agility values as 5.27 ± 0.74 for 10-16 years old basketball players in his study. Also, the mean values of the agility T-test for basketball players were 5.80 ± 0.59 sec for aged 13 and under and 4.82 ± 0.52 for aged 14 and over, respectively. In a study of,²⁰ it was reported that the mean values were 27.44 reps for males judokas, and 27.44 reps female judokas in the university. Boyacı (2016) reported the mean values for young female players were 5.14 ± 0.25 sec for pro-agility test and 16.23 ± 0.47 sec for Illinois agility tests, respectively. Özveren (2015) reported the means for female volleyball players were 29.63 ± 3.05 reps for sit up and 22.13 ± 2.39 reps for a push-up, respectively while Özveren (2015) reported that sit up and push up performance depend on the variables of age, gender, sports branch, and training experience. Ekici (2017) reported the mean results for female volleyball players were 24.4 ± 1.53 reps for sit ups, 17.5 ± 1.39 reps for push-up and 238.5 ± 7.35 cm for standing long jump, respectively. The findings of researches in the literature are similar to our study in terms of muscular strength. In a similar study conducted by Albay et al., mean values for 10 m speed of team sports were 1.87 ± 0.07 seconds for volleyball players, 1.82 ± 0.08 seconds for soccer players, 1.77 ± 0.1 seconds for handball players while same values for 20 m speed of team sports were 3.23 ± 0.13 seconds for volleyball players, 3.06 ± 0.16 seconds for football players. and 3.09 ± 0.11 seconds in handball players.²⁰ Kale et al. (2018) reported the mean values of sprinters for 20, 30, 40 and 50 meters sprints were 3.14 ± 0.14 sec, 4.23 ± 0.16 sec., 5.27 ± 0.17 sec., 6.29 ± 0.19 sec, respectively. The average values reported by Kılınç et al. (2011) for cadet basketball players were 3.6 ± 0.2 seconds for 20 m and 5.0 ± 0.3 seconds for 30 m. Green et al. reported (1998) the averages of 20-yd (18.288 m) in basketball players were 3.46 ± 0.27 seconds for females and 3.13 ± 0.21 sec for males. Wallace compared 10 and 30 meters sprinting characteristics between fitness participants and sprinters in his study. Sprint performances of 10 and 30 meters of sprinters were 1.98 sec for 10 m and 4.75 sec for 30 meters sprints while same values for fitness participants. Sprinters had a better sprints performance for 10 m and 30 m sprints than those of fitness participants. The results of the studies in the literature are similar to our study. Aerobic power is the ability to generate aerobic energy in high intensity exercise and is defined by the maximum oxygen consumption (VO_2max). Aerobic capacity is used synonymously with the word endurance and is defined as the ability to continue an exercise for a long time.¹⁹⁻³⁵ The MaxVO_2 values reported by,²⁵ are 46.6 ml / kg / min for female volleyball players and 56.7 ml / kg / min for female basketball players. In these studies, it was determined that the MaxVO_2 value of basketball players was higher than that of volleyball players.²³ voleybolcuların MaxVO_2 değerini 55.5 ml/kg/dk, Puhl ve ark. (1982) bu değeri 50.6 ml/kg/dk olarak belirtmişlerdir.²⁴ It was reported the average resting heart rate of 24 infrastructure basketball players aged 13-14 as 84.72 ± 13.94 beats/min in his study while³³ stated that the average resting heart rate of 25 basketball players aged 11-15 was 89.92 ± 10.23 beats / minute. Moreover, Kuter and Öztürk (1992) stated the average resting heart rate of 13 cadet basketball players as 68.25 ± 6.25 beats /min. In another study, the resting heart rate of volleyball players with 73.94 ± 8.07 was higher than those of basketball (66.24 ± 10.96 beats / min) and handball players (66.86 ± 3.73 beats / min).²⁹⁻³² Some factors determining the recovery process are heart rate, the time for breathing to return to normal and the lactic acid level formed during exercise returns to the normal level. The recovery heart rate is used as an indicator of the benefits of training.³⁶ As the load increases with training and exercise, sympathetic activity in skeletal and cardiac muscles increases while parasympathetic activity decreases in other organs. In recovery, the opposite happens. When the groups were compared, the average resting heart rate of volleyball players was found to be significantly higher than basketball players. In various studies, significant reductions in heart rate were achieved with regular training, and it was determined that the contraction force of the heart was caused by the increase in stroke volume. As the training level and duration increases, the heart rate decreases at the same intensity.²⁹⁻³¹ Heart rate at rest in well trained athletes, is at a more economical level compared to healthy but not untrained persons. The lower resting heart rate of the athletes gives an idea that their performance levels are also high.³⁰ The results of this study showed that basketball players were older, taller, and heavier. On the other hand, volleyball players' mean speed of 10 m was significantly higher than basketball players; there was no significant difference between the groups in the 5 m and 20 m speed tests. The push-up and sit-up averages of basketball players is significantly higher than volleyball players. The maxVO_2 values calculated with the average distance traveled in the Yoyo test are significantly higher than basketball players.

While the heart rate of basketball players during warm-up were significantly higher than volleyball players, volleyball players' heart rate after speed test and Yoyo test were significantly higher than basketball players. Group variable (volleyball=1, basketball=2) positively correlated with mean push ($r=.626$, $p<.01$), with sit up ($r=.661$, $p<.01$), while this variable negatively

correlated with 10 meter sprint ($r=-.751$, $p<.01$), and maximum oxygen consumption ($r=-.446$, $p<.01$) at .01 confidence level. The mean push and sit up were positively correlated with group variable in the favor of volleyball players while this variable negatively correlated with 10-meter sprint and maximum oxygen consumption in the favor of basketball players at .01 confidence level (Table 4). Group variable positively correlated with mean, recovery heart rate (RHR) after warm up ($r=.684$, $p<.01$), age ($r=.784$, $p<.01$), body height ($r=.390$, $p<.01$), and body weight ($r=.441$, $p<.01$), while this variable negatively correlated with RHR after speed tests ($r=-.746$, $p<.01$), and RHR after Yoyo tests ($r=-.434$, $p<.01$) at .01 confidence level. The RHR after warm up, age, body height, and body weight were positively correlated with group variable in the favor of volleyball players while this variable negatively correlated with RHR after speed tests and RHR after Yoyo tests in the favor of basketball players at .01 confidence levels (Table 4). It is interesting that age variable as well correlated with group variable. This means that the mean age of volleyball players was lower than basketball players. The differences in means of 10 m, agility speed, push up and sit up tests between volleyball and basketball players may be partly explained by age factor (Table 4).

CONCLUSION

It can be concluded that the findings of our study showed partly the similarities with the physical fitness components of volleyball players and basketball players in the literature. Also, the number and intensity of maximum intermittent efforts in volleyball competitions and workouts and the increase in aerobic metabolism in recovery lead to the differentiation between volleyball and basketball players concerning speed and aerobic power. In addition, these significant differences in means of 10 m, agility speed, push up and sit up tests between volleyball and basketball players may be originated from age-related differences. Finally, it can be thought that the physical fitness components were differentiated depending on the character of the game, and the age and level of the athlete.

REFERENCES

- Fontani, G., Ciccarone, G., & Giulianini, R. (2000). Nuove regole di gioco ed impegno fisico nella pallavolo. *SDS*, 19(50), 14-20.
- Metaxas, T. I., Koutlianos, N., Sendelides, T., & Mandroukas, A. (2009). Preseason physiological profile of soccer and basketball players in different divisions. *The Journal of Strength & Conditioning Research*, 23(6), 1704-1713.
- Ostojic, S. M., Mazic, S., & Dikic, N. (2006). Profiling in basketball: Physical and physiological characteristics of elite players. *Journal of strength and Conditioning Research*, 20(4), 740.
- Peña, J., Moreno-Doutres, D., Coma, J., Cook, M., & Buscà, B. (2018). Anthropometric and fitness profile of high-level basketball, handball and volleyball players. *Revista Andaluza de Medicina del Deporte*, 11(1), 30-35.
- Sheppard, J. M., Nolan, E., & Newton, R. U. (2012). Changes in strength and power qualities over two years in volleyball players transitioning from junior to senior national team. *The Journal of Strength & Conditioning Research*, 26(1), 152-157.
- Balcioğlu, A. (2018). *Futsal antrenmanlarının 12-14 yaş erkek çocuklarda sürat, çeviklik ve anaerobik güce etkisi* (Doctoral dissertation, Yüksek Lisans Tezi, Hatay Mustafa Kemal Paşa Üniversitesi, Hatay).
- Paradis, S. A. (2004). The effects of a 6-week speed and agility program on the development of explosive power, strength, speed, and agility in youth soccer players.
- Okudur, A., & Sanioğlu, A. (2012). 12 Yaş Tenisçilerde Denge ile Çeviklik İlişkisinin İncelenmesi. *Selçuk Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi*, 14(2), 165-170.
- Tamer, K. (2000). *Sporla fiziksel-fizyolojik performansın ölçülmesi ve değerlendirilmesi*. Bağırhan Yayınevi.
- Castagna, C., Abt, G., & D'Ottavio, S. (2005). Competitive-level differences in Yo-Yo intermittent recovery and twelve minute run test performance in soccer referees. *Journal of Strength and Conditioning Research*, 19(4), 805.
- Svensson, M., & Drust, B. (2004). 'Testing soccer players', *Journal of Sports Sciences*, 23:6, 601 – 618.
- Krustrup, P., Mohr, M., Amstrup, T., Rysgaard, T., Johansen, J., Steensberg, A., ... & Bangsbo, J. (2003). The yo-yo intermittent recovery test: physiological response, reliability, and validity. *Medicine & Science in Sports & Exercise*, 35(4), 697-705.
- Alemdaroğlu, U. (2008). *Aerobik kapasitenin belirlenmesinde kullanılan saha ve laboratuvar testlerinin karşılaştırması* (Master's thesis, Pamukkale Üniversitesi Sağlık Bilimleri Enstitüsü).
- Ergun, N., Baltacı, G., & Yılmaz, İ. (1994). Elit bir voleybol takımının fiziksel yapı, uygunluk ve performans düzeyinin analizi. *Hacettepe Üniversitesi Voleybol Bilim ve Teknoloji Dergisi*, 2(2), 26-33.
- Gelecek, N., Başkurt, F., & Akyol, S. (2000). Elit bayan voleybolcularda fiziksel uygunluk. *Spor Araştırmaları Dergisi*, 4(1), 45-46.
- Güler, U. (2016). *10-16 Yaş grubu erkek basketbol ve futbolcuların seçili antropometrik ve motorik özelliklerinin karşılaştırılması* (Master's thesis, İstanbul Gelişim Üniversitesi Sağlık Bilimleri Enstitüsü).
- Boyacı, A. (2016). 12-14 Yaş grubu çocuklarda merkez bölge (core) kuvvet antrenmanlarının bazı motorik parametreler üzerine etkisi. *Muğla sıtkı koçman üniversitesi, sağlık bilimleri enstitüsü, beden eğitimi ve spor anabilim dalı, Yayımlanmamış Yüksek Lisans Tezi, Muğla*, 15.
- Özveren, Y. (2015). Genç kadın voleybolcularda 12 haftalık plyometrik antrenmanların bazı biyomotor yetiler üzerine etkisi, *Sağlık Bilimleri Enstitüsü, Spor Salık Bilimleri Anabilim Dalı, İzmir, (Yüksek Lisans Tezi)*.
- Ekici, F. (2017). *12 Haftalık Voleybol Antrenmanlarının 15-18 yaş grubu öğrencilerin fiziksel ve motorik özellikleri üzerine etkisi* (Master's thesis).

20. Albay, M. D., Tutkun, E., Ağaoğlu, Y. S., Canikli, A., & Albay, F. (2008). Hentbol, voleybol ve futbol üniversite takımlarının bazı motorik ve antropometrik özelliklerinin incelenmesi. *Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi*, 6(1), 13-20.
21. Kılınç, F., Koç, H., Erol, A. E., Pulur, A., & Gelen, E. (2011). Kısa kamp döneminde uygulanan yoğun antrenmanların yıldız erkek basketbolcuların biyomotorik ve teknik performansları üzerine etkileri. *Uluslararası İnsan Bilimleri Dergisi*, 8(1), 1072-1081.
22. Wallace, C. (2008). *The effects of sprint and bounds training on 0-30 m running speed in elite adolescent rugby league players* (Doctoral dissertation, University of Newcastle).
23. Kovaleski, J. E., Parr, R. B., Hornak, J. E., & Roitman, J. L. (1980). Athletic profile of women college volleyball players. *The physician and Sportsmedicine*, 8(2), 112-119.
24. Sugahara M, Yoshimoto O, Tahara Y, Hirata H, Yukawa Y, Hasegawa R. Training and conditioning of a women's basketball team; change of physique, physical strength and hematological findings for a oneyear period. *Bull Faculty Liberal Arts, Nagasaki Univ.*, 1983; 23:23-32.
25. Tsunawake, N., Tahara, Y., Yukawa, K., Katsuura, T., Harada, H., & Kikuchi, Y. (1995). Characteristics of body shape of female athletes based on factor analysis. *Applied Human Science*, 14(1), 55-61.
26. Savucu, Y., Polat, Y., Ramazanoğlu, F., Karahüseyinoğlu, M. F., & Biçer, Y. S. (2004). Alt yapıdaki küçük, yıldız ve genç basketbolcuların bazı fiziksel uygunluk parametrelerinin incelenmesi. *F.Ü. Sağlık Bil. Dergisi*, 18(4), 205-209.
27. Kuter, M., & Öztürk, F. (1992). Türkiye şampiyonu yıldız basketbol takımının fiziksel ve fizyolojik profilinin dereceye giremeyen bir takımla karşılaştırılması" *Spor Bilimleri II. Ulusal Kongre Bildirileri, Spor Bilimleri ve Teknik YO. Yay*, (2 S 265).
28. Bayramoğlu, O. E. (1998). Yıldız ve genç erkek basketbolcularında morfolojik yapı ve performans ilişkileri. *Antalya, Akdeniz Üniversitesi Sağlık Bilimleri Enstitüsü Yüksek Lisans Tezi*, 1998.
29. Cicioğlu, İ., Günay, M., & Gökdemir, K. (1998). Farklı branşlardaki elit bayan sporcuların fiziksel ve fizyolojik profillerinin karşılaştırılması. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, 3(4), 9-16.
30. Akgün N. (1992). Egzersiz fizyolojisi, İzmir, Ege Üniversitesi Basımevi, 4(1):184-190.
31. Günay, M. (1998). *Egzersiz fizyolojisi*. Bağırhan Yayınevi.
32. Erol, E., Tamer, K., Sevim, Y., Cicioğlu, İ., & Çimen, O. (1997). Yaygın interval metot ile uygulanan dayanıklılık çalışmalarının 13-14 yaş grubu erkek basketbolcuların aerobik-anaerobik güç ve bazı fiziksel parametreler üzerine etkilerinin incelenmesi. *Performans Dergisi*, 3(1), 7-15.
33. Yazarer, İ., Taşmektepligil, M. Y., Ağaoğlu, Y. S., & Ağaoğlu, S. A. (2004). Yaz spor okullarında basketbol çalışmalarına katılan grupların iki aylık gelişmelerinin fiziksel yönden değerlendirilmesi. *SPORMETRE Beden Eğitimi ve Spor Bilimleri Dergisi*, 2(4), 163-170.
34. Molenaar, A. J. (2009). A comparison of conditioning levels between off-season and competition season for division II women's volleyball. THESIS Submitted to Northern Michigan University In partial fulfillment of the requirements For the degree of Masters Of Science Graduate Studies Office.
35. Reilly, T., Bangsbo, J., & Franks, A. (2000). Anthropometric and physiological predispositions for elite soccer. *Journal of sports sciences*, 18(9), 669-683.
36. Scott O. Roberts, (2002). Heart rate response to exercise, American Fitness, Issue: July-August.
37. Puhl, J. Case, S. Fleck, S. Handel, V. (1982). Physical and physiological characteristics of elite volleyball players. *Res Quart.*;53: 257-262.
38. Peña J., Moreno-Doutresb, D., Comaa, J., Cookc, M., Buscàd, B. et al. (2016). Anthropometric and fitness profile of high-level basketball, handball and volleyball players. *Rev Andal Med Deporte*.

HOW MUCH FLUID LOSS AND URINE DENSITY CAUSED BY AEROBIC EXERCISE AND SAUNA IN TENNIS PLAYERS? A DESCRIPTIVE STUDY?

Günay Ali¹, Küçükubas Nigar^{2*}

1.Coaching Department, Faculty of Sport Sciences, Halic University, Istanbul, Turkey, aligunay2004@gmail.com

2. Recreation Department, Faculty of Sport Sciences, Yalova University, Yalova, Turkey,

Address: Recreation Department, Faculty of Sport Sciences, Yalova University, Yalova, Turkey

GSM:+905333562220

Corresponding Author: nigar.kucukkubas@hotmail.com

ABSTRACT

The study aimed to determine the amount of fluid loss with aerobic exercise and sauna protocols, and to compare the change in urine density in the same amount of fluid lost with aerobic exercise and sauna. Thirty-five tennis players (mean age: 24.36 ± 4.03 years $R=18-32$) training 3 hours/day, 2 times/week (mean training age: 4.07 ± 1.43 years ($R=2-6$ years)) participated voluntarily. Method: Bodyweight by using a scale and height by using a stadiometer were used to measure. Küçükubas, (2007) and Siri Formula (1956) were used to determine the body density and body fat percentage respectively. Bruce protocol was used to determine Maximal Oxygen Consumption ($VO_2\max$) for calculation of the intensity from $VO_2\max$ by using the Karvonen method on the first day with controlled hydration status of the athletes to be hydrated. Firstly, at the predetermined %60 of $VO_2\max$ for 6x15 min (8 minutes rest interval) on the treadmill with a total of 90 minutes of running exercise were applied. Secondly, 48 hours later, the amount of fluid and body weight lost during aerobic exercise was also made lost in sauna protocol and urine density was controlled. Thus, urine density corresponding to the same amount of fluid loss lost in aerobic exercise and sauna was compared. **Results:** The values of USG were significantly different pre-exercise (1.016 ± 4.1 g/cm³) from after exercise (1.024 ± 3.10 g/cm³) ($p < 0.01$); pre-sauna (1.016 ± 4.33) from post-sauna (1.022 ± 3.05) and pre-exercise (1.016 ± 4.1 g/cm³) and post sauna (1.022 ± 3.05). **Conclusion:** Using hydration status is a good strategy for athletes monitoring body weight before training sessions or competitions to maintain proper hydration. Moreover, questioning the amount of mineral quantity and content loss or with fluid and mineral intake during fluid loss in aerobic exercises and tournament environments will shed light on future studies.

Keywords: Aerobic Exercise, Tennis player, Dehydration, Fluid Loss, urine density, sauna

INTRODUCTION

Tennis matches and training cause athletes to stay on the court for quite a long time (1). Fluid loss due to long-term stay on the court may cause different effects on different age and training level groups who are playing both recreationally and/or as a competitor.^{1,2} This may result in heat-related injury or/and decrease peak performance.^{3,4} Physiological exertion in a long time duration and thermoregulatory condition may lead to impairments in performance.⁵ Moreover, in the case of insufficient hydration, death may occur as a result of impaired cognitive functions, neurological dysfunction and aggravation of dehydration.^{6,7} When all these factors are considered, exercise or sauna studies have been focused to determine the effect of dehydration and athletic performance.⁸⁻¹⁰ During real matches in tournaments measuring fluid loss, hydration status and core temperature were difficult.¹¹ In this context, playing tennis in different weather conditions.^{3,12} heat stress, court floor¹³ and opponent level¹⁴ may change the quantity of fluid loss and performance parameters.^{4,14} Due to the fact that playing tennis looks like an aerobic system predominantly, it includes different loads in matches with different energy systems in its content. On average, playing tennis is 60% aerobic loading looking at the total match time.^{14,15} The frequency also changes in professional tennis players who play more than seven matches within two weeks.^{4,12} Moreover, the frequency of matches increases as a result of matches postponed in adverse weather conditions. Failure to replace the fluid loss in hot environments can impair performance in athletes, increase in the level of difficulty perceived was reported as well as a decrease in plasma volume.^{14,16} In addition to that thirst is not an indicator of body water status.^{1,2} Although replacing the loss of fluid amount ensures fluid and electrolyte balance are important in terms of performance.¹⁶⁻¹⁸ replacing fluid does not always mean replacing the electrolyte loss.² Furthermore, hyponatremia was observed in athletes due to excessive water consumption, especially in American football and tennis, played in hot and humid weather.¹⁹ Sodium intake has been suggested to prevent hyponatremia as a result of excessive fluid consumption.^{20,21} Moreover, it has also been reported that athletes experience dehydration despite fluid intake.¹⁶

Despite the loss of body weight with individual differences, the quantity of the body water loss by bodyweight weighing is a convenient method to determine the amount of fluid loss. Therefore, determining the amount of fluid loss with aerobic exercise and sauna protocols and comparing the change in urine density with the same amount of fluid lost with aerobic exercise and sauna will be beneficial, useful and will shed light on future scientific studies to sport scientists, coaches and athletes. For this reason, the objective of the current study is to determine how much fluid loss is caused by aerobic exercise in tennis players with no fluid intake. In addition to that, the objective of the present study was to compare the change in urine density in the same amount of fluid lost with aerobic exercise and sauna.

MATERIALS AND METHODS

Subjects: Thirty-five tennis players between 18 to 32 (mean age: 24.36 ± 4.03 years) training 3 hours/day, 2 times/week (mean training age: 4.07 ± 1.43 years) between 2-6 years of training ages participated voluntarily in the present study. After the participants were informed about the study, they signed the voluntary consent form. The study was prepared following the World Medical Association Helsinki Declaration rules. The ethics committee approval was obtained (dated 08.11.2018, protocol number 2018/168, decision no: 11).

Anthropometric Measurements

Bodyweight (BW) was measured by using a scale (Tanita TBF-418 Body Fat Analyzer, Tanita Corp., Tokyo, Japan). The Height (H) of the subjects were measured barefoot to the nearest ± 0.1 cm with reference to the Frankfort plane horizontal by using a stadiometer (SECA, France). Body mass index (BMI) was calculated by the formula: body weight (kg) divided by squared height (m^2). To calculate the body fat percentage of the athletes, subscapular, abdomen and thigh skinfold measurements were completed as described in Eston and Reilly,²¹ Küçükubas,²² formula and Siri Formula²³ were used to determine body density and body fat percentage respectively.

Maximal Oxygen Consumption (VO_{2max}): Bruce protocol was used to determine VO_{2max} for calculation of the intended intensity from VO_{2max} by using the Karvonen method²⁴ on the first day with controlled hydration status of the hydrated athletes.

The Karvonen method (24) factors in resting heart rate (HR_{rest}) to calculate target heart rate (THR), using a range of 50–85%:

$$THR = ((HR_{max} - HR_{rest}) \times \%Intensity) + HR_{rest}$$

Urine Density-Urine Specific Gravity (USG) Measurement: The urine density of the athletes was checked using a refractometer (Soif brand, China) to make sure they were hydrated so that the established exercise and sauna protocol could be applied. Before each measurement, the refractometer was calibrated with distilled water.

Exercise and Sauna Protocol:

Firstly, the subjects were dehydrated at the predetermined 60% of VO_{2max} for 6x15 min (8 minutes rest interval) on the treadmill with a total of 90 minutes of running exercise protocol. Secondly, 48 hours later, the amount of fluid loss and body weight loss during aerobic exercise was also made lost in the sauna. Urine density corresponding to the same amount of fluid loss lost in aerobic exercise and sauna was measured. Before each USG measurement, the refractometer was calibrated with distilled water.

Research Design

Figure 1. Research Design



VO_{2max} measurements were completed immediately after anthropometric measurements were made on the first day. Bruce protocol was used to determine VO_{2max} for calculation of the intended intensity from VO_{2max} by using the Karvonen method (24) with controlled hydrated status of the athletes. The Third day, urine density was checked for the hydration status of tennis players. If the value was normal limits, they were included in the exercise protocol. Athletes were dehydrated at the predetermined %60 of VO_{2max} for 6x15 min (8 minutes rest interval) on the treadmill with a total of 90 minutes of running exercise without fluid intake. On the fifth day, dehydration conditions were checked with a refractometer to be sure that tennis players were at normal hydration status. Then, tennis players were asked to stay in the sauna as long as they could in order to ensure that the amount of fluid they lost in the exercise protocol was lost in the sauna. They came out whenever they wanted during their stay. BW was checked at each exit, and the protocol was terminated when they lost the amount of fluid they lost during the exercise. Before and after the sauna protocol, dehydration conditions were recorded with a refractometer (Figure 1).

Statistical Methods

Data were collected, tabulated, then analyzed by using the software SPSS version 24. Normally distributed numerical data were presented as mean ($\bar{x}$) and standard deviation (SD). A two-sided p-value of <0.01 was considered statistically significant. Paired samples T-test was used to compare the difference and was interpreted as follows: p-values <0.01 were considered statistically significant.

Findings

Physical Parameters of the Tennis Players

Table 1 shows the physical parameters of the tennis players. Average values of the participants were: age = 23.34 ± 3.33 years; $\text{VO}_2\text{max} = 54.83 \pm 7.54$ ml/kg/min ($R = 38.19 - 69.08$), tennis training ages = 3.29 ± 1.43 years; BW = 70.88 ± 7.50 kg; calculated BMI was 22.76 ± 2.58 , BF% as $8.76 \pm 3.06\%$, height 1.77 ± 0.06 m. Physical parameters of the athletes were as follows; height = 1.75 ± 0.06 m ($R = 1.70 - 1.88$), BW = 71.00 ± 8.37 kg ($R = 57.70 - 87.20$).

Table 1. Descriptive Statistics of Physical Parameters of the Tennis Players (n: 35)		
	$\bar{x}$ -SD	min-max
Age (years)	23.34 ± 3.33	18-32
VO_2max (ml/kg/min)	54.83 ± 7.54	38.19-69.08
Training Age (years)	3.29 ± 1.43	2.00 – 6.00
BW (kg)	70.88 ± 7.50	57.70-87.20
Height (m)	1.77 ± 0.06	1.69 - 1.90
BMI (kg/m^2)	22.76 ± 2.58	18.87-30.53
BF%	8.76 ± 3.06	2.66 - 14.75

The dehydration results of the tennis players (Table 2) demonstrated that pre-exercise USG values were 1.016 ± 4.1 gr/cm³ were hydrated in the normal ranges. However, after exercise, the mean of urine densities of tennis players was medium dehydrated (1.024 ± 3.10 gr/cm³). After 48 hours the rest period, the amount of fluid loss as well as body weight lost during aerobic exercise was also lost in the sauna and urine density was controlled. Thus, urine density corresponding to the same amount of fluid loss lost in aerobic exercise and sauna was measured and compared. Pre-sauna mean USG values were 1.016 ± 4.33 gr/cm³ 48 hours after exercise protocol, after sauna values of the tennis players were 1.022 ± 3.05 gr/cm³. By the same schedule the values of BW and %change were also measured pre- and post-exercise and pre- and post-sauna for exercise were 1.73 ± 0.54 kg and $2.45 \pm 0.74\%$; and for sauna were 1.43 ± 0.42 kg and $2.01 \pm 0.56\%$ respectively (Table 3).

Table 2. Hydration Status of Tennis Players (n: 35)		
	$\bar{x}$ -ss	min-max
Pre-exercise USG (gr/cm ³)	1.016 ± 4.10	1.002-1.022
After Exercise USG (gr/cm ³)	1.024 ± 3.10	1.018-1.030
Pre-sauna USG (gr/cm ³)	1.016 ± 4.33	1.002-1.022
After Sauna USG (gr/cm ³)	1.022 ± 3.05	1.018-1.032

Table 3. Quantity Fluid Loss of the Tennis Players (n: 35)		
	$\bar{x}$ -ss	min-max
BW loss by Exercise (kg)	1.73 ± 0.54	1.00-3.20
BW loss by Sauna (kg)	1.43 ± 0.42	0.50-2.50
BW% Loss by Exercise	2.45 ± 0.74	1.45- 4.59
BW% Loss by Sauna	2.01 ± 0.56	0.78-3.57

Dehydration Status of Tennis Players (n:35)

The dehydration status of tennis players is shown in Table 4. The dehydration status of the athletes was determined and the T-test was applied to samples independent of statistical tests between pre-post exercise, pre-post sauna, exercise BW loss-sauna BW loss, post-exercise post-sauna USG, pre-exercise-pre-sauna USG values. As a result of the statistical evaluation, the athletes before and after exercise; There was a significant difference between USG values before and after sauna ($p < 0.01$). There was a significant difference between exercise BW loss and sauna BW loss of athletes ($p < 0.01$). In addition to that, there was no significant difference between post-exercise and post-sauna USG values of athletes ($p < 0.01$). There was no significant difference between pre-exercise and pre-sauna USG values of athletes ($p < 0.01$).

Table 4. T-test results of Dehydration Status in Tennis Players (n:35)		
	t	p
Pre exercise-post exercise USG (gr/cm ³)	-14.48	0.00**
Pre sauna-post sauna USG (gr/cm ³)	-11.74	0.00**
Post Exercise-Post Sauna BW (kg)	3.76	0.00**
Pre-exercise- Pre sauna USG (gr/cm ³)	0.25	0.81
Post Exercise- Post Sauna USG (gr/cm ³)	1.47	0.15

**($p < 0.01$)

DISCUSSION

The main reason for scientific studies in training science is to obtain maximal training potential and gain peak competitive performance in sports. One of the major preventive factors that could degrade the peak performance in tennis is to keep the hydration state under control for preventing the effects of fluid loss from decreasing performance. By examining the dehydration status of athletes in different methods and different exercise intensities, the researcher tried to measure and evaluate the loss quantity and effects of the hydration status. Studies have shown that dehydration differs in terms of exercise intensity and individual differences (25-29). In the current study, how much dehydration tennis players are exposed to as a result of aerobic exercise was investigated; and an exercise with 60% intensity, considering the average number of heartbeats of tennis matches. Since there is no time limitation in tennis matches, 90 minutes of running was organized considering the longest time that can be done in the laboratory environment. Casa et al. (2000)(30) conducted a graded dehydration classification study. The study categorized the urine density (USG) 1.010-1.020 g/cm³ and/or -1 to -3% BW change as minimal and 1.021-1.030 g/cm³ and -3 to -5 as significant or moderate dehydration status respectively. According to USG values measured as 1.024 ± 3.10 g/cm³ after exercise and 1.022 ± 0.5 g/cm³ after sauna shows that there is dehydration above the minimal level (Table 2). Some studies support the findings of the current study for exercise-induced dehydration results (31) and those that do not (9,32). For instance, the mean fluid loss by exercise in BW of the present study was 1.73 ± 0.54 kg and $2.45 \pm 0.74\%$, fluid loss of the endurance-trained males (25 ± 5 years; 175 ± 5 cm; 70.35 ± 5.46 kg; VO_{2max} , 62.95 ± 7.20 ml/kg/min-1) in ³³ percentage change in the BW ($2.43 \pm 0.59\%$, 1.71 ± 0.46 kg) results were parallel with the present study (Table 3).

Tennis players lost 1.73 ± 0.54 kg and $2.45 \pm 0.74\%$ of their total BW in total of 90 minutes in 60% intensity exercise in this study (Table 3). The results demonstrated that both of the study BW losses differed proportionally but the range of the % BW loss was similar according to the Casa et al (2000)(30) classification (minimal dehydration ranges = -1 to -3% BW loss). When the results of this study were compared with the study of Irwin et al., (2017)(33) It was seen that the proportional BW loss was low, while the BW loss was high when evaluated as kg. This suggests that exercise duration and intensity increase total BW loss, but do not have the same effect on proportional fluid loss. There were also the dehydration studies with fluid intake parallel with the current study results. López-Samanes et al. (2018)(31) examined the hydration status of tennis players during the match conditions. Hypohydrated (USG = 1.026 ± 0.002) tennis players lost $1.0 \pm 0.3\%$ of BW in spite of 1.035 ± 0.124 L/h of fluid ingestion. In the present study, the dehydration value (USG) without fluid intake was 1.024 ± 3.10 gr/cm³ and the BW loss was 1.73 ± 0.54 kg (Table 3). The reason for the higher value of BW loss in the current study than López-Samanes et al. ³² study may be the exercising protocol that was applied without fluid intake in the current study. Both of the studies demonstrated that despite the difference in exercise protocol and match condition with and without fluid intake, similar changes in BW and % fluid loss values were observed. Another study in a similar way, taking fluid Ito et al. (2020) examined the effect of electrolyzed hydrogen water on dehydration and triathlon athlete performance. In the study, the athletes exercised 65% of their VO_{2max} for 1 hour and took 2ml/kg of fluid every 15 minutes. It was stated that electrolyzed hydrogen water did not change the athlete's performance and body fluid balance, but reduced energy consumption. In the study, an average of 1.1 ± 0.4 kg BW loss was observed despite fluid intake during 1 hour of exercise. tennis players exercised for 90 minutes without fluid intake and a loss of 1.73 ± 0.54 kg ($2.45 \pm 0.74\%$) was determined (Table 3). Another study investigating the physiological responses of tennis players on different grounds, despite fluid intake, an average of $1.05 \pm 0.49\%$ BW loss was observed on the hardcourt and $0.32 \pm 0.56\%$ on the clay court. Before the match, the mean USG value of athletes' clay and hard courts were measured as 1.022 ± 0.004 (9) (USG value 1.020 is considered normal hydration (30)). The study also shows similar USG results on different court measurements. Indeed, these scientific studies show that for the evaluability and interpretation of the findings, controlled studies should be carried out on how much fluid loss will affect hydration when the athlete does or does not take fluids during match and laboratory conditions. Athletes dehydrate in different amounts depending on many variables such as the duration of the sauna, body composition, routine sauna activity in research studies. ^{10,33,34} Researchers have also investigated the effects of sauna-induced dehydration on athletes. In the study of Gutierrez et al. (2003), three-period sauna of 20 minutes at intervals of 5 minutes were applied to male athletes to evaluate the rapid weight loss of athletes. In the mentioned study, the athletes' BW loss result 1.40 kg ($1.8 \pm 0.5\%$) was similar to the current study 1.43 kg ($2.01 \pm 0.56\%$). In the study of Podstawski et al, (2014) sedentary participants were taken to the sauna with 5-minute breaks and two times of 10-minute periods, the participants lost an average of 0.42 ± 0.14 kg from their BW. Similarly, in the Podstawski et al. study (2019) the sedentary participants were kept for 40 minutes with 5-minute breaks, the participants lost an average of 0.65 ± 0.24 kg from their BW. Moreover, participants were allowed to enter the pool and take a shower with 14-15 degrees water during breaks. Due to the difference in the study design, no application to reduce body temperature was applied to tennis players in the present study might be the result of the less BW (1.43 ± 0.42 kg) loss in this study (Table 3). Since USG values were not examined in the study, the hydration status was not compared. The BW loss results of studies (33,34) were parallel with the current study. In contrast to the above-mentioned study, Hornery study (2007)(9) it is stated that their body temperature increased due to lack of thermoregulation. Therefore, less fluid loss was observed compared to the present study. This situation is thought to be caused by the athletes starting the match dehydrated.

Conclusions and recommendations

It is a good strategy for athletes to monitor body weight before training sessions or competitions, to maintain proper hydration. Moreover, monitoring the color of urine is a simple way to assess the hydration status. However, the American College of Sports Medicine (ACSM) warns that urine color may be misleading about the hydration status.

The findings of the research are guiding in terms of dehydration comparison for athletes, coaches, conditioners, and sports scientists. For future studies and to prevent dehydration, fluid and electrolyte loss should be determined using ergogenic assistance. The study offers the opportunity to compare the sauna practices and hydration conditions of athletes.

This study was produced from the master's thesis prepared by the first author under the supervision of the second author.

REFERENCES

1. McCarthy, PR, Thorpe, RD, & Williams, C. Body fluid loss during competitive tennis match-play. In Science and racket sports II. Taylor & Francis. 1998 70-3.
2. Kovacs, M. S. A review of fluid and hydration in competitive tennis. Int J Sports Physiol Perform. 2008 Dec;3(4):413-23.
3. Fleming JA, Naughton RJ, Harper LD. Investigating the nutritional and recovery habits of tennis players. Nutrients. 2018 Apr;3;10(4):443-55.
4. Toktas, N., & Demirors, R. Teniste Beslenme. Beslenme ve Diyet Dergisi. 2020 Oct;48(2):1-9.
5. Maughan, RJ., & Shirreffs, SM. Muscle cramping during exercise: causes, solutions, and questions remaining. Sports Med. 2019 Dec;49(Suppl 2):115-24.
6. Lieberman HR. Hydration and cognition: a critical review and recommendations for future research. J Am Coll Nutr. 2007 Oct;26(5):555-61.
7. Szinnai G, Schachinger H, Arnaud MJ, Linder L, Keller U. Effect of water deprivation on cognitive-motor performance in healthy men and women. Am J Physiol Regul Integr Comp Physiol. 2005 Jul;289(1):275-80.
8. Savvides, A., D Giannaki, C., Vlahoyiannis, A., S Stavrinou, P., & Aphamis, G. Effects of Dehydration on Archery Performance, Subjective Feelings and Heart Rate during a Competition Simulation. J. Funct. Morphol. Kinesiol. 2020 Aug;5(3):67-6.
9. Hornery, D. J., Farrow, D., Mujika, I., & Young, W. An integrated physiological and performance profile of professional tennis. Br J Sports Med. 2007 Aug;41(8):531-6.
10. Gutierrez A, Mesa JL, Ruiz JR, Chiroso LJ, Castillo MJ. Sauna-induced rapid weight loss decreases explosive power in women but not in men. Int J Sports Med. 2003 Oct;24(7):518-22.
11. Pearce AJ. Core temperature and hydration status in professional tennis players measured in live tournament conditions. Sci and Racket Sports, IV, 14. Taylor, Francis e-library. 1st Edition (2008).
12. Parker-Simmons, S, & Love, P. Sports Nutrition for Tennis Players. In Tennis Medicine. 2018 563-72.
13. Martin C., Prioux J. Tennis playing surfaces: The effects on performance and injuries. J Med Sci Tennis. 2016;21(1):11-19.
14. Kilit, B., & Arslan, E. Physiological demands during tennis matches. Spormetre Beden Egitimi ve Spor Bilimleri Dergisi. 2017 Apr;15(3):157-64.
15. Fernandez J, Mendez V, Pluim BM. Intensity of tennis match play. Br J Sports Med. 2006 May;40(5):387-91.
16. Toktas, N., & Demirors, R. Teniste Beslenme. Beslenme ve Diyet Dergisi. 2020 Oct;48(2):1-9.
17. Sanchez J, Mata F, Grimaldi M, Domínguez R. Nutritional and water needs. ITF Coaching and Sport Science. 2017 Dec;73(25):13-5.
18. Teodor DF. Nutrition guidelines for competitive tennis. Palestrica of the third millennium—Civilization and Sport. 2017 Oct 18(4):225-8.
19. Sawka, M. N., Burke, L. M., Eichner, E. R., Maughan, R. J., Montain, S. J., & Stachenfeld, N. S. American College of Sports Medicine position stand. Exercise and fluid replacement. Med Sci Sports Exerc. 2007 Feb;39(2):377-90.
20. International Tennis Federation. Nutrition. Available at: <https://www.itf-tennis.com/science-and-medicine/nutrition/eating-right.aspx> Accessed Feb 4, 2019
21. Kerkick CM, Wilborn CD, Roberts MD, Smith-Ryan A, Kleiner SM, Jäger R, ... & Greenwood M. ISSN exercise & sports nutrition review update: research & recommendations. J Int Soc Sports Nutr. 2018 Aug;15(1):38.
22. Küçükbas N, (2007). 15-17 yas antrenmanlı erkek ergenlerde vücut kompozisyonunun belirlenmesi. Doktora tezi. Hacettepe Üniversitesi, Sağlık Bilimleri Enstitüsü.
23. Siri, WE. Gross composition of the body. In: J.H. Laerence and C.A. Tobias (Eds.) Advance in Biological and Medical Physics IV. New York: Academic Press Inc. 1956;(4):239-280.
24. Gibson AL, Wagner D & Heyward V. Advanced Fitness Assessment and Exercise Prescription, 8E, America: Human kinetics. 8th ed. (2018).
25. Bowtell JL, Avenell G, Hunter PS, Mileva NK. Effect of Hypohydration on Peripheral and Corticospinal Excitability and Voluntary Activation. PLoS One. 2013 Oct 2;8(10):1-9.
26. Matias A, Dudar M, Kauzlaric J, Frederick KA, Fitzpatrick S, Ives SJ. Rehydrating efficacy of maple water after exercise-induced dehydration. J Int Soc Sports Nutr. 2019 Feb;16(1):5-18.
27. Morgan RM, Patterson MJ, Nimmo MA. Acute Effects of Dehydration on Sweat Composition in Men During Prolonged Exercise in the Heat. Acta Physiol Scand. 2004 Sep;182(1):37-3.
28. Ring M, Member S, Lohmueller C, Rauh M, M. Eskofier BM. On Sweat Analysis for Quantitative Estimation of Dehydration during Physical Exercise, IEEE, 2015 Aug; 7011-14.
29. Yapıcı A, Kavruk H, Celik E. Yüzücülerde Esik Dayanıklılık Antrenmanı (End-2) Sonucunda Olusan Dehidratasyonun Performans Üzerine Etkileri ve Vücut Hidratasyon Düzeyinin İncelenmesi. UKSAD. 2017 ;3(Special Issue 2):372-81.
30. Casa DJ, Armstrong LE, Hillman SK, Montain SJ, Reiff RV et. al. National Athletic Trainers' Association position statement: fluid replacement for athletes. J Athl Train. 2000 Apr;35(2):212-24.
31. López A, Mora-Rodríguez R & Ortega JF. Hormonal and neuromuscular responses during a singles match in male professional tennis players. PLoS One. 2018 Apr 6;13(4):1-13.
32. Ito, H., Kabayma, S., & Goto, K. Effects of electrolyzed hydrogen water ingestion during endurance exercise in a heated environment on body fluid balance and exercise performance. Temperature. 2020 7;(3):290-99. López-Samanes ÁG, Pallarés J, Pérez-
33. Irwin C, Campagnolo N, Iudakhina E, Cox GR, & Desbrow B. Effects of acute exercise, dehydration and rehydration on cognitive function in well-trained athletes. J Sports Sci. 2018 Feb;36(3):247-55.

34. Podstawski R, Boraczyński T, Boraczyński M, Choszcz D, Mańkowski S et. al. Sauna-induced body mass loss in young sedentary women and men. The Scientific World Journal. 2014 Dec;1-7.
35. Podstawski R, Boryślawski K, Clark C, Choszcz D, Finn KJ et al. Correlations between Repeated Use of Dry Sauna for 4 x 10 Minutes, Physiological Parameters, Anthropometric Features, and Body Composition in Young Sedentary and Overweight Men: Health Implications. BioMed Research International. 2019 Jan;1-13.

EFFECT OF COVID-19 ON AMATEUR FOOTBALL: PERSPECTIVE OF PHYSICAL ACTIVITY, NUTRITION, AND MOOD

İNCİ KESİLMİŞ^{*1}, OSMAN YILMAZ², DEMET ÖZTÜRK ÇELİK¹

1. Department of Physical Education and Sports, Osmaniye Korkut Ata University, Osmaniye, Turkey

2. Institute of Health Sciences, Department of Training Education, Selçuk University, Konya, Turkey

Corresponding author. incikesilmis@osmaniye.edu.tr

ABSTRACT

The aim of this study was to examine the correlation between physical activity, mood and nutrition of amateur football players and the differences in mood and nutritional variables depending on their physical activity status. 286 amateur league footballers whose leagues were suspended due to the pandemic participated in the study. Brunel Mood Scale was used to determine the mood of the athletes, the International Physical Activity Scale was used to determine the physical activity levels, and the Three-Factor Eating Questionnaire was used to evaluate the nutritional status. After testing the normality of the distribution, the Spearman correlation coefficient was used for correlational analysis. Kruskal Wallis H test was used to evaluate mood and nutrition according to physical activity groups, and the Mann Whitney U test was used in paired groups to determine the source of the difference. When the fatigue and vigor scores of the inactive and minimally active players were examined, it was seen that the difference between them was statistically significant in favor of the football players included in the minimally active group. When the results of the nutrition variables were examined, it was seen that the difference between the variables of emotional eating, cognitive restraint and susceptibility to hunger was in favor of the minimally active group. In all mood variables according to the physical activity levels of Health Enhancing Physical Activity (HEPA) active and inactive football players, all of the statistically significant differences observed in all nutritional variables except uncontrolled eating were in favor of the HEPA active group ($p < .05$). All of the statistically significant differences observed in all mood variables according to the physical activity levels of minimally active and HEPA active football players were in favor of the HEPA active group ($p < .05$). No statistically significant difference was observed between the nutritional variables of minimally active and HEPA active football players ($p > .05$). The results of this research showed that maintaining regular physical activity was an important preventive strategy for mental health and nutrition during the mandatory isolation period, such as the current coronavirus pandemic.

KEYWORDS: Coronavirus, fatigue, depression, anger, vigor, uncontrolled eating, emotional eating, cognitive restraint, susceptibility to hunger.

INTRODUCTION

The world is faced with a global threat from the 2019 Coronavirus disease (COVID-19) caused by SARS-CoV-2. COVID-19 which emerged in China towards the end of 2019 was identified as a low respiratory infection followed by the severe acute respiratory syndrome.¹ The new type of coronavirus pandemic seriously affected health, entertainment and many sports organizations around the world, including the Olympics, which are a world cultural heritage.² The most important way to prevent the COVID 19 pathogen is to have a strong immune system, and the strong immune system is directly related to regular physical activity and a healthy diet.^{3,4} Regular exercises of different intensities have a positive effect on people's physical and psychological health.⁵⁻⁷ This situation is also extremely important for professional athletes. With the effect of changes in the daily plans of elite athletes and social isolation, it is stated that the decrease in athlete performance, daily negative news, economic problems, tension caused by differences in social life, stress and uncertainty about returning to sports can adversely affect the mental health of athletes.⁸ At the same time, it is known that nutrition, as well as physical activity, is of great importance in terms of protecting physical and mental health.^{9,10} The positive effect of nutrition on health is known and it is stated that different eating behaviors emerge in some situations that cause negative physical and psychological consequences. In general, it is stated that many non-physiological factors such as eating habits and food choices are affected by the emotions that occur in people's eating behavior, but problems such as obesity and eating disorders may be caused by social appearance anxiety and emotions.^{11,12} Lippi et al. (2020) stated that a decrease in the level of physical activity can negatively affect the person psychologically and as a result, anger, sadness, arousal and disappointment are felt intensely.¹³ With the COVID-19 process, it is thought that the quarantine conditions that athletes are exposed to may have physical and psychological effects and this will have different effects on athlete performance.² It is stated that outbreaks with fatal effects will cause people in quarantine to show psychological symptoms such as depression, confusion, stress and eating disorders.^{13,14} As a result of the uncertainties in the pandemic process, serious confusion has emerged about the exercise status of the athletes, their resumption of sports activities, and most importantly, how infected athletes can manage the process.¹⁵ The COVID-19 pandemic has caused daily activities to suddenly stop and millions of people to be isolated. Since the COVID-19 outbreak process puts athletes in a situation such as home quarantine, it is stated that the deterioration in physical fitness parameters is seen as a result of insufficient and/or inappropriate training types.¹⁶ Following the cancellation of professional football practices and competitions in many countries, and due to a global health warning, players were often forced to be quarantined in their homes. During the COVID-19 process, a significant decrease or even a complete cessation of football training occurred and many professional football players around the world were adversely affected by this situation.¹⁷ During this isolation, soccer players likely suffered some degree of underperformance as a result of inadequate and / or inappropriate training effects.¹⁸

After the outbreak of COVID 19, Turkey Football Federation has suspended the regional and local amateur leagues on 14-15 March 2019 and, with the decision taken the 2019-2020 season was registered. Then, in line with the measures taken within the scope of coronavirus, the launch of amateur leagues for the new season was postponed. With the prolongation of the pandemic process, it is thought that amateur football players are affected physically, mentally and economically. When the literature is reviewed, there are studies that contain recommendations for improving the performance of football players in the event that the COVID-19 epidemic is over,¹⁸ that contain medical advice for the training of football players in quarantine,⁸ that examine worldwide effect of COVID-19 on physical activity,¹⁹ that examine the correlation between training variables, sleep patterns and mood of the COVID-19 quarantine process in football players,²⁰ that offer insights on fitness training, physical preparation, recovery and how elite soccer players can return to the competitive pitch after the crisis around the world during pandemic conditions.²¹ However, it seems that there is no study examining the correlation between physical activity, mood and nutrition of amateur football players who were exposed to social isolation due to COVID-19. Thus, this study aimed to examine the correlation between physical activity, mood and nutrition of amateur football players and the differences in mood and nutritional variables depending on their physical activity status.

METHODS

Design

In order to conduct the study, an "Ethics Committee Approval Certificate" was obtained from the Scientific Research and Publication Ethics Committee of Osmaniye Korkut Ata University (2021/2/7-373). The research group consists of athletes who were licensed in the amateur football team in Turkey. The scales and questionnaires transferred to the online platform with the Google form online survey method were sent to the athletes and the data were recorded.

Participants

286 amateur league players with the mean training year of 9.41 ± 5.15 yr participated in the study. 133 of the athletes were in the regional amateur league and 153 of them were in the local amateur league. The mean age of participants was 21.93 ± 4.72 yr, the mean body height of them was 177.97 ± 6.15 cm and the mean body mass of them was 71.79 ± 8.08 kg.

Data Collection Tools

Brunel Mood Scale

The adolescent and adult form of the Brunel Mood Scale was developed by Terry et al. (1999; 2003), which examined the answers given by the athletes to the question of "How are you feeling right now?". The validity-reliability study (Turkish adaptation) of the Brunel Mood Scale in adult athletes was conducted by Çakıroğlu (2016).²⁴ The study group consisted of 608 licensed athletes over the age of 18 from different branches. As data collection tools, "Brunel Mood Scale (BRUMS)" and personal information form were used. The Cronbach alpha coefficient was used for the reliability of the scale, and the test-retest reliability was found ($\alpha = .866$) and ($\alpha = .853$) respectively, and the scale was found to be quite reliable. For the test-retest item factor analysis, the dependent sample t-test was performed, and the results obtained in two different time periods were similar, thus the invariance of the scale was determined. In the confirmatory factor analysis (CFA) model results, it was observed that the model showed a perfect fit with the value of χ^2/df as 2.95 with 0.05 significance. When the correlation coefficients between the sub-dimensions of the scale were examined, it was seen that there was a significant correlation. As a result, It has been reported that the Turkish version of the Brunel Mood Scale (BRUMS) is a valid and reliable scale.

International Physical Activity Scale (IPAQ)

The International Physical Activity Questionnaire was developed to determine the physical activity levels of participants aged 15-65.²⁵ The validity and reliability study of the Turkish version of the International Physical Activity Questionnaire (IPAQ) was conducted by Sağlam et al. (2010) on 1,097 participants (721 women, 376 men) between the ages of 18-32.²⁶ It was reported that it also provided test-retest reliability ($r = .69$, $p < .001$). Caltrac accelerometer data were compared with the IPAQ scores of 80 participants who fit well for the short and long forms, and the Turkish versions of the IPAQ short and long forms were reported to be reliable and valid in the assessment of physical activity.²⁶ The questionnaire consists of seven questions, providing information about walking, moderate vigorous activities and time spent in vigorous activities, walking and sitting. The calculation of the total score includes the total duration of moderate vigorous activity and vigorous activity process (minutes) and frequency (days) of walking. Calculation of the total score for the short form includes the total duration (minutes) and frequency (days) of walking, moderate activity, and vigorous activity. The energy required for the activities is calculated with the MET-minute score. Standard MET values were established for these activities.

Three-Factor Eating Questionnaire (TFEQ)

Three-factor eating questionnaire was used to determine the participants' level of uncontrolled eating, emotional eating, cognitive restraint and susceptibility to hunger. TFEQ was first developed by Stunkard and Messic in 1985 to measure the behavioral and cognitive components of eating.²⁷ The questionnaire was first developed with 51 questions, and after the validity and reliability analyzes were made, it took its final form with 18 questions. The Turkish version of Questionnaire was developed by Kırac et al. (2015) and its reliability was reported to be high in accordance with validity and reliability analysis.²⁸ The reliability of the three-factor eating questionnaire was calculated by the Cronbach alpha value (Cronbach alpha value 0.721). Also, test-retest reliability coefficients of the questionnaire were calculated (Factor 1 = 0.958, Factor 2 = 0.92, Factor 3 = 0.967, Factor 4 = 0.954). As a result of the factor analysis made in the questionnaire; questions 1, 7, 13, 14 and 17 measure people's uncontrolled eating levels; questions 3, 6 and 10 measure the degree of emotional eating; questions 2, 11, 12, 15, 16 and 18 measure the degree of restriction of people's cognitive restraint and questions 4, 5, 8 and 9 measure the susceptibility to hunger.²⁸

Statistical Analysis

Using the Descriptive Statistics and Kolmogorov Smirnov test, the normality of the distribution was tested, Z scores were calculated and outliers were excluded from the study. Since the distribution was not normal, Spearman Correlation Coefficient was used for correlational comparisons, Kruskal Wallis H test was applied to examine mood and nutritional status according to MET Categories, and Mann Whitney U analysis was performed to examine between which groups the observed significant differences were. A correlation coefficient of 1.00 indicates a perfect positive relationship, a perfect negative relationship of -1.00, and non-existence of 0.00. A coefficient between 0.70-1.00 is defined as high, between 0.70-0.30 as medium, and between 0.30-0.00 as a low-level relation.²⁹

RESULT

There was a low-level positive correlation between fatigue-depression-anger and emotional eating-susceptibility to hunger. There was a low-level negative correlation between fatigue-depression-anger and cognitive restraint. A low negative correlation was observed between Fatigue and all physical activity variables. A low-level negative correlation was observed between depression and anger variables and all physical activity variables except moderate ($p < .05$). While there was a low-level negative correlation between the vigor variable and emotional eating and susceptibility to hunger, there was a low-level positive correlation between the vigor variable and cognitive restraint, MET-Vigorous, MET-Moderate and MET-Walking. A moderate positive correlation was observed between the vigor variable and Total MET. There was a low-level negative correlation between emotional eating and all physical activity variables except MET Walking. A low-level positive correlation was observed between cognitive restraint and MET-Moderate and Total-MET. A low level of negative correlation was observed between susceptibility to hunger and all physical activity variables except MET-Vigorous (Table I).

Table I. Spearman Correlation Coefficient Results

Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	10	11	12
Fatigue (1)	C												
	C	1											
	Sig.	.											
Depression (2)	C												
	C	0,806*	1										
	Sig.	.000	.										
Anger (3)	C												
	C	0,752*	0,843*	1									
	Sig.	.000	.000	.									
Vigor (4)	C												
	C	-0,63*	-	-	1								
	Sig.	.000	.000	.000	.								
Uncontrolled Eating (5)	C												
	C	0,089	0,102	0,064	-0,077	1							
	Sig.	0,133	0,085	0,283	0,192	.							
Emotional Eating (6)	C												
	C	0,219*	0,202*	0,231*	-	0,514*	1						
	Sig.	.000	0,001	.000	.000	.000	.						
Cognitive Restraint (7)	C												
	C	-	-	-	0,181*	-	-0,26*	1					
	Sig.	.000	.000	0,005	0,002	.000	.000	.					
Susceptibility to Hunger (8)	C												
	C	0,247*	0,184*	0,194*	-	0,668*	-	1					
	Sig.	.000	0,002	0,001	.000	.000	.000	.000	.				
MET- Vigorous (9)	C												
	C	-	-	-	0,297*	-0,048	-0,19*	0,165*	-0,114	1			
	Sig.	0,003	0,007	0,005	.000	0,421	0,001	0,005	0,054	.			
MET – Moderate (10)	C												
	C	-	-	-	0,165*	-0,11	-	0,258*	-	0,54*	1		
	Sig.	0,005	0,088	0,116	0,005	0,062	0,015	.000	0,013	.000	.		
MET - Walking (11)	C												
	C	-	-	-	0,23*	0,01	-0,092	0,107	-	0,191	0,168	1	
	Sig.	0,002	0,001	.000	.000	0,861	0,122	0,071	0,001	* 0,001	* 0,004	.	
Total MET (12)	C												
	C	-	-	-	0,326*	-0,045	-	0,202*	-0,2*	0,874	0,599	0,54	1
	Sig.	.000	0,001	.000	.000	0,447	0,001	0,001	0,001	* .000	* .000	* .000	.

Note CC=Correlation Coefficient, * $p < .05$.

Table 2. Mood and Nutrition According to MET Groups

Variables	MET Category	N	Mean Rank	χ^2	df	Sig
Fatigue	Inactive	58	176,2155	15,627	2	0,000
	Minimally Active	125	145,292			
	HEPA Active	103	122,9029			
Depression	Inactive	58	161,8362	9,403	2	0,009
	Minimally Active	125	150,812			
	HEPA Active	103	124,301			
Anger	Inactive	58	164,0517	11,761	2	0,003
	Minimally Active	125	151,604			
	HEPA Active	103	122,0922			
Vigor	Inactive	58	103,3793	25,623	2	0,000
	Minimally Active	125	139,372			
	HEPA Active	103	171,1019			
Uncontrolled Eating	Inactive	58	150,5259	1,298	2	0,523
	Minimally Active	125	137,392			
	HEPA Active	103	146,9563			
Emotional Eating	Inactive	58	170,5862	8,095	2	0,017
	Minimally Active	125	138,312			
	HEPA Active	103	134,5437			
Cognitive Restraint	Inactive	58	113,0345	10,569	2	0,005
	Minimally Active	125	147,4			
	HEPA Active	103	155,9223			
Susceptibility to Hunger	Inactive	58	179,9052	14,391	2	0,001
	Minimally Active	125	135,84			
	HEPA Active	103	132,2961			

Note HEPA= Health Enhancing Physical Activity

Analysis results showed that the variables of fatigue [χ^2 (sd=2, n=286)=15.627, $p<.05$], depression [χ^2 (sd=2, n=286)=9.403, $p<.05$], anger [χ^2 (sd=2, n=286)=11.761, $p<.05$], vigor [χ^2 (sd=2, n=286)=25.623, $p<.05$] differ significantly according to the physical activity levels of the football players. Considering the mean rank of fatigue, depression and anger variables according to the physical activity levels, it appeared to be higher in the inactive group, followed by the minimally active and HEPA active group. Considering the mean rank of the vigor variable according to the level of physical activity, it was observed that it was high in the HEPA active group, followed by the minimally active and inactive group (Table 2). When the results of the nutritional data were examined, a statistically significant difference was not observed in the uncontrolled eating variable according to the physical activity levels of the football players ($p>.05$). Also, it was seen that the variables of emotional eating [χ^2 (sd=2, n=286)=8.095, $p<.05$], cognitive restraint [χ^2 (sd=2, n=286)=10.569, $p<.05$], and susceptibility to hunger [χ^2 (sd=2, n=286)=14.391, $p<.05$], differ significantly according to the physical activity levels of football players. Considering the mean rank of the emotional eating and susceptibility to hunger variables according to the level of physical activity, it was observed that it was high in the inactive group, followed by the minimally active and HEPA active group. Considering the mean rank of the cognitive restraint variable according to the level of physical activity, it was observed that it was high in the HEPA active group, followed by the minimally active and inactive group (Table 2).

Table 3. Mann Whitney U Test Results According to MET Groups (Inactive and Minimally Active)

Variables	MET Category	N	Mean Rank	Sum of Ranks	U	Z	Sig
Fatigue	Inactive	58	106,069	6152	2809	-2,45538	0,014
	Minimally Active	125	85,472	10684			
Depression	Inactive	58	96,77586	5613	3348	-0,83169	0,406
	Minimally Active	125	89,784	11223			
Anger	Inactive	58	97,73276	5668,5	3292,5	-0,99971	0,317
	Minimally Active	125	89,34	11167,5			
Vigor	Inactive	58	76,07759	4412,5	2701,5	-2,78253	0,005
	Minimally Active	125	99,388	12423,5			
Uncontrolled Eating	Inactive	58	97,35345	5646,5	3314,5	-0,93786	0,348
	Minimally Active	125	89,516	11189,5			
Emotional Eating	Inactive	58	106,0172	6149	2812	-2,46062	0,014
	Minimally Active	125	85,496	10687			
Cognitive Restraint	Inactive	58	76,76724	4452,5	2741,5	-2,66275	0,008
	Minimally Active	125	99,068	12383,5			

Susceptibility to Hunger	Inactive	58	112,6034	6531	2430	-3,61331	0,000
	Minimally Active	125	82,44	10305			

When the fatigue ($U = 2809$, $p < .05$) and vigor ($U = 2701.5$, $p < .05$) scores of the inactive and minimally active football players were examined, it was seen that the difference was statistically significant in favor of the football players included in the minimally active group. When the results of the nutrition variables were examined, the difference between the variables of emotional eating ($U = 2812$, $p < .05$), cognitive restraint ($U = 2741.5$, $p < .05$) and susceptibility to hunger ($U = 2430$, $p < .05$) was in favor of the minimally active group. (Table 3).

Table 4. Mann Whitney U Test Results According to MET Groups (Inactive and HEPA Active)

Variables	MET Category	N	Mean Rank	Sum of Ranks	U	Z	p
Fatigue	Inactive	58	99,64655	5779,5	1905,5	-3,82155	.000
	HEPA Active	103	70,5	7261,5			
Depression	Inactive	58	94,56034	5484,5	2200,5	-2,77526	.006
	HEPA Active	103	73,36408	7556,5			
Anger	Inactive	58	95,81897	5557,5	2127,5	-3,04211	.002
	HEPA Active	103	72,65534	7483,5			
Vigor	Inactive	58	56,80172	3294,5	1583,5	-4,96082	.000
	HEPA Active	103	94,62621	9746,5			
Uncontrolled Eating	Inactive	58	82,67241	4795	2890	-0,34406	.731
	HEPA Active	103	80,05825	8246			
Emotional Eating	Inactive	58	94,06897	5456	2229	-2,70444	.007
	HEPA Active	103	73,64078	7585			
Cognitive Restraint	Inactive	58	65,76724	3814,5	2103,5	-3,12897	.002
	HEPA Active	103	89,57767	9226,5			
Susceptibility to Hunger	Inactive	58	96,80172	5614,5	2070,5	-3,24664	.001
	HEPA Active	103	72,10194	7426,5			

Note HEPA= Health Enhancing Physical Activity

According to the physical activity levels of HEPA active and inactive football players, all of the statistically significant differences observed in all mood variables and in all nutritional variables except uncontrolled eating were in favor of the HEPA active group (Table 4).

Table 5. Mann Whitney U Test Results According to MET Groups (Minimally Active and HEPA Active)

Variables	MET Category	N	Mean Rank	Sum of Ranks	U	Z	p
Fatigue	Minimally Active	125	122,82	15352,5	5397,5	-2,10679	0,035
	HEPA Active	103	104,4029	10753,5			
Depression	Minimally Active	228	124,028	15503,5	5246,5	-2,4061	0,016
	HEPA Active	125	102,9369	10602,5			
Anger	Minimally Active	125	125,264	15658	5092	-2,72537	0,006
	HEPA Active	103	101,4369	10448			
Vigor	Minimally Active	125	102,984	12873	4998	-2,91559	0,004
	HEPA Active	103	128,4757	13233			
Uncontrolled Eating	Minimally Active	125	110,876	13859,5	5984,5	-0,92077	0,357
	HEPA Active	103	118,8981	12246,5			
Emotional Eating	Minimally Active	125	115,816	14477	6273	-0,33583	0,737
	HEPA Active	103	112,9029	11629			
Cognitive Restraint	Minimally Active	125	111,332	13916,5	6041,5	-0,80263	0,422
	HEPA Active	103	118,3447	12189,5			
Susceptibility to Hunger	Minimally Active	125	116,4	14550	6200	-0,48272	0,629
	HEPA Active	103	112,1942	11556			

Note HEPA= Health Enhancing Physical Activity

All of the statistically significant differences observed in all mood variables according to the physical activity levels of minimally active and HEPA active football players were in favor of the HEPA active group ($p < .05$). No difference was observed between the nutritional variables of minimally active and HEPA active football players ($p > .05$).

DISCUSSION

In team sports such as football, it is possible that the communication between the athletes and the coach will decrease and the individual training conditions are inadequate due to the lack of regular training and official competitions during the isolation period. To our knowledge, this study is the first study that examines the correlation between physical activity, mood and nutrition of amateur football players and the differences in mood and nutritional variables depending on their physical activity status during the pandemic. Our current understanding of these lockdown measures on physical activity, nutrition and mood of athletes are limited. Due to the impact of quarantine conditions, the training routines of a significant number of athletes around the world were suddenly interrupted and the athletes were further away from the benefits they received from daily training, with uncertainties about the future, serious damage was done to the quality and quantity of training.⁸ It has been reported that changes in health behavior during the quarantine process may be responsible for worse mood, anxiety and depression.³⁰ Before the pandemic, elite athletes suffered from many mental health symptoms and disorders compared to non-athletes. COVID-19 has put new strains on elite athletes, potentially increasing their vulnerability to mental health symptoms.³¹

There are studies in the literature that include strategies and suggestions for returning to football after the COVID-19 quarantine³² and examining the factors related to anxiety in professional football teams.³³ In a study in which investigated the effect of psychological factors in the quarantine process of handball players, who are from team sports, it has been shown that psychological factors are extremely effective in training and recovery processes.²⁰ In our study, a low negative correlation was observed between fatigue and all physical activity variables. A low-level negative correlation was observed between depression and anger variables and all physical activity variables except MET-moderate (Table 1). Social isolation, reduction of exercise, sedentary behavior, and changes in diet as a result of the pandemic have psychological consequences and can affect fatigue.³⁴ There are studies showing that participation in regular physical activity positively affects mood,³⁵ even in the off-season.³⁶ It has been reported that the decrease in the level of physical activity causes an increase in depressive disorders.³⁷ Similarly in a study examining the relationship between the physical activity and mood of children and adolescents in social isolation during the COVID-19 pandemic, it was found that the level of physical activity had a significantly positive effect on their mood. At the same time, similar to our study, the total mood disturbance was significantly lower in the medium and high-level physical activity groups than in the low-level physical activity group.³⁸ There are studies on psychological problems during the COVID-19 process, but studies on football players are limited.³⁹ Studies are reporting that a prolonged quarantine period causes a large negative psychological effect and causes negative moods such as depression, stress, and anxiety.^{40,41} There are also studies reporting that participation in physical activity in accordance with WHO recommended guidelines in the first phase of the COVID-19 quarantine is significantly associated with reduced anxiety and bad mood.⁴² Similarly, Turgut et al (2020) reported a high correlation between night eating and fatigue, depression. There are studies reporting.² Besides, there are studies reporting that night eating behavior is effective on depressive mood, stress and anxiety.⁴³ As another result of this study, all of the statistically significant differences observed in all of the mood variables according to the physical activity levels of HEPA active and inactive football players and in all nutritional variables except uncontrolled eating were in favor of the HEPA active group (Table 4). Pillay et al (2020) reported that COVID-19 had physical, nutritional and psychological consequences that could affect athletes' return to safe sports and their general health, in the study investigating the effect of coronavirus-related measures on elite and non-elite athletes.³⁴ Turgut et al. (2020) showed that athletes were protected against the negative effects of situations related to night eating behavior and mood as long as they remained physically active during the COVID-19 process.² In our study, all of the statistically significant differences observed in all mood variables according to the physical activity levels of minimally active and HEPA active football players were in favor of the HEPA active group ($p < .05$). No difference was observed between the nutritional variables of minimally active and HEPA active football players ($p > .05$).

CONCLUSION

It is important to pay attention to the nutritional habits of athletes as much as the importance given to physical activity during social isolation. As a result of this period, it may lead to consumption of high-calorie foods due to anxiety.⁴⁴ League cancellations and extensive restrictions on social distance negatively affect athletes who cannot continue regular training.⁴⁵ It has also been reported that as a result of not being able to manage stress in this process, it may cause some athletes to experience short or long-term depression.⁴⁶ In this study, it has been shown that being physically active in amateur league players positively affects mood and nutritional variables compared to being inactive. Based on the results of this research, it is recommended that football players should do regular physical activity despite all the limitations.

REFERENCES

1. Hammami A, Harrabi B, Mohr M, Krstrup P. 2020. Physical activity and coronavirus disease 2019 (COVID-19): specific recommendations for home-based physical training, *Manag. Sport Leis* <https://doi.org/10.1080/23750472.2020.1757494>
2. Turgut M, Soyly Y, Metin SN. 2020. Physical activity, night eating, and mood state profiles of athletes during the COVID-19 pandemic. *Progress in Nutrition*, 22(2):e2020019. <https://doi.org/10.23751/pn.v22i2-S.10567>
3. Li X, Geng M, Peng Y, Meng L, Lu S. 2020. Molecular immune pathogenesis and diagnosis of COVID-19. *J Pharm Anal* 10(2):102–108. <https://doi.org/10.1016/j.jpha.2020.03.001>
4. Ravalli S, Musumeci G. 2020. Coronavirus Outbreak in Italy: Physiological Benefits of Home-Based Exercise During Pandemic. *J. Funct. Morphol. Kinesiol* 5, 31. <https://doi.org/10.3390/jfmk5020031>
5. Janssen I, LeBlanc AG. 2010. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity* 7(1): 1–16.
6. Soyly Y, Arslan E, Sogut M, Kilit B, Clemente F. 2021. Effects of self-paced high-intensity interval training and moderate intensity continuous training on the physical performance and psychophysiological responses in recreationally active young adults. *Biology of Sport* 38(4): 555-562.

7. Turgut M, Soylu Y. 2021. Effects of 8-week zumba exercise on blood lipids profile in sedentary women. *Pedagogy of Physical Culture and Sports* 25(3):172-177. <https://doi.org/10.15561/26649837.2021.0305>
8. Andreato LV, Coimbra DR, Andrade A. 2020. Challenges to Athletes During the Home Confinement Caused by the COVID-19 Pandemic. *Strength Cond J* 42 (3), 1–5. <https://doi.org/10.1519/SSC.0000000000000563>
9. Martin K, Woo J, Timmins V, et al. 2016. Binge eating and emotional eating behaviors among adolescents and young adults with bipolar disorder. *J Affect Disord* 195: 88–95. <https://doi.org/10.1016/j.jad.2016.02.030>
10. Arslan E, Aras D, Can S. 2016. Comparison of daily energy expenditure and physical activity levels of female athletes and sedentary. *Spormetre The Journal of Physical Education and Sport Sciences* 14(1): 53–61. https://doi.org/10.1501/Sporm_00000000284
11. Soylu Y, Atik F, Öcalan M. 2017. An investigation on adolescents' social appearance levels (Sample of Kırıkkale Province) *Sportif Bakış: Spor ve Eğitim Bilimleri Dergisi* 51 (1): 38–45.
12. Canetti L, Bachar E, Berry EM. 2002. Food and emotion. *Behav Processes* 60(2): 157–164. [https://doi.org/10.1016/s0376-6357\(02\)00082-7](https://doi.org/10.1016/s0376-6357(02)00082-7)
13. Lippi G, Henry BM, Sanchis-Gomar F. 2020. Physical inactivity and cardiovascular disease at the time of coronavirus disease 2019 (COVID-19). *Eur J Prev Cardiol* 27(9), 906–908. <https://doi.org/10.1177/2047487320916823>
14. Brooks SK, Webster RK, Smith LE, et al. 2020. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 395(10227), 912-920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
15. Yeo TJ. 2020. Sport and exercise during and beyond the COVID-19 pandemic. *Eur J Prev Cardiol* 27(12), 1239– 1241. <https://doi.org/10.1177/2047487320933260>
16. Sarto F, Impellizzeri FM, Spörri J, Porcelli S, Olmo J, Requena B, ... & Franchi MV. 2020. Impact of potential physiological changes due to COVID-19 home confinement on athlete health protection in elite sports: a call for awareness in sports programming. *Sports Medicine* 50: 1417-1419.
17. Eirale C, Bisciotti G, Corsini A, Baudot C, Saillant G, Chalabi H. 2020. Medical recommendations for home-confined footballers' training during the COVID-19 pandemic: from evidence to practical application. *Biology of Sport* 37(2), 203.
18. Casais-Martínez L, Sanroman-Cortés Z, Del Hoyo-Lora M, Solla-Aguar I, Lago-Penas C. 2020. Return to training and competition after COVID-19 in professional football. *Science Performance and Science Reports*, 102(1): 1-3.
19. Tison GH, Avram R, Kuhar P, Abreau S, Marcus GM, Pletcher MJ, Olgin JE. 2020. Worldwide effect of COVID-19 on physical activity: a descriptive study. *Annals of Internal Medicine*, 173(9), 767-770. <https://doi.org/10.7326/M20-2665>
20. Mon-López D, García-Aliaga A, Bartolomé AG, Solana DM. 2020. How has COVID-19 modified training and mood in professional and non-professional football players? *Physiology & Behavior*, 227, 113148. <https://doi.org/10.1016/j.physbeh.2020.113148>
21. Mohr M, Nassis GP, Brito J, Randers MB, Castagna C, Parnell D, Krstrup P. 2020. Return to elite football after the COVID-19 lockdown, *Managing Sport and Leisure* 1-9. <https://doi.org/10.1080/23750472.2020.1768635>
22. Terry PC, Lane AM, Lane HJ, Keohane L. 1999. Development and validation of a mood measure for adolescents. *Journal of Sports Sciences* 17: 861–872. <https://doi.org/10.1080/026404199365425>
23. Terry PC, Lane AM, Fogarty GJ. 2003. Construct validity of the Profile of Mood States-Adolescents for use with adults. *Psychology of Sport and Exercise* 4(2): 125-139. [https://doi.org/10.1016/S1469-0292\(01\)00035-8](https://doi.org/10.1016/S1469-0292(01)00035-8)
24. Çakıroğlu, AA. 2016. The validity and reliability study of the brunel mood scale with the adult athletes. Master of Science Thesis, Institute of Health Sciences, Çanakkale Onsekiz Mart University.
25. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, Oja P. 2003. International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise* 35(8): 1381-1395. <https://doi.org/10.1249/01.MSS.0000078924.61453.FB>
26. Sağlam M, Arikian H, Savci S, Inal-Ince D, Bosnak-Guclu M, Karabulut E, Tokgozoglu L. 2010. International physical activity questionnaire: reliability and validity of the Turkish version. *Perceptual and Motor Skills* 111(1): 278-284. <https://doi.org/10.2466/06.08.PMS.111.4.278-284>
27. Stunkard AJ, Messick S. 1985. The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *J. Psychosomat. Res* 29(1):71-83. [https://doi.org/10.1016/0022-3999\(85\)90010-8](https://doi.org/10.1016/0022-3999(85)90010-8)
28. Kırac D, Kaspar EC, Avcılar T, Çakır ÖK, Ulucan K, Kurtel H, Güney Aİ. 2015. A new method in investigation of obesity-related eating behaviors 'three-factor eating questionnaire'. *Clinical and Experimental Health Sciences* 5(3): 162-169. <https://doi.org/10.5455/musbed.20150602015512>
29. Büyüköztürk S. 2010. *Data Analysis Handbook*. Pegem Academy, Ankara ISBN 978-975-6802-74-8. p.32
30. Ingram J, Maciejewski G, Hand CJ. 2020. Changes in diet, sleep, and physical activity are associated with differences in negative mood during COVID-19 lockdown. *Frontiers in psychology* 11: 2328. <https://doi.org/10.3389/fpsyg.2020.588604>
31. Reardon CL, Bindra A, Blauwet C, Budgett R, Campriani N, Currie A, Hainline B. 2020. Mental health management of elite athletes during COVID-19: a narrative review and recommendations. *British Journal of Sports Medicine*. 0:1-10. <https://doi.org/10.1136/bjsports-2020-102884>
32. Rico-González M, Pino-Ortega J, Ardigo LP. 2021. Playing Non-Professional Football in COVID-19 Time: A Narrative Review of Recommendations, Considerations, and Best Practices. *International Journal of Environmental Research and Public Health*, 18(2), 568. <https://doi.org/10.3390/ijerph18020568>
33. Esteves NS, Brito MA, Soto DAS, Müller VT, Aedo-Munoz E, Brito CJ, Miarka B. 2020. Effects of the COVID 19 pandemic on the mental health of professional soccer teams: epidemiological factors associated with state and trait anxiety. *Journal of Physical Education and Sport (JPES)*, 20(5): 3038 – 3045. <https://doi.org/10.7752/jpes.2020.413>

34. Pillay L, van Rensburg DCCJ, van Rensburg AJ, Ramagole DA, Holtzhausen L, Dijkstra HP, Cronje T. 2020. Nowhere to hide: The significant impact of coronavirus disease 2019 (COVID-19) measures on elite and semi-elite South African athletes. *Journal of Science and Medicine in Sport* 23(7): 670-679. <https://doi.org/10.1016/j.jsams.2020.05.016>
35. Maugeri G, Castrogiovanni P, Battaglia G, Pippi R, D'agata V, Palma A, Di Rosa M, Musumeci G. 2020. The impact of physical activity on psychological health during Covid-19 pandemic in Italy. *Heliyon* 6, e04315.
36. Gabbett TJ, Whyte DG, Hartwig TB, Wescombe H, Naughton GA. 2014. The relationship between workloads, physical performance, injury and illness in adolescent male football players. *Sports Med* 44, 989–1003.
37. Reardon CL, Hainline B, Aron CM, Baron D, Baum AL, Bindra A, Budgett R, Campriani N, Castaldelli-Maia JM, Currie A. 2019. Mental health in elite athletes: International Olympic Committee consensus statement (2019). *Br. J. Sports Med* 53, 667–699.
38. Zhang X, Zhu W, Kang S, Qiu L, Lu Z, Sun Y. 2020. Association between physical activity and mood states of children and adolescents in social isolation during the COVID-19 epidemic. *International Journal of Environmental Research and Public Health* 17(20), 7666. <https://doi.org/10.3390/ijerph17207666>
39. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, Yao L, Bai H, Cai Z, Xiang YB. et al. 2020. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav. Immun* 87: 11–17. <https://doi.org/10.1016/j.bbi.2020.03.028>
40. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. 2020. The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet*, 395, 912–920.
41. McAlonan GM, Murphy DG, Edwards AD. 2020. Multidisciplinary research priorities for the COVID-19 pandemic. *Lancet Psychiatry* 7(7): e35. [https://doi.org/10.1016/S2215-0366\(20\)30229-7](https://doi.org/10.1016/S2215-0366(20)30229-7)
42. López-Bueno R, Calatayud J, Ezzatvar Y, Casajús JA, Smith L, Andersen LL, Lopez-Sanchez GF. 2020. Association between current physical activity and current perceived anxiety and mood in the initial phase of COVID-19 confinement. *Frontiers in Psychiatry* 11(729):1-8. <https://doi.org/10.3389/fpsy.2020.00729>
43. Caredda, M., Roscioli, C., Mistretta, M., & Pacitti, F. (2009). Stress vulnerability and night eating syndrome in the general population. *Rivista di psichiatria*, 44(1), 45-54. PMID: 20066937
44. Rice SM, Purcell R, De Silva S, Mawren D, McGorry PD, Parker AG. 2016. The mental health of elite athletes: a narrative systematic review. *Sports Medicine* 46(9), 1333-1353. <https://doi.org/10.1007/s40279-016-0492-2>
45. World Health Organization WH. 2020. Considerations for sports federations/sports event organizers when planning mass gatherings in the context of COVID-19: interim guidance, 14 April 2020. Retrieved from.
46. Frank A, Fatke B, Frank W, Förstl H, Hölzle P. 2020. Depression, dependence and prices of the COVID-19-Crisis. *Brain Behav., Immunity*. <https://doi.org/10.1016/j.bbi.2020.04.06>

SPORTS ACTIVITIES IN THE COVID-19 PANDEMIC PROCESS

YASİN KARACA*¹, METİN CAN KALAYCI²

1. Assistant Professor, Osmaniye Korkut Ata University, College of Applied Sciences, Department of Recreation Management, Osmaniye, Turkey

2. Lecturer, Dicle University, College of Physical Education and Sport, Department of Coaching Training, Diyarbakır, Turkey

Corresponding author: yasinkaraca99@gmail.com

ABSTRACT

COVID-19 has adversely affected many areas of social life, especially health, economy, education and daily life. COVID-19 also caused various adversities in sports and sports activities. This study focuses on the effects on individuals doing sports in the COVID-19 period and sports practices in this period. In this study, in which the literature review method was used, information about the problems faced by fans, trainers, professional athletes and amateur sports individuals during the COVID-19 period is presented and some suggestions were made to individuals who do sports.

KEYWORDS: COVID-19, sport, sport activities

INTRODUCTION

Considered as an epidemic by the World Health Organization (WHO), COVID-19 has rapidly changed daily life from health to economy, from education to sports, by affecting the whole world. While the world is struggling with COVID-19 in every field, the world of sports has faced an unprecedented crisis. COVID-19 caused the cancellation of many national and international sports organizations around the world, postponing all kinds of competitions, keeping amateur athletes away from sports environments, and quarantining professional athletes. Sports, which is an effective tool for the physical, mental and social strengthening of individuals and societies, has ceased to be a regular activity of daily life after the epidemic spread throughout the world. COVID-19 has caused psychological and social problems in individuals who are interested in and somehow connected with sports. Social isolation and quarantine processes applied due to the epidemic disrupted sports activities of trainers, fans, amateur or professional athletes and individuals engaged in recreational sports, and kept away from sports environments and sports activities.¹ COVID-19 caused disruption of the training and competition programs of athletes.² Respiratory system and exercise capacity of athletes were negatively affected by these disruptions caused by COVID-19.³ In addition, the epidemic decreased the maximal and submaximal exercise performance by limiting the training practices specific to the field of athletes. The limitation negatively impacted the athletes' aerobic performance, cardiovascular function, and muscle metabolism. Due to the lack of regular training during this period, athletes suffered major losses at the VO₂max level.⁴ When access to professional facilities and disciplined support teams were interrupted during the epidemic period, only health measures were taken and the training schedule was tried to be postponed.⁵ Regardless of the category, uncertainties regarding the conditions that need to be created to ensure that athletes avoid physical contact that would endanger them and to allow sports fans to come together as before the epidemic remain uncertain.⁶ In the United Nations epidemic report, it was reported that most people were unable to participate in individual or group physical activities outside of their homes due to the epidemic restricting the areas of physical activity, and these conditions led most people to be less physically active. The United Nations also reported that the lack of access to physical activity during the pandemic isolates many people from normal social life and negatively impacts their participation in physical activity.¹

Sports Activities During the Epidemic Period

In research, the importance of cleanliness, social distance and necessary health checks in sports areas are emphasized. In addition, it is stated that it is important for individuals from all walks of life to do physical activity regularly to stay healthy in such times when most individuals do not have any experience with the epidemic. Physical activity experts indicate that 150-300 minutes of medium-intensity exercise and 2 sessions of muscle-strengthening exercises per week are very beneficial.¹ Studies have shown that regular physical activity has specific benefits in terms of mental, physical and physiological health parameters and positive health outcomes.^{7,8} During the epidemic, most individuals can do physical activity at home without the need for any equipment and special space. There are many options that the individual can stay active in the home environment throughout the day. Simple stretching movements, household chores, climbing stairs, dancing with music or various exercise movements can be performed. In addition, individuals with internet access can look for ways to stay active during this period by taking advantage of many free internet resources. In internet resources, games with physical activity content that are suitable for each individual and can be performed in small areas can be accessed online.¹ This is an indication that technology, which is an important part of daily life and makes life easier, can be used more effectively in sports activities. Technological innovations have also started to affect people's entertainment styles, behaviors, needs and values in the sports industry. The use of technology in sports is increasing. This increase in usage shows that the change in the sports industry in the next decade will be far greater than the previous few decades. At this stage, issues such as which sports will be more popular after the epidemic, how sports will be

organized in the future and how to enjoy sports should be emphasized. In addition, the need for deeper interaction and a more diverse content development to meet the changing behavior and new demographic needs of existing sports and sports enthusiasts should be on the agenda.⁹ The epidemic accelerated the digitalization of the sports sector and the integration of technology with sports. Thanks to the integration of sports with technology, mobile phones that identify and recognize the individual, and applications that collect personal information, physical activities, training programs, nutrition and motivation programs specific to the individual have started to help the individual to organize his daily life. Now, thanks to technological tools, trainers can make individuals do sports activities in front of cameras without any time and place limitations. Thus, technology makes it possible for individuals to follow their coach from home.¹⁰ Although there are good developments of this kind, epidemic problems still persist. Another problem affecting the sports sector during the epidemic period is the games played with the ball, which are popular with children and young people. It should be explained to young athletes why the games played with the ball should be limited in this period. Young people and children should be encouraged to temporarily stop playing ball sports during the epidemic and instead turn to fun physical activities that help maintain health. This change may not be easy for children and young people.¹¹ Physical activity plays an important role in the socialization of children and young people.¹² The loss of social interaction of children and young people during this period may endanger their peer relationships. Early research findings suggest that the epidemic increases youth's anxiety, depression and the abuse of time.^{13,14} Sports and exercise psychologists, physical education teachers and coaches should be engaged in providing social-psychological support to young athletes (online) during this period. Support during this period can help young athletes to keep their motivation high. Support can also be obtained from parents and peers in this process, but these individuals should not be subjected to excessive pressure to maintain social distance.¹⁵ Maintaining team spirit during this period is important for young athletes. Online group meetings can be held at times when they need to get together to provide team spirit and peer support due to restrictions. Thus, both social distances are maintained and mutual interaction can be established. Sports psychologists can help athletes develop skills to cope with anxiety, identify athletes who have been adversely affected by the epidemic or social isolation, and refer those with problems to mental health professionals. The crisis caused by the epidemic can be turned into an opportunity to help athletes and their families communicate with each other and improve their family relationships.¹⁶ Developments show that the impacts caused by COVID-19 are enormous and deeply affect sports and individuals interested in sports. Although it is not possible to eliminate the effects of the epidemic, some methods that can be applied in the process of returning to normal can help reduce the current effect. As part of the normalization process, a framework is presented below to help do sports activities more risk-free and safe. This framework, it is aimed to reduce the risk of COVID-19 transmission during sports activities and to raise awareness of the risks that participants may face.

Before Activity

Necessary precautions regarding the epidemic should be taken before starting sports activities. Regular assessments of individuals participating in or participating in sports activities should be conducted against suspected COVID-19. Athletes should be informed about the risks that may occur specific to their sport.¹⁷ Athletes must comply with epidemic restrictions and avoid risky behavior in their surroundings to avoid endangering other participants. Athletes should stay away from crowded environments against the risk of epidemics, prefer private vehicles for transportation, and prefer to walk if possible. In cases where a participant has been in contact or has been diagnosed with an outbreak, the names and contact information of the participants should be collected and kept for two weeks, provided that the personal information of the participants is kept confidential, in order to follow the public health radiation.

During Activity

Attention should be paid to social distance, masks should not be used during the activity, and sharing of personal belongings and sports equipment should be avoided. It is necessary to have information about how to protect the items and materials used during the activity against the risk of an epidemic. Materials used in sports activities should be cleaned frequently against the risk of spreading epidemics. Those who organize sports activities related to the cleaning of the balls used in games played with the ball should make a risk reduction plan.¹⁷ Whether athletes engage in behaviors that facilitate the spread of the epidemic during the activity should be observed by the activity authorities and, if necessary, these people should be warned. If athletes encounter a health problem that requires external intervention during the activity, attention should be paid to hygiene and cleanliness, according to health priority, and the intervener should take measures to protect himself and the athlete. At the end of the intervention, hands should be cleaned and sterilized with soap or disinfectant type materials.

In Activity Areas

Sports activities should be done outdoors as much as possible. Ventilation systems should be suitable for sports activities in indoor environments and efficient air filters should be used in these environments. If possible, natural ventilation methods should be preferred. Air fresheners and perfumes that cause sneezing or coughing should not be used indoors. It should be ensured that there are as few people as possible in closed environments. Facility staff should be trained on the epidemic. Items such as magazines, candy, phone chargers in public areas should be removed. Hand disinfectant should be placed at the entry-exit points, and disposable wet wipes or napkins should be preferred for cleaning when necessary. Participants showing signs of an epidemic should be reported to healthcare facilities immediately. In addition to usual facility cleaning procedures, frequently touched surfaces should be disinfected at short intervals. The seating arrangement of the common areas in the facilities should be arranged in accordance with the distance rule. The usage capacity limits of the changing rooms should be determined. The frequency of cleaning the floors of sports halls should be increased.¹⁷

Fomites in Equipment

In research, it has been proven that the virus can persist for a long time on equipment used in sports activities. Therefore, these equipments can act as fomite to carry the virus, and in this way COVID-19 can infect participants. Below are some suggestions that can help participants against fomite risk.

According to this; First of all, the equipment used in sports activities is defined. What is this equipment and what ingredients does it contain? How to clean this equipment in the most effective and safest way? The purpose of use, method of use and change of equipment are learned. Overall use of the equipment can be reduced. Sharing of equipment for personal use can be avoided. The risk of outbreak transmission during use of the equipment should be estimated. Equipment can be replaced with other equipment in case of epidemic transmission risk. When necessary, training on the use of equipment against risks can be obtained.¹⁷

Risk Assessment

In addition, due to the high number of participants in sports fields, the combative and competitive nature of the sport, the frequency of physical contact increases the risk of transmission of COVID-19. Therefore, the risk assessment should be done based on three basic variables in sports.¹⁵ First, an evaluation of virus droplet transfer should be made. Virus droplet transmission poses a risk associated with the actions of athletes in activity depending on the duration of sports and physical activity and social distance. Athletes can predict how risky the movements in the sports environment are. For example, everything from the fight against one or more people to the initial phase will determine the overall risk level specific to the sport. Second, infection transport and transmission assessment should be made. Thirdly, the risks that may be encountered during the transportation and transfer of sports equipment and the number of participants should be evaluated. The number of participants in the sports activity and other health problems that may be caused by these participants or the previously known risk factors of the participants should be evaluated. According to this general risk profile, some sports types may be included in the low-risk category. Therefore, returning to normal in these sports types will be faster and easier. In this process, a comprehensive risk assessment should be made in line with the action plan for protection from the epidemic by performing all sports activities in accordance with the procedures for protection from the epidemic. Particular attention should be paid to individuals under 18 and vulnerable adults who are less conscious of social distancing.¹⁷

CONCLUSION

As a result, these measures to be taken in environments where sports activities are carried out aim to minimize any direct or indirect contact of sports participants in order to protect them from the epidemic. Considering this main theme, all kinds of measures that can be taken both individually and institutionally play an important role in preventing negligence related to the pandemic. The main purpose here is to do sports activities safely during the pandemic process and to make the most of the benefits of sports. Therefore, in order to reduce the effects of the COVID-19 pandemic on sports activities and to continue to benefit from the benefits of sports, sports psychologists, trainers and athletes should cooperate and fight altogether. In order to protect the health of individuals who do sports regardless of their sports category or any age group and to ensure their participation in sports at all levels, it is recommended that every individual participating in sports activities or participating in sports environments avoid attitudes and behaviors that will increase the negative effects of the pandemic.

REFERENCES

1. United Nations (UN). (2020). The impact of COVID-19 on sport, physical activity and well-being and its effects on social development. Retrieved from <https://www.un.org/development/desa/dspd/2020/05/covid-19-sport/>
2. Chen P, Mao L, Nassis GP, Harmer P, Ainsworth BE, Li F. (2020). Returning Chinese school-aged children and adolescents to physical activity in the wake of COVID-19: Actions and precautions. *Journal List Elsevier Public Health Emergency Collection PMC7154517 J Sport Health Sci.*, 9 (4): 322-324. doi: 10.1016/j.jshs.2020.04.003
3. Timpka T. (2020). Sports health during the SARS-Cov-2 pandemic. *Sports Medicine (Auckland, Nz)*, 1-4.
4. Jukic I, Calleja-González J, Cos F, Cuzzolin F, Olmo J, Terrados N, et al. (2020). Strategies and solutions for team sports athletes in isolation due to COVID-19. *Sports*, 10.3390/sports8040056, 8 (4): 56
5. Mann RH, Clift BC, Boykoff J, Bekker S. (2020). Athletes as community; athletes incommunity: Covid-19, sporting mega-events and athlete health protection. *British Journal of Sports Medicine*, 54: 1071-1072. doi: 10.1136/bjsports-2020-102433.
6. Gilat R, Cole BJ. (2020). Editorial Commentary: COVID-19, medicine, and sports. *Arthroscopy, Sports Medicine, and Rehabilitation*, 10.1016/j.asmr.2020.04.003.
7. Chekroud SR, Gueorguieva R, Zheutlin AB, Paulus M, Krumholz HM, Krystal JH, Chekroud AM. (2018). Association between physical exercise and mental health in 1.2 million individuals in the USA between 2011 and 2015: A cross-sectional study. *The Lancet Psychiatry*, 5(9): 739-746. doi: /10.1016/S2215-0366
8. Mathieu RA, Powell-Wiley TM, Ayers CR, McGuire DK, Khera A, Das SR, Lakoski SG. (2012). Physical activity participation, health perceptions, and cardiovascular disease mortality in a multiethnic population: The Dallas heart study. *American Heart Journal*, 163(6): 1037-1040. doi:10.1016/j.ahj.2012.03.005
9. Bradford J. (2020). COVID-19 impact on sport. Retrieved from <https://www.mediacom.com/uk/article/index?id=covid-19-impact-on-sport>
10. Demiray H. (2020). Koronavirüsün spor sektörüne getirdiği maliyetler. [The costs of coronavirus to the sports industry]. Retrieved from <https://www.aa.com.tr/tr/spor/spor-futuristi-demiray-koronavirus-spor-sektorune-ciddi-maliyet-getirecek/1841114>
11. AMSN, NATA. (American Medical Society for Sports Medicine and the National Athletic Trainers 'Association) (2020). Youth sports and COVID-19: Understanding the risks, Retrieved from <https://www.healthychildren.org/English/health-issues/conditions/COVID-19/Pages/Youth-Sports-and-COVID-19-Understanding-the-Risks.aspx>

12. Ilkim M, Tanır H, Özdemir M. (2018). Socialization effect of physical activity in students who need special education. *Asian Journal of Education and Training*, 4(2);128-131.
13. Huang Y, Zhao N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 epidemic in China: A web-based cross-sectional survey. *medRxiv*. Retrieved from <https://www.medrxiv.org/content/10.1101/2020.02.19.20025395v2?rss=1>
14. Taub A. (2020). A new Covid-19 crisis: Domestic abuse rises World wide. *New York Times*, 6. Retrieved from <https://www.nytimes.com/2020/04/06/world/coronavirus-domestic-violence.html>
15. Oosterhoff B, Palmer C, Wilson J, Shook N. (2020). Adolescents' Motivations to Engage in Social Distancing during the COVID-19 Pandemic: Associations with Mental and Social Health. *67 (2): 179-185*. <https://doi.org/10.31234/osf.io/jd2kq>
16. Papaioannou AG, Schinke RJ, Chang YK, Kim YHH, Duda JL. (2020). Physical activity, health and well-being in an imposed social distanced world, *International Journal of Sport and Exercise Psychology*, 18:4, 414-419, DOI: 10.1080/1612197X.2020.1773195
17. Gov UK. (2020). Coronavirüs (Covid-19) guidance on the phased return of sport and recreation. Retrieved from <https://www.gov.uk/government/publications/coronavirus-covid-19-guidance-on-phased-return-of-sport-and-recreation>

THE RELATIONSHIP BETWEEN HEALTH LITERACY, HEALTH PROMOTING LIFESTYLE AND SCHOOL SPORTS PARTICIPATION AMONG ADOLESCENTS

Demet Ozturk Celik

Department of Physical Education and Sports, Osmaniye Korkut Ata University, Osmaniye, Turkey

Corresponding Author. demetozturk@osmaniye.edu.tr

ABSTRACT

The objective of this research was to investigate the relationship between perceived health literacy, health-promoting lifestyle and participation in school sports among adolescents. The data was obtained using a questionnaire consisting of three sections respectively as student information form including the participant demographics, the Turkish Version of Health Literacy for School-Aged Children (HLSAC-T) scale for measuring the subjective health literacy and the Turkish Version of Adolescent Lifestyle Profile (ALP-T) scale for measuring health-promoting lifestyle of students. The study was conducted in ten junior high schools located in Osmaniye Province of Turkey targeting students between ages 11 to 14 and from 5th grade to 8th grade. School sports participation status of students and its relationship between health literacy and lifestyle profiles are investigated based on the demographics of students. A Chi-square test with cross-tabulation is conducted in order to test the association between participation in school sports, student demographics, health literacy, health responsibility, physical activity and positive life perspective. Multiple logistic regression is also performed in order to determine the four independent variables (health responsibility, physical activity, positive life perspective and health literacy) from ALP-T and HLSAC-T scale affecting the participation of students to school sports. The results showed that the perceived health literacy levels of students were higher among the students that participate in school sports. From the sports participation point of view, low health responsibility and high positive life perspective levels were determinative on school sports participation.

KEYWORDS: *Physical Education, School Sports, Health Promotion, Health Literacy, Adolescents, Children.*

INTRODUCTION

According to World Health Organization (WHO), the term health literacy is broadly defined as the ability of individuals to "gain access to, understand and use information in ways which promote and maintain good health" ¹. Although health literacy is a relatively new concept, ² it is considered as an effective method in health promotion, a key determinant of health ³ and recently an important issue in public health policy. ⁴The researches on health literacy have shown that low health literacy is generally associated with poor health and social outcomes ^{5,6} such as less participation in health-promoting services, riskier health behaviors, less participation in early disease detection, increased hospitalization and health-care costs. ⁷ Health literacy levels of a person is often connected with a personal situation, health status, social group association and other socio-economic variables. ⁸ The literacy skill of individuals is an important factor in the development of their health literacy. ⁹ Hence much of the previous researches investigated the relationship between health literacy and health outcomes for adults rather than adolescents. ¹⁰ Moreover, since adults have much more health service utilization rates than adolescents, when considered from risk factor point of view, this makes them an important target group in health-literacy studies. This situation results in the neglect of health-literacy development among younger populations and thus prevent the improvement of future health outcomes ¹¹. According to Lawson, H.A. (2005) "human health and health-enhancing environments" are one of the five main contributions of sport, exercise and physical education (SEPE) to sustainable social and economic development. ¹² Since Lawson's statement does not describe the measure for health-enhancing environments which is dependent on infrastructure and other concepts that are not related to sports directly, Lee, S.P. et al., (2013) suggested "health literacy" as one of the dimensions to measure the social impact of sports due to its capability of capturing outcomes of sport. ¹³

Numerous studies are conducted on the outcomes of sport on health. Studies investigating the relationship between sports participation and health behaviors among adolescents underscore that the adolescents who participate in sports reported showing lower depressive symptoms, better self-rated mental and emotional health ¹⁴⁻¹⁶. In terms of the relationship between health literacy and participation in sports clubs, Paakkari, L. et al., (2017) reported that adolescents who are members of sports clubs tend to have a higher perception of health literacy than non-members. ¹⁷ Pate, R.R. et al., (1987) states that "a health-oriented physical education supported by scientific-based logic is an important tool to improve the health of children and youth" Pate also underlines that "physical education is highly compatible with modern "preventive health" philosophy due to its health-oriented origins and listed this statement as a reason to why physical education should play a central role in school health promotion programs. ¹⁸ In addition Jewett, et al., (2014) denote that participation to school sports may protect adolescents to develop poor mental health. And in order to promote mental health, increasing school sport participation may be included as a part of public health strategies. ¹⁴

In this study, it is aimed to investigate the relationship between health literacy, health-promoting lifestyle profiles and school sports participation among adolescents. In order to analyze the relationship between school sports participation, health literacy and health-promoting lifestyle profiles among adolescents, variables like age, gender, employment status of parents, perception of school achievement, perception of family economic condition, perception of health condition, importance of healthy lifestyle, relationship with family and friends are taken into account. The three sub-scales (health responsibility, physical activity, positive life perspective) of ALP-T is used as an instrument to measure health-promoting the lifestyle of

adolescents. The subjective health literacy levels of participants were measured using the HLSAC-T scale. Thus, four variables from two scales were used in order to determine their relationship between participation in school sports.

METHODOLOGY

Participants

The study is performed between April 2018 and June 2018 in ten junior high schools located in a rural area of Osmaniye province of Turkey affiliated with Osmaniye Provincial Directorate for National Education. The target population is composed of students between ages 11-14 from 5th grade to 8th grade. In order to compute the size of the sample group, an apriori statistical power analysis is conducted using G*Power 3.0.10. software¹⁹ by selecting the Type I error as 0.05 and Type 2 error as 0.20 (80% power) using the chi-square test by Paakkari, L. et al.(2017)¹⁷. Thus the required number of participants is determined as 286. However, all the students who volunteered to participate in the survey with a basic understanding of the instruments are also included in the study.

Measures

Student Information Form

The demographics of the participants are obtained by the student information form located in the first section of the questionnaire. The form includes information about participants such as age, grade, gender, height, weight, school sports participation status, employment and health insurance status of parents, perception of school achievement and health condition, the importance of healthy lifestyle for the participant and the number of regular exercise days in a week.

Adolescent Lifestyle Profile Scale (ALP)

The Adolescent Lifestyle Profile (ALP) is originally developed by Hendricks, C. et al., (2006) targeting to measure health-promoting lifestyle of adolescents²⁰. The scale is the revised version of Health Promoting Lifestyle Profile II (HPLP II) proposed by Pender, N.J. et al., (2002)²¹. HPLP II scale is based on Health Promotion Model²². The ALP scale consists of seven domains and 44 items. Each item of the scale is 4-point Likert type. The instrument has no cut-off point. Increasing scores indicate increasing level of health promoting lifestyle behaviors. The scale is translated to Turkish by Ardic, A. and Esin, M.N. (2015)²². The validity of Turkish ALP (ALP-T) is evaluated ($\chi^2 = 176.05$, $df = 91$, $p < .001$, $\chi^2/df = 1.93$, $GFI = .93$, $CFI = .94$, $AGFI = .90$, $RMSEA = .060$, $SRMR = .060$) with reliability (Cronbach's alpha 0.87). In this study, we use the three sub-scales of ALP-T respectively as health responsibility, physical activity and positive life perspective.

Health Literacy for School-Aged Children Scale (HLSAC-T)

The HLSAC scale is developed by Paakkari, O. et al., (2016) in order to measure the health literacy among the children²³. The scale is composed of 10 items with a 4-point Likert-type response format (1: not at all true, 2: barely true, 3: somewhat true, 4: absolutely true). The distribution of the scores is 10 to 40 (the minimum score is 10 and the maximum score is 40). In this study, the score levels proposed by Paakkari, L. et al., (2017)¹⁷ is used to categorize health literacy. The health literacy score levels are; (10-25) denoted as low, (26-35) denoted as moderate, (36-40) denoted as high. The Turkish version of HLSAC (HLSAC-T) is developed by Haney, M.O. (2018)⁴ and translated into Turkish by using the back-translation technique. The validity and reliability of HLSAC-T is evaluated by Haney, M.O. (2018)⁴. The validity of the scale in Turkish children ($RMSEA = .035$, $GFI = .99$, $CFI = .99$, normal fit index (NFI) = .98, non-normal fit index (NNFI) = .98, $AGFI = .97$, $\chi^2 = 38.86$, $df = 23$, $\chi^2/df = 1.68$, $p < .05$) and reliability (Cronbach's alpha = .77) was established⁴.

Methods

In order to conduct the study, permissions and ethical approval is obtained from the Scientific Research and Publication Ethics Committee of Osmaniye Korkut Ata University with approval no: 59754796-050.99 and from Osmaniye provincial directorate for national education. The parents of the students were informed and asked to sign an agreement in order to have their permission to allow their children to participate. The data were collected during classroom hours. The researcher and the teacher were present during the data collection. All students were initially informed about the contents of the questionnaire and were assured that their responses to the questionnaire will be kept confidentially.

Statistical Analysis

The data is analyzed using SPSS 15.0 statistical analysis software with an accepted statistical significance value as $p < .05$. Chi-square test with cross-tabulation is used in order to test the association between participation in school sports, student demographics, health literacy, health responsibility, physical activity and positive life perspective. An independent samples t-test is also conducted in order to test the differences in average health literacy, health responsibility, physical activity and positive life perspective scores among students in terms of school sports participation status. Additionally, a multiple logistic regression analysis is performed to determine the four independent variables (health literacy, health responsibility, physical activity and positive life perspective) affecting the participation of students in school sports.

RESULTS

Socio-demographics of participants

A total number of 580 students participated in the questionnaire ($n=22$, 5th grade; $n=111$, 6th grade; $n=202$, 7th grade; $n=245$, 8th grade). %57,4 of the participants consists of female students and %42,6 consists of male students. The mean age of the participants was 13.14 ± 0.92 . Fifty percent of the students actively participated in school sports. %25,7 of mothers and %89,7 of

fathers were fully or part-time employed. %39,8 of students considered their health status as very good and %88,5 reported that healthy lifestyle was important. Among the participants, the average time spent by regular exercises was $3,96 \pm 1,14$ days. The average scores for health responsibility, physical activity, positive life perspective and health literacy subscales obtained from ALP-T and HLSAC-T were respectively $12,15 \pm 2,71$, $17,41 \pm 3,76$, $25,88 \pm 4,18$ and $31,79 \pm 4,99$. The percentage of participants with "Low", "Moderate" and "High" health literacy scores were respectively %10,2, %66,2, and %23,6.

School sports participation and participant demographics

Participation to school sports among female students was significantly higher than male students ($p < .001$). The students who participate in school sports were those who reported a high number of regular exercise days a week (3-5 days), perceive better school achievement (% 45,5 Good, %36,6 Very good) and better relationship with family (%72,8 Very good) and friends (%71,4 Very good) ($p < .001$). The ratio of participation in school sports was significantly higher among the students who do not have any health insurance and the perception of health condition at a "very good" level was significantly higher among the students who participate in school sports ($p < .001$) (Table 1)

Table 1. School sports participation and participant demographics.

	Participation in school sports		p
	Yes (%)	No (%)	
Gender			
Female	72,40%	42,40%	0.000*
Male	27,60%	57,60%	
	290 (%100)	290 (%100)	
Age			
11-13	51,40%	68,30%	0.000*
14-15	48,60%	31,70%	
Regular exercise days in a week			
0-2 days	0,70%	100,00%	0.000*
3-5 days	99,30%	0,00%	
School achievement			
Poor	17,90%	22,10%	0.000*
Good	45,50%	69,00%	
Very good	36,60%	9,00%	
Relationship with family			
Poor	7,20%	9,00%	0.000*
Good	20,00%	61,40%	
Very good	72,80%	29,70%	
Relationship with friends			
Poor	3,80%	11,00%	0.000*
Good	24,80%	36,20%	
Very good	71,40%	52,80%	
Health insurance status			
Insured	89,70%	97,90%	0.000*
Not Insured	10,30%	2,10%	
Family economic condition			
Poor	2,80%	1,70%	0.000*
Moderate	41,40%	19,70%	
Good	47,90%	70,30%	
Very good	7,90%	8,30%	
Health condition			
Poor	7,60%	3,40%	0.000*
Good	45,20%	64,10%	
Very Good	47,20%	32,40%	

Note * $p < .001$, ** $p < .05$

Health-promoting lifestyle and health literacy according to school sports participation

Regarding the average health-promoting lifestyle and health literacy scores in terms of school sports participation, the average health literacy, physical activity and positive life perspective scores were significantly higher among the students who participate in school sports. However, the mean health responsibility score was significantly higher among students those not participate in school sports (Table 2). The percent of the students within the high health literacy, physical activity and positive life perspective score levels were significantly higher among the students who participate in school sports. Nevertheless, the percentage of the students with high health responsibility score level were significantly higher among the students those not participate in school sports (Table 3).

Table 2. Average health literacy and health-promoting lifestyle scores according to school sports participation (t-test).

	Participation in school sports		P
	Yes (n=290)	No (n=290)	
	Mean $\pm$ SD	Mean $\pm$ SD	
Health literacy score	32.41 $\pm$ 4.65	31.18 $\pm$ 5.24	0.003**
Health responsibility score	11.55 $\pm$ 2.72	12.75 $\pm$ 2.57	0.000*
Physical activity score	17.81 $\pm$ 3.62	17.02 $\pm$ 3.86	0.011**
Positive life perspective score	26.59 $\pm$ 4.26	25.16 $\pm$ 3.97	0.000*

Note *p<.001, **p<.05

Table 3. Health literacy and health promoting lifestyle levels by sports participation (chi-squared).

	Participation in school sports		p
	Yes (%)	No (%)	
Health Literacy Levels			
Low	7,90%	12,40%	0.008**
Medium	63,40%	69,00%	
High	28,60%	18,60%	
	290 (%100)	290 (%100)	
Health Responsibility Levels			
Low	67,00%	43,40%	0.000*
High	33,00%	56,60%	
	290 (%100)	290 (%100)	
Physical Activity Levels			
Low	43,10%	52,10%	0.031**
High	56,90%	47,90%	
	290 (%100)	290 (%100)	
Positive Life Perspective			
Low	35,50%	53,80%	0.000*
High	64,50%	46,20%	
	290 (%100)	290 (%100)	

Note *p<.001, **p<.05

Multiple logistic regression analysis is performed in order to determine whether the independent variables (health literacy, health responsibility, physical activity and positive life perspective) are statistically associated with the outcome variable (participation in school sports). The results of logistic regression analysis indicated that the independent variables (health literacy and physical activity) had no significant determinative impact on participation to school sports. On the other hand, it is determined that low health responsibility and high positive life perspective levels were determinative on school sports participation (p<.001) (Table 4).

Table 4. Logistic regression analysis of the relationship between participation in school sports and variables (health literacy and healthy lifestyle).

β	SE	Wald squared	Chi-squared	df	p	AOR	95% CI

Participation in school sports**	0,231	0,31	0,563	1	0,45	1,26	0.689-2.306
Moderate HL***	0,601	0,36	2,84	1	0,09	1,82	0.907-3.669
High HL***	-1,219	0,19	42,321	1	,000*	0,3	0.205-0.427
Health responsibility	0,124	0,2	0,372	1	0,54	1,13	0.760-1.687
Physical activity	0,828	0,21	15,266	1	,000*	2,29	1.510-3.465
Positive life perspective	0,231	0,31	0,563	1	0,45	1,26	0.689-2.306

Note * $p < .001$, ** (ref: nonparticipation), *** (ref: low scores), HL: Health Literacy

DISCUSSION

In this study, it is aimed to investigate health literacy and health promoting lifestyles of adolescents in terms of school sports participation and determine the relationship between health literacy, health promoting lifestyles and school sports participation. The instruments ALP-T and HLSAC-T are used in order to measure health promoting lifestyle and health literacy levels of adolescents respectively.

Regarding health literacy, the results indicated that perceived health literacy was higher among the adolescents who participate in school sports. Moreover, the adolescents with high physical activity scores were also those who participate in school sports. These findings are in line with previous research results^{13,17,24}. In their study aiming to examine the perceived health literacy levels of adolescents in terms of sports club membership, Paakkari, L. et al., (2017) reported that adolescents who participate in sports club activities had higher perceived health literacy than those do not participate¹⁷. Additionally, in another study Lee, S. et al., (2013) also reported that community-oriented sports have an important positive impact on an individuals perception of health literacy¹³. Furthermore from the school sports participation point of view, the results also revealed that health literacy and physical activity levels of adolescents were not significantly determinative on participation to school sports. This finding endorses the result hypothesized by Paakkari, L. et al., (2017) as "sports club participation is the differentiating factor rather than valuing the health by the young people"¹⁷.

Regarding the health-promoting lifestyle levels of adolescents, the results of the present study showed that, positive life perspective and physical activity scores were higher among adolescents who participate in school sports. It is a widely accepted common concept that sports plays important role on individuals' perceived health, well-being and also in the development of youth^{16,25}. Since, almost all schools have sports facilities, sports equipments, physical education personnel and found in all societies, it is considered to be the primary institution for health promotion among young people and gives them the opportunity to be socially connected and at the same time physically active²⁶. Numerous studies have been conducted on the relationship between sports participation, health promotion and health related quality of life among adolescents^{14,18,27,28,29,30}. In the study conducted by Pate, R. R. et al., (2000) among US high school students the results showed that participation in organized sports activities are associated with several health benefits and in conclusion, it is suggested that young people should be encouraged to participate in sports teams²⁷. In another study conducted by Eime, R. M. et al., (2010) the results showed that participation in sports clubs is associated with health benefits as better mental health and life satisfaction.²⁹ Furthermore in the results of the study conducted by Lee, S.-M. et al., (2020) indicated that sports participation has a positive effect on health promoting behaviors of adolescents³⁰. Therefore the finding of the present study on health promoting lifestyles of adolescents in terms of school sports participation is consistent with mentioned notions and research results.

An interesting finding of this research was that the health responsibility scores of adolescents who participate in school sports were significantly lower than those not participating. Furthermore from the sports participation point of view, it is determined that low health responsibility and high positive life perspective levels of adolescents were found to be determinative factors on school sports participation. Pate, R. R. et al., (1987) states that rather than skills oriented school physical education, comprehensive health oriented physical education approach should be supported in schools and health promotion objectives of physical education should be defined in school health programs¹⁸. Given this notion, one possible explanation for the aforementioned findings on health responsibility levels of adolescents might be inadequate school health policies without well defined health promotion goals related to physical education for targetted schools. Considering the age group of targetted adolescents another explanation might be that participants were still in the cognitive development stage and very young to notice their roles in promoting health^{31,32}.

CONCLUSION

Perceived health literacy, positive life perspective and physical activity levels were significantly higher among the adolescents who participate in school sports. However average health responsibility levels of adolescents who do not participate were higher than those who participate in school sports. Low health responsibility and high positive life perspective levels were significantly determinative on school sports participation among adolescents while health literacy and physical activity levels have no significant determinative effect on school sports participation.

REFERENCES

1. Nutbeam D. Health promotion glossary. Health Promotion International. 1998;13(4):349-64.

2. Kilgour L, Matthews N, Christian P, Shire J. Health literacy in schools: prioritising health and well-being issues through the curriculum. *Sport, Education and Society*. 2015;20(4):485-500. <https://doi.org/10.1080/13573322.2013.769948>
3. Vozikis A, Drivas K, Miliotis K. Health literacy among university students in Greece: determinants and association with self-perceived health, health behaviours and health risks. *Arch Public Health*. 2014;72(1) <https://dx.doi.org/10.1186/2049-3258-72-15>
4. Haney MO. Psychometric testing of the Turkish version of the Health Literacy for School-Aged Children Scale. 2018;22(1):97-107. <https://doi.org/10.1177/1367493517738124>
5. Eichler K, Wieser S, Brügger U. The costs of limited health literacy: a systematic review. *International Journal of Public Health*. 2009;54(5):313 <https://doi.org/10.1007/s00038-009-0058-2>
6. Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, et al. Association of Health Literacy With Diabetes Outcomes. *JAMA*. 2002;288(4):475-82 <https://doi.org/10.1001/jama.288.4.475>
7. World Health Organization. Regional Office for E. Health literacy: the solid facts. Copenhagen: World Health Organization. Regional Office for Europe; 2013 2013
8. Bröder J, Okan O, Bauer U, Bruland D, Schlupp S, Bollweg TM, et al. Health literacy in childhood and youth: a systematic review of definitions and models. *BMC Public Health*. 2017;17(1):361 <https://doi.org/10.1186/s12889-017-4267-y>
9. Brown SL, Teufel JA, Birch DA. Early Adolescents Perceptions of Health and Health Literacy*. 2007;77(1):7-15. <https://doi.org/10.1111/j.1746-1561.2007.00156.x>
10. Manganello JA. Health literacy and adolescents: a framework and agenda for future research. *Health Education Research*. 2007;23(5):840-7 <https://doi.org/10.1093/her/cym069>
11. Massey PM, Prelep M, Calimlim BM, Quiter ES, Glik DC. Contextualizing an expanded definition of health literacy among adolescents in the health care setting. *Health education research*. 2012;27(6):961-74 <https://doi.org/10.1093/her/cys054>
12. Lawson HA. Empowering people, facilitating community development, and contributing to sustainable development: The social work of sport, exercise, and physical education programs. *Sport, Education and Society*. 2005;10(1):135-60 <https://doi.org/10.1080/1357332052000308800>
13. Lee SP, Cornwell TB, Babiak K. Developing an Instrument to Measure the Social Impact of Sport: Social Capital, Collective Identities, Health Literacy, Well-Being and Human Capital. 2013;27(1):24 <https://doi.org/10.1123/jsm.27.1.24>
14. Jewett R, Sabiston CM, Brunet J, O'Loughlin EK, Scarapicchia T, O'Loughlin J. School Sport Participation During Adolescence and Mental Health in Early Adulthood. *Journal of Adolescent Health*. 2014;55(5):640-4 <https://doi.org/10.1016/j.jadohealth.2014.04.018>
15. Snyder AR, Martinez JC, Bay RC, Parsons JT, Sauers EL, McLeod TCV. Health-Related Quality of Life Differs Between Adolescent Athletes and Adolescent Nonathletes. 2010;19(3):237 <https://doi.org/10.1123/jsr.19.3.237>
16. Thorlindsson T, Vilhjalmsson R, Valgeirsson G. Sport participation and perceived health status: A study of adolescents. *Social Science & Medicine*. 1990;31(5):551-6 [https://doi.org/10.1016/0277-9536\(90\)90090-F](https://doi.org/10.1016/0277-9536(90)90090-F)
17. Paakkari L, Kokko S, Villberg J, Paakkari O, Tynjälä J. Health literacy and participation in sports club activities among adolescents. 2017;45(8):854-60 <https://doi.org/10.1177/1403494817714189>
18. Pate RR, Corbin CB, Simons-Morton BG, Ross JG. Physical Education and its Role in School Health Promotion. 1987;57(10):445-50 <https://doi.org/10.1111/j.1746-1561.1987.tb03191.x>
19. Faul F, Erdfelder E, Lang A-G, Buchner A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*. 2007;39(2):175-91 <https://doi.org/10.3758/BF03193146>
20. Hendricks C, Murdaugh C, Pender N. The Adolescent Lifestyle Profile: development and psychometric characteristics. *Journal of National Black Nurses' Association : JNBNA*. 2006;17(2):1-5
21. Pender NJ, Murdaugh CL, Parsons MA. *Health Promotion in Nursing Practice*: Prentice Hall; 2002.
22. Ardic A, Esin MN. The Adolescent Lifestyle Profile Scale: Reliability and Validity of the Turkish Version of the Instrument. 2015;23(1):33-40 <https://doi.org/10.1097/jnr.0000000000000052>
23. Paakkari O, Torppa M, Kannas L, Paakkari L. Subjective health literacy: Development of a brief instrument for school-aged children. 2016;44(8):751-7 <https://doi.org/10.1177/1403494816669639>
24. Alfrey L, Brown TD. Health literacy and the Australian Curriculum for Health and Physical Education: a marriage of convenience or a process of empowerment? *Asia-Pacific Journal of Health, Sport and Physical Education*. 2013;4(2):159-73 <https://doi.org/10.1080/18377122.2013.805480>
25. Kwan M, Bobko S, Faulkner G, Donnelly P, Cairney J. Sport participation and alcohol and illicit drug use in adolescents and young adults: A systematic review of longitudinal studies. *Addictive Behaviors*. 2014;39(3):497-506 <https://doi.org/10.1016/j.addbeh.2013.11.006>
26. Kanters MA, Bocarro JN, Edwards MB, Casper JM, Floyd MF. School sport participation under two school sport policies: comparisons by race/ethnicity, gender, and socioeconomic status. *Annals of behavioral medicine : a publication of the Society of Behavioral Medicine*. 2013;45 Suppl 1:S113-21 <https://doi.org/10.1007/s12160-012-9413-2>
27. Pate RR, Trost SG, Levin S, Dowda M. Sports Participation and Health-Related Behaviors Among US Youth. *Archives of Pediatrics & Adolescent Medicine*. 2000;154(9):904-11 <https://doi.org/10.1001/archpedi.154.9.904>
28. Kokko S, Kannas L, Villberg J. Health promotion profile of youth sports clubs in Finland: club officials' and coaches' perceptions. *Health Promotion International*. 2009;24(1):26-35 <https://doi.org/10.1093/heapro/dan040>
29. Eime RM, Harvey JT, Brown WJ, Payne WR. Does sports club participation contribute to health-related quality of life? *Medicine and science in sports and exercise*. 2010;42(5):1022-8 <https://doi.org/10.1249/MSS.0b013e3181c3adaa>
30. Lee S-M, Jeong H-C, So W-Y, Youn H-S. Mediating Effect of Sports Participation on the Relationship between Health Perceptions and Health Promoting Behavior in Adolescents. *International Journal of Environmental Research and Public Health*. 2020;17(18):6744. <https://doi.org/10.3390/ijerph17186744>
31. Malina RM, Bouchard C, Bar-Or O. *Growth, Maturation, and Physical Activity: Human Kinetics*; 2004.

32. Esatbeyoglu F, Kin İslar A. Physical Activity Levels, BMI and Healthy Life Style Behaviors in Adolescents Living in a Rural District. urkiye Klinikleri Spor Bilimleri. 2018;10(1). <https://doi.org/10.5336/sportsci.2017-57533>

COMPARISON OF THE 100 M SPEED PARAMETER OF ATHLETES IN INDIVIDUAL AND TEAM SPORTS

Varol TUTAL*, Tarkan SÖĞÜT

Siirt University, School of Physical Education and Sports, Siirt, TURKEY

(v.tutal@siirt.edu.tr & tarkan.sogut@siirt.edu.tr)

Corresponding author: v.tutal@siirt.edu.tr

ABSTRACT

The aim of this study is to examine the 100 m speed parameter of athletes in individual and team branches by different variables. A total of 417 volunteer participants, who are enrolled in the School of Sports, consisting of 72 female and 74 male athletes engaged in individual sports (athletics, swimming, taekwondo, badminton, tennis, boxing, wrestling, orienteering, judo, wrestling, gymnastics karate, weightlifting, skiing, paragliding), and 120 female and 151 male athletes engaged in team sports (football, futsal, handball, volleyball, basketball) participated in the study. The age, athletic age, height, body weight and 100m sprint parameters of the volunteers participated in the study were measured. In the study, first, the skewness and kurtosis values for the normality test were examined and the distribution was found normal. Accordingly, the data obtained from male and female participants were evaluated within themselves, and an independent t-test was used to determine whether the 100 m parameter differs according to the branch variable (individual team). Additionally, a Pearson Product Moment Correlation analysis was used to determine the relationship between athletic age, height and body weight variables and the 100 m parameter of the individuals participated in the study. The findings of the study showed that there was no statistically significant difference between male and female athletes in the individual and team branches in terms of 100m sprint score means ($p > 0.05$). According to the results of the Pearson correlation analysis, it was found that there was no relationship between the height of a female individual and team athletes and the variable of 100 m ($r = -, 078, p > 0.05$, $r =, 065, p > 0.05$, respectively). It was determined that there is a very weak positive correlation between body weight and 100 m speed performance in female athletes in individual sports ($r =, 243 *$, $p < 0.05$), but not in female athletes in team sports ($r =, 170, p > 0.05$). It was found that there was no relationship between the height of the male athletes in individual and team sports and 100 m (respectively $r = -, 036, p > 0.05$, $r = -, 012, p > 0.05$). It was found that there was no relationship between body weight and 100 m speed variable in male athletes in individual sports ($r =, 124, p > 0.05$), whereas there was a weak positive correlation in male athletes in team sports ($r =, 260 **$, $p < , 001$).

KEYWORDS: Sports, Speed, Individual Sports, Team Sports

INTRODUCTION

The 100-m event is the standard measure of the Overspeed capabilities of human locomotion and defines "the fastest person in the world" for a certain period. Therefore, scientific research on the limits of human locomotion and determinants of sprint performance has viewed record holders and world champions as examples of the limitations of the muscular, physiological, and mechanical properties of human locomotion.⁹ The process of discovering talented athletes to participate in an organized exercise program is one of the most important issues in sports, and the 100 m sprint limits remain the subject of many studies. Can it be said that the speed performance of athletes is better than the other because they are involved in individual and team sports? Considering the parameters such as duration-time, score advantage, and desire to win in both groups, it can be said that speed which is one of the basic motoric features is necessary. One of the physical component factors needed in sports is speed. Running a 100-meter sprint is an ability that determines the process of moving body position quickly from one place to another. Speed in various branches of sports is a component of the basic physical condition.⁴ Speed is considered a necessary physical ability for high-performance levels in many sports.² Motoric properties affecting speed include muscle strength, coordination, muscle condition, reaction speed, contraction speed, anthropometric properties, and endurance.¹⁰ In addition, muscle quality is another important aspect of achieving success in most games, especially in 100-meter running.⁵ Sport can often be distinguished as an individual or team sport and performance is determined only by the effort of the individual compared to the collective interaction of multiple teammates (or at least two people).⁸ While performance criteria in individual sports are unidimensional, performance in group sports depends on the performance of teammates.⁶ This study aimed to reveal the differences between the branches by comparing the 100 m sprint parameter of athletes in individual and team sports.

METHOD

As this study was conducted to determine the performance values of 100-meter speed of athletes in individual and team sports, it was designed based on the comparison in the descriptive model. A total of 417 volunteer participants, who are enrolled in the Siirt University School of Physical Education and Sports, consisting of 72 female and 74 male athletes engaged in individual sports (athletics, swimming, taekwondo, badminton, tennis, boxing, wrestling, orienteering, judo, wrestling, gymnastics karate, weightlifting, skiing, paragliding), and 120 female and 151 male athletes engaged in team sports (football, futsal, handball, volleyball, basketball) participated in the study. The physical characteristics of the athletes are presented in table 1.

Age, Height and Body Weight Measurement

Participants were barefoot and wore shorts when their body weights were measured on a weighbridge that is precise up to 20 grams. In height measurements, the sliding caliper was adjusted to touch the participant's head while the athletes were standing in an upright position and the height was recorded by measuring with 1 mm precision while in this position. Birth dates were recorded as month and year for age calculation.

100-Meter Sprint Test

Participants were positioned on the start line of the 100-meter sprint track and started running by passing through the start photocell with the go signal and the results obtained after passing the finish photocell were recorded. The test was repeated twice, and the best result was accepted as the 100-m score of the athletes.

Data Analysis and Interpretation

Microsoft Excel and SPSS 22.0 computer programs were used for the statistical analysis of the data obtained within the scope of the study. First, blank data were evaluated to check the appropriateness of the analyses and the assumptions. As a result of these processes, analyses were carried out on the data of 417 people. After this stage, when the skewness and kurtosis values for the normality test were examined, it was found that the distribution was normal.¹³ In line with this, the data obtained from the male and female participants were evaluated within themselves and a t-test was completed to determine whether the 100 m parameter differs by the branch variable (individual vs. team). Additionally, a Pearson Product Moment Correlation analysis was completed to determine the relationship between athletic age, height and body weight variables and the 100 m parameter of the individuals included in the study.

FINDINGS

Table 1. Physical characteristics of male and female athletes in individual and team branches

Gender		Branch	N	Minimum	Maximum	x±ss	P
Female	Age (years)	Individual	72	17	21	18.74±.96	.001
		Team	120	17	25	19.33±1.50	
	Height (cm)	Individual	72	1.53	1.75	1.64±.04	.671
		Team	120	1.51	1.80	1.64±.06	
	Kg (kg)	Individual	72	42	70	54.06±5.63	.804
		Team	120	39	80	54.28±6.44	
	Athletic Age (years)	Individual	72	1	11	3.67±2.47	.898
		Team	120	1	10	3.62±1.98	
Male	Age (years)	Individual	74	17	24	19.28±1.29	.000
		Team	151	17	30	20.19±2.18	
	Height (cm)	Individual	74	1.63	1.93	1.75±.05	.066
		Team	151	1.55	1.93	1.76±.06	
	Kg (kg)	Individual	74	50	106	67.43±10.06	.585
		Team	151	52	92	66.76±7.87	
	Athletic Age (years)	Individual	74	1	10	4.85±2.89	.496
		Team	151	1	13	4.58±2.81	

While there was a significant difference in age parameters of female athletes in individual and team branches ($p < 0.05$), there was no statistically significant difference between height, body weight and athletic age ($p > 0.05$). While there was a significant difference in age parameters of male athletes in individual and team branches ($p < 0.05$), no statistically significant difference was found between height, body weight and sports age ($p > 0.05$).

Table 2. Comparison of 100 m sprint parameters of male and female athletes in individual and team branches

Gender	Branch	N	x± ss	sd	t	P
Female	Individual	72	16.57 ±1.47	190	-.197	.844
	Team	120	16.61 ±1.12			
Male	Individual	74	13.11 ±.79	223	.279	.780
	Team	151	13.08 ±.63			

There was no statistically significant difference between male and female athletes in individual and team branches for 100m sprint score means ($p > 0.05$).

Table 3. Pearson Correlation analysis results for parameters of male and female athletes in individual and team branches.

Gender	Athlete			Height	Kg	100m
Female	Individual N=72	Height	<i>r</i>	1	.200	-.078
			<i>p</i>		.091	.516
		Kg	<i>r</i>	.200	1	.243*
			<i>p</i>	.091		.040

Team N=120	100m	<i>r</i>	-.078	.243*	1
		<i>p</i>	.516	.040	
	Height	<i>r</i>	1	.468**	.065
		<i>p</i>		.000	.478
Individual N=74	Kg	<i>r</i>	.468**	1	.170
		<i>p</i>	.000		.064
	100m	<i>r</i>	.065	.170	1
		<i>p</i>	.478	.064	
Team N=151	Height	<i>r</i>	1	.368**	-.036
		<i>p</i>		.001	.761
	Kg	<i>r</i>	.368**	1	.124
		<i>p</i>	.001		.291
	100m	<i>r</i>	-.036	.124	1
		<i>p</i>	.761	.291	
	Height	<i>r</i>	1	.432**	-.012
		<i>p</i>		.000	.881
	Kg	<i>r</i>	.432**	1	.260**
		<i>p</i>	.000		.001
	100m	<i>r</i>	-.012	.260**	1
		<i>p</i>	.881	.001	

* $p < 0.05$. ** $p < 0.01$.

r: Interpretation of Pearson's correlation coefficient; 0.00-0.24 very weak, 0.25-0.49 weak, 0.50-0.69 medium, 0.70-0.89 high, 0.90-1.00 very high. According to the results of the Pearson correlation analysis, it was found that there was no relationship between the height of female athletes in individual and team sports and the variable of 100 m ($r = -.078$, $p > 0.05$, $r = .065$, $p > 0.05$, respectively). It was found that there was a very weak positive correlation between body weight and 100 m speed performance in female athletes in individual sports ($r = .243$ *, $p < 0.05$), but not in female athletes in team sports ($r = .170$, $p > 0.05$). There was no relationship found between the height of individual male athletes and team athletes and 100 m ($r = -.036$, $p > 0.05$, $r = -.012$, $p > 0.05$, respectively). There was no relationship between body weight and 100 m speed variable in individual male athletes ($r = .124$, $p > 0.05$), whereas there was a weak positive correlation in male team athletes ($r = .260$ **, $p < .001$).

DISCUSSION

In our study conducted to determine the 100 m sprint scores of athletes in individual and team branches, there was no statistically significant difference between male and female athletes in individual and team branches in terms of 100m sprint score means. According to the results of the Pearson correlation analysis, it was found that there was no relationship between the height of a female individual and team athletes and the variable of 100 m ($r = -.078$, $p > 0.05$, $r = .065$, $p > 0.05$, respectively). It was determined that there was a very weak positive correlation between body weight and 100 m speed performance in individual female athletes ($r = .243$ *, $p < 0.05$), but not in female team athletes ($r = .170$, $p > 0.05$). It was found that there was no relationship between the height of the male individual and team athletes and 100 m (respectively $r = -.036$, $p > 0.05$, $r = -.012$, $p > 0.05$). There was no relationship between body weight and 100 m speed variable in individual male athletes ($r = .124$, $p > 0.05$), whereas there was a weak positive correlation in male team athletes ($r = .260$ **, $p < .001$). When the literature is examined, there were similarities and differences between our findings on the parameters in individual and team athletes and the literature. Bicić et al. (2009) compared the speed performance of 40 male athletes in 20 individual and 20 team branches and found a statistically significant difference. Koc et al. (2010) compared the speed performance of 84 male athletes in 36 individual and 48 team branches and found that the differences were statistically insignificant. Gaurav et al. (2011) found that 15 individual athletes had a higher speed than 15 team athletes. Saygın and Ozsaker (2012) conducted a study with a total of 274 participants consisting of 28 female and 47 male athletes in individual sports and 86 female and 113 male athletes in team sports and found that there was a statistically significant difference in the speed parameter between the elite female athletes in individual and team sports and the elite male athletes. Singh (2014) reported that athletes in individual sports are better in speed than athletes in team sports. Mackala et al. (2020) reported that individual athletes performed better than team athletes in the evaluation of speed performance in a study conducted with 36 individual and 34 team athletes. Dhapola and Verma (2017) found a significant relationship between athletes' body weight and speed ($r = .543$, $p < 0.05$), and the relationship between height and speed was not significant ($r = .065$, $p > 0.05$). In another similar study, Thakur (2016) reported a significant relationship between body weight and speed ($r = .538$, $p < 0.05$) in 45 male athletes, while the relationship between height and speed ($r = .085$, $p > 0.05$) was not significant.

CONCLUSION

As a result, it was observed that there was no significant difference between male and female athletes' 100m sprint score means in individual and team branches. The findings of this exploratory study will not only serve scientists and trainers in the selection of young athletes according to 100m speed variables of individual and team athletes but also provide guidelines for training programs for athletes in the individual and team branches.

REFERENCES

I. Bicić, R., Savas, A., & Vatan, K. (2009). The Motoric Properties of Individual and Team Sportsman. *Ovidius University Annals, Series Physical Education & Sport/Science, Movement & Health*, 9(2). 101-109.

- 2.Dhapola, M. S., & Verma, B. (2017). Relationship of body mass index with agility and speed of university players. *International Journal of Physical Education, Sport and Health*, 4(2), 313-315.
- 3.Gaurav, V., Singh, A., & Singh, S. (2011). Comparison of physical fitness variables between individual games and team games athletes. *Indian Journal of Science and Technology*, 4(5), 547-549.
- 4.Henjilito, R., Asmawi, M., & Tangkudung, J. (2018). The Influence Of Exercise Method And Reactions Time To Skills Sprint 100 Meters. *Ijpes-Journal Of Indonesian Physical Education And Sport*, 4(1), 126-140.
- 5.Jabbar, A. K., & Khefi, S. M. 2020 The Impact Of A Preparation Educational Plan In Two Strategies For Appropriation And Centralization Of Power, And Their Relationship To Accomplishing 100 Meters Running For The Youth. *Impact of educational preparation People*, 1, 2 1-9.
- 6.Kajbafnezhad, H., Ahadi, H., Heidarie, A. R., Askari, P., & Enayati, M. (2011). Difference between team and individual sports with respect to psychological skills, overall emotional intelligence and athletic success motivation in Shiraz city athletes. *Journal of Physical Education and Sport*, 11(3), 249-254
- 7.Koc, H., Coskun, B., Yılmaz, E., Coban, O., & Yıldız, K. (2010). Bireysel ve takım sporlardaki 13-15 yas grubu erkek sporcuların bazı fiziksel ve fizyolojik parametrelerinin karşılaştırılması. *Mustafa Kemal University Journal of Physical Education And Sport Sciences Vol 1*(1), 23-30.
- 8.Mackala, K., Vodičar, J., Žvan, M., Križaj, J., Stodolka, J., Rauter, S., & Čoh, M. (2020). Evaluation of the pre-planned and non-planned agility performance: comparison between individual and team sports. *International journal of environmental research and public health*, 17(3), 1-4.
- 9.Morin, J. B., Bourdin, M., Edouard, P., Peyrot, N., Samozino, P., & Lacour, J. R. (2012). Mechanical determinants of 100-m sprint running performance. *European journal of applied physiology*, 112(11), 3921-3930.
- 10..Mulyadi, H., & Indah, D. (2019). The Effect Of Exercise Methods On Variations And Strengths Of Explosive Muscle Power Of The Power Of 100 Meters Of Running Capability In State Middle School I Rambah Rokan Hulu Regency. *Journal Of Education, Health And Sport*, 9(7), 626-630.
- 11.Saygın, O., & Ozsaker, M. (2012). The Comparison of Some Physical Fitness For Individual and Team Athletes *Journal of Physical Education & Sports Science/Beden Eğitimi ve Spor Bilimleri Dergisi*, 6(2), 102-111.
- 12.Singh, A. (2014). Study of Selected Motor Fitness Variables between Individual and Dual Sport Athletes. *Indian Streams Research Journal*, 4(8). 1-4
- 13.Tabachnick L, Fidell, (2013) *Using Multivariate Statistics (sixth ed.)* Pearson, Boston.
- 14.Thakur, J. S. (2016). Association of obesity with agility and speed of university level kabaddi players. *Intern Journal of Physical Education, Sports and Health*, 3(2), 254-256.

OBESITY PREVALENCE and FATHER-CHILD BMI RELATIONSHIP in PRE-SCHOOL CHILDREN 5-6 YEARS OLD

Varol TURAL

Siirt University, School of Physical Education and Sports, Siirt (TURKEY)

(v.tural@siirt.edu.tr)

Corresponding author: v.tural@siirt.edu.tr

ABSTRACT

This study was conducted to determine the prevalence of obesity and the relationship between father and son BMI in 5-6 years child studying in pre-school education institutions in Siirt center. The research was conducted on 65 children aged 5-6 and their fathers enrolled in 6 different pre-school education institutions affiliated to the Ministry of National Education in the city center of Siirt. Participant's body weight and height were measured, Body Mass Index (BMI) was calculated, BMI was classified according to WHO-2004 reference values for fathers, and CDC 2000 (*Centers for Disease Control and Prevention*) growth chart for children by age and gender. In the study, 3.22% of a 5-year-old child were weak, 25.80% were risky overweight and 19.35% were obese, 2.94% of a 6-year-old child were weak, 35.29% risky overweight, 29.41% were obese, fathers; It was determined that 1.53% were weak, 93.84% were risky overweight and 1.53% were obese. 6-year-old child were found to have a higher prevalence of obesity than a 5-year-old child. The average age of the fathers participating in the study was determined as $M_{age}=37.04$, average height $M_{height}=176.6$ cm, average weight $M_{weight}=84.13$ kg, and average BMI $M_{bmi}=26.96$. A medium-level positive correlation was found between the BMI of the children and their fathers ($r=345$, $p<0.05$). As a result, it is important that children, their families, and teachers who are educated in preschool period see obesity as a health problem as well as in the overweight group, which is a sub-level, and in the underweight group, which is the lowest value, as a health problem. In the light of the findings obtained within the scope of the research, education programs should be prepared to increase the knowledge and skills of families about healthy eating habits and the importance of physical activity for children's health. In this context, it emerges that physical activity and movement education are important for the healthy growth of children in pre-school education, and thus, teachers should pay attention to physical activity according to the curriculum determined for children's health.

KEYWORDS: Obesity, 5-6 years, BMI, Father

INTRODUCTION

Obesity is one of the biggest health problems of our age. All over the world, obesity is seen as a common health problem starting from early childhood.¹¹⁻¹⁴⁻²⁰ Obesity occurs as a result of the increase in the amount of fat in the human body. These increased amounts of fat in childhood bring important health problems in the future.¹³ It is possible to say that one of the important causes of obesity is genetic factors and other important causes are environmental factor.¹³ In this context, it can be said that the importance of nutrition and physical activity, movement training are emerging in childhood. Especially, families showing the necessary sensitivity in terms of nutrition and movement education and also teachers' doing their part in this issue will make a positive contribution. In 2011, the National Education Directorate of Health Affairs joint carried out in Turkey by Hacettepe University with school-age children (6-10 age group) growth monitoring (TOCBI of 2011) project research report is a result of obesity in children and weaknesses incidence to be similar to some value and mild obesity / being overweight and the problem of being stunted was also noted to be important in children. Siirt province is not included among the 26 provinces where the study was conducted. According to the childhood obesity survey conducted jointly by the Ministry of Health and Hacettepe University in different regions of Turkey in 2013, it is seen that there is a problem of weakness and obesity according to the structure of the settlement according to the region in which children live, as well as gender.¹⁴⁻²⁶ At the same time, in the regions in Turkey in 2016, the Ministry of Education and conducted jointly by the Ministry of Health of Turkey "Turkey Childhood" Elementary 2nd grade students are also seen in similar situations with the work being done in obesity research (COU-TUR 2016). In this context, policies regarding healthy nutrition and physical activity of children should be strengthened and priority should be given urgently for implementation. About physical activity in families and teachers; It is important for a healthy future that teachers at school and families outside the school show the necessary sensitivity and provide the necessary support.

Obesity is positively associated with urbanization, income, education and other socioeconomic status in developing countries.²⁴ According to 2019 data, The total population of the center of Siirt is 168,659. Peanut production is an important economic resource in the province. It can be said that Siirt cuisine has an important place in the country. The büryan kebab made in the province, dishes made with red meat, perde pilaff, kitel, mumar, stuffed arabic, meatballs, pastries, etc.) are among the foods that are frequently consumed locally. Studies on childhood obesity-obesity have been conducted. In the studies conducted, significant correlations were found between BMI of children and BMI of parents (mothers and fathers) it was reported that these correlations increase with the age of the child.^{5, 6, 15, 30} Studies have shown that there is a direct relationship between obesity, especially mother's ethnic origin, race, pre-pregnancy weight status, weight status during pregnancy, smoking habits, and the duration of breastfeeding.^{3, 8, 12, 16, 21, 25, 28} One of the factors affecting childhood obesity is that parents are obese.^{9, 11} In other studies, it is seen that the variability of parents (mothers and fathers), educational status, ages and socioeconomic levels of families are associated with high or low obesity prevalence.^{1, 13, 23} Studies on obesity in preschool children are limited in our country, most studies have been conducted on obesity in school-age and adolescence. Studies evaluating the prevalence of

obesity in preschool period together are needed. In this study, obesity prevalence and father-child BMI relationship was investigated in 5-6 age group child living in Siirt.

METHOD

The study is in a cross-sectional scanning model. Screening models are research approaches that aim to describe a past or present situation as it exists. The event or individual subject to research is defined within their conditions without being changed or affected. In the cross-sectional approach, it is tried to be determined by observations to be made on different groups that are accepted to be at various stages of development.¹⁰

Research Group

65 children in the 5-6 age group and their fathers from 6 different kindergartens affiliated to the state in the city center of Siirt participated in the study. The data of the children who participated in the study are presented in Table 2 and Table 3. The average age of the fathers participating in the study was determined as $M_{age}=37.05$ average height $M_{height}=176.6$ cm, average weight $M_{weight}=84.14$ kg, and average BMI $M_{bmi}=26.96$.

Data Collection Tools:

Height Measurement: The height measurement was measured barefoot with 0.1 cm accuracy using a standard steel stadiometer.

Weight Measurement: Weight measurement was measured barefoot and without any metal on it with Tanita INBODY-120 Segmental Body Analysis System.

BMI: It was calculated with the formula $\text{Weight (kg)} \div (\text{Height cm})^2$. The BMI values obtained in children were evaluated as <5 underweight, 5-85% normal, 85-95% risky overweight and > 95 obese depending on age according to the growth curves of CDC 2000 (2002) 2-20 years (See Table 1). BMI values taken from the INBODY-120 Segmental Body Analysis System are lean (<18.50 kg / m²), normal (18.50-24.99 kg / m²) and bulk / obese (≥ 25.00 kg / m²) and obese (≥ 30.00 kg / m²) (WHO, 2004).

Table 1. BMI Assessment by Age

BMI= WEIGHT/(BOY) ²	5 Age MALE	6 Age MALE
WEAK	-13,8	-13,8
NORMAL	13,8 -16,8	13,8-17
RISKY OVERWEIGHT	16,9- 18	17,1- 18,4
OBESE	18 +	18,4 +

- <http://www.cdc.gov/growthcharts> (2000) (Only the values of 5-6 year old child are taken)

Data Collection: Approval was obtained from the Siirt Provincial Directorate of National Education for the study. Considering the number of students from state-owned kindergartens in the city center of Siirt, their location in the province and the socio-economic levels of the parents, 6 kindergartens (high, medium and low) were determined. The aim and content of the study were explained by sending letters to the parents of the students in the kindergarten through the teachers. Height and weight measurements were taken one by one in a specially prepared classroom environment by the same researcher from all fathers and children (who do not have any physical and mental health problems) who volunteered to participate in the study by coming to the kindergarten on the day and time announced.

ANALYSIS of DATA

In the analysis of the data, the Pearson correlation method was used for the relationship between frequency, percentage, average, standard deviation, and BMI of children and BMI of fathers. $p < 0.05$ was accepted as the level of significance.

RESULTS

The age groups of children, height, weight, BMI averages and the prevalence values of underweight, risky overweight and obesity are presented in Table 2.

Table 2. Average Height, Weight and BMI of the Subjects by Age Groups

Age	N	Height (cm)	Weight (kg)	BMI	Weak (%)	Normal (%)	Risky Overweight (%)	Obese (%)
5	31	114,09	21,83	16,7	3,22	51,61	25,80	19,35
6	34	120,94	25,82	17,59	2,94	32,35	35,29	29,41
Total	65	117,51	23,82	17,14	3,08	41,98	30,54	24,38

- After the 6th month, the next age is taken as a basis.
- <5 underweight, 85-95 risky overweight, > 95 obese according to CDC (2000) references.

Table 3. Height, Weight and BMI Averages of Fathers

		Height	Weight	BMI	Weak	Normal	Risky	Obese
N	Age	(cm)	(kg)		(%)	(%)	Overweight (%)	(%)
65	37,05	176,6	84,14	26,96	1,53	4,61	93,84	1,53

When the BMI of the fathers participating in the study was evaluated, it was found that 1.53% was underweight, 93.84% was risky overweight and 1.53% was obese. When we look at the Pearson correlation coefficient to determine the relationship between the BMI of a child and the BMI of fathers, a medium-level positive correlation was found ($r = .345$, $p < 0.05$).

DISCUSSION

While obesity or obesity is defined as excessive fat accumulation in the body that can lead to health risks (WHO, 2004, Koksall et al, 2008), it is also seen that weakness, which is an important health problem, also occurs when BMI is below normal values due to malnutrition. is important to know. At the same time, considering the development of technology today and the possibility of children spending most of their days in front of the computer and phone, and their lack of physical mobility can also lead to obesity. When looked at, it is seen that obesity is gradually increasing among children. In 2016, "41 million children aged 0-4 and 340 million children aged 5-19 are overweight or obese".¹⁴⁻²⁶ Looking at these results, we can say that the important health problem of children is obesity. When we look at the results of the study, it is seen that the prevalence of thinness (3.08%) in boys aged 5-6 years is obesity %24.38 in Siirt. These results show that the rate of weakness is low and the rate of obesity is high. When these results are compared with the studies conducted by Kerkez et al. (2013), obese rates show similar results. But the results for weakness are not similar. It can be said that this result is because girls and boys in the 3-6 age group of the children who participated in the study were evaluated together and the number of children participating in the study was high. Again, these results are similar to the obese results of the TOCBİ (2011) report. In the study conducted by Onal et al. (2016) on preschool children, it is seen that 2.9% of 4-year-old boys are underweight children and 1.8% of 5-year-old boys the rate of being overweight were found to be 15.4% in 3-year-old boys, 13.2% in 4-year-olds and 16.4% in 5-year-olds. Obese rates were found to be 5% in 3-year-old boys, 5.9% in 4-year-old boys, and 7.3% in 5-year-old boys. According to the study, weakness values and overweight values are similar. At the same time, the Ministry of Education in the region in 2016 in Turkey carried out jointly by the Ministry of Health of Turkey "Turkey Childhood" Primary Grade 2 students in the region Southeastern Anatolia study performed in obesity research 1.6% of poor, 83.5% normal, 10.5% were found to be overweight and 4.5% as obese.¹⁴⁻²⁶ In these results, it is seen that the weak and obese values are in parallel with the study. Again, in the same study, 1.5% of the boys in the Southeastern Anatolia region were found to be thin, 82.5% normal, 11.1% overweight and 4.9% obese. In another literature Yabancı et al. (2009), as a result of the study conducted on 375 children in the 5-6 age group in Ankara, recorded the rate of underweight and extremely thin as 10.4% and the rate of collective and obese as 18.4%. It is seen that the obesity rate is similar to the result of this study, but the rate of weakness is higher in Ankara than in Siirt. In the same study, it was determined that the body weight, BMI, waist and hip circumference and waist-hip ratio of children whose parents were of normal weight were lower than the children with bulk/fat in both mothers and fathers. At the same time, it has been noted that the risk of being obese is high, as children in the family live with obese people. The correlation relationship between BMI values of mother and child has been revealed in other studies. This relationship obtained poses a risk of obesity in children both hereditary and environmentally.¹⁹⁻³⁵ The results obtained in this study are in parallel with previous similar studies. A medium-level positive correlation was found between the BMI of boys and the BMI of fathers. The BMI of 6-year-old boys was found to be higher than that of 5-year-old boys. This result Santos et al. (2009) can be said to be compatible with the results of the study when considered as a parent. In the Eastern and Southeastern Anatolia Regions, children are modeled primarily by the mother, father and other family members in nutrition. To bring healthy individuals to society, healthy eating and physical activity habits should be introduced to the family and continued at school starting from the preschool period. The main limitations of this study are that the study was in a cross-sectional scanning model, and physical activity, nutrition and weight could not be monitored continuously and for a long time. Likewise, whether there are health problems related to obesity is not discussed in this study. In the evaluation of growth in Turkish children, more data are needed on preschool period obesity, weakness and stunting.

CONCLUSION

In conclusion, it should be seen that obesity and weakness in the preschool period is an important problem. The growth status of children should be carefully evaluated, healthy eating habits and regular physical activity habits should be taken and necessary measures should be taken to prevent diseases related to lifestyle in adulthood. In this context, it is important for pre-school education institutions to fulfil their duties, take necessary precautions and raise awareness in their families.

REFERENCES

- 1.Akgün, Seval, Bakar, C Kut, A ve Tulgar, S K..(2006) Baskent Üniversitesi Hastanesi Pediatri Polikliniklerine Basvuran Bes Yas Altı Çocuklarda Obezite Görülme Sıklığı ve Etkileyen Faktörler. *STED* 15.4 60-66
- 2.Centers for Disease Control and Prevention (2002). 2000 CDC Growth Charts for the United States: Methods and Development. Series 11, Number 246, Hyattsville, Maryland.
- 3.Chen, A., Pennel, M.L., Klebanoff, M.A., Rogan, W.J., Longnecker, M.P. (2006). Maternal smoking during pregnancy in relation to child overweight: follow-up to age 8 years. *International Journal of Epidemiology*, 2006; 35:121–30.
- 4.Cocukluk Çağı Obezite Araştırması(COSI-TR) On Rapor(2013), Ankara

5. Danielzik, S., Langnäse, K., Mast, M., Spethmann, C., Müller, M.J. (2002). Impact of parental BMI on the manifestation of overweight 5-7 year old children. *Eur J Nutr.* 2002; 41: 132-8.
6. Gahagan S. (2004). Child and adolescent obesity. *Curr. Probl. Pediatr. Adolesc. Health Care.* 2004; 34: 6-43.
7. Gillman, M.W., Rifas-Shiman, S.L., Kleinman, K., Oken, E., Rich-Edwards, J.W., Taveras, E.M. (2008). Developmental origins of childhood overweight: potential public health impact. *Obesity* 2008; 16: 1651-6.
8. Harder, T., Bergmann, R., Kallischnigg, G., Plagemann, A. (2005). Duration of breastfeeding and risk of overweight: a meta-analysis. *American Journal of Epidemiology*, 2005; 162: 397-403.
9. Jiang, J., Rosenqvist, U., Wang, H., Greiner, T., Ma, Y., Toschke, A.M. (2006). Risk factors for overweight in 2-to 6-year-old children in Beijing, China. *Int J Pediatr Obes.* 2006; 1: 103-8.
10. Karasar N. (2005). Bilimsel Arastırma Yöntemi. Nobel Yayın Dağıtım, 14. Baskı, Ankara.
11. Kerkez, F.İ., Tatal, V., Akcınar, F. (2013). Malnutrition/ Obesity Prevalence in Children Between the Ages 3 and 6 and Mother - Child BMI Relation; *International Journal of Academic Research* Vol. 5. No. 5. September, 2013; 211-214
12. Kitsantas, P., Gaffney, K.F. (2010). Risk profiles for overweight/obesity among preschoolers. *Early Human Development* 86 (2010) 563-568.
13. Koksall, G., Gokmen Ozel, H. (2008). Okul öncesi dönemde obezite. *Klasmat Matbaacılık*, birinci basım, sağlık bakanlığı yayın no: 729 ISBN: 978-975-590-245-6, Ankara
14. Larson NI, Story M (2007). The pandemic of obesity among children and adolescents: what actions are needed to reverse current trends? *J Adolesc Health* 41:521-522.
15. Livingstone B. (2000). Epidemiology of childhood obesity in Europe. *Eur J Pediatr.* 2000; 159 (Suppl 1): S14-34.
16. Oken, E., Taveras, E.M., Kleinman, K.P., Rich-Edwards, J.W., Gillman, M.W. (2007). Gestational weight gain and child adiposity at age 3 years. *Am J Obstet Gynecol* 2007; 196: 322.
17. Onal, S., Özdemir, A., Mese, C., Koca Ozer, B. (2016). Okul Öncesi Dönem Çocuklarında Malnütrisyon ve Obezite Prevalansının değerlendirilmesi: Ankara Örneği. *DTCF Dergisi* 56.1 (2016): 210-225
18. Park, H.S., Yim, K.S., Cho, S (2004). Gender differences in familial aggregation of obesity-related phenotypes and dietary intake patterns in Korean families. *Ann Epidemiol* 2004, 14: 486-491.
19. Reilly, J.J., Armstrong, J., Dorosty, A.R., Emmett, P.M., Ness, A., Rogers, I., Steer, C., Sherriff, A. (2005). Avon Longitudinal Study of Parents and Children Study Team: Early life risk factors for obesity in childhood: cohort study. *BMJ* 2005, 330: 1357-1364.
20. Rossem L.V., Silva, L.M., Hokken-Koelega, A., Arends, L.R., Moll, H.A., Jaddoe, V.W.V., Hofman, A., Mackenbach, J.P. and Raat, H. (2010). Socioeconomic status is not inversely associated with overweight in preschool children. *The Journal of Pediatrics*, Vol. 157, No. 6, 929-935.
21. Salsberry, P.J., Reagan, P.B. (2005). Dynamics of early childhood overweight. *Pediatrics* 2005; 116: 1329-38.
22. Santos, J.L., Kain, J., Dominguez-Vásquez, P., Lera, L., Galván, M., Corvalán, C. and Uauy, R. (2009). Maternal anthropometry and feeding behavior toward preschool children: association with childhood body mass index in an observational study of Chilean families. *International Journal of Behavioral Nutrition and Physical Activity*, 6: 93, 1-8.
23. Sarıtekin, S., ve Dindar, İ. (2013) "Edirne Merkez Kres ve Anaokullarına Kayıtlı 2-6 Yaş Grubu Çocukların Büyüme Gelişim Durumları ve Etkileyen Etmenler." *Ankara Sağlık Hizmetleri Dergisi* 12.1 11- 24
24. Süzek, H., Arı, Z., Uyanık, B.S. (2005). Muğla'da Yaşayan 6-15 Yaş Okul Çocuklarında Kilo Fazlalığı ve Obezite Prevalansı. *Türk Biyokimya Dergisi [Turkish Journal of Biochemistry - Turk J Biochem]* 2005; 30 (4); 290-295.
25. Toschke, A.M., Beyerlein, A., von Kries, R. (2005). Children at high risk for overweight: a classification and regression trees analysis approach. *Obesity Research* 2005; 13: 1270-4.
26. Türkiye Çocukluk Çağı (İlkokul 2. Sınıf öğrencileri) Sismanlık Arastırması COSI-TUR 2016(2017) Sağlık Bakanlığı Yayın No: 1080, 1. Basım: Kasım: 2017, Ankara
27. Türkiye'de Okul Çağı Çocuklarında (6-10 Yaş Grubu) Büyümenin İzlenmesi (TOCBİ) Projesi Arastırma Raporu (2011). Sağlık Bakanlığı Yayın No: 834, 1. Basım: Temmuz 2011, Ankara.
28. Welch, K.R., Ariza, A.J., Wieczarek, J.L., Binns, H.J. (2008). Characteristics of obese children aged 1-4 years at a referral clinic. *J Natl Med Assoc* 2008; 100: 884-91.
29. WHO (2004). Obesity: Global Database on Body Mass Index, (http://apps.who.int/bmi/index.jsp?introPage=intro_3.html).
30. Yabancı, N., Simsek, I., İstanbulluoğlu, H., Bakır, B. (2009). Ankara'da Bir Anaokulunda Sismanlık Prevalansı ve Etkileyen Etmenler. *TAF Preventive Medicine Bulletin*, 2009; 8(5): 397-404.

EVALUATION OF PROCESS-BASED MANAGEMENT FOR SPORTS BUSINESSES

FERAY KÜCÜKBAS DUMAN^{*1} & CEMİLE NİHAL YURTSEVEN²

¹Lecturer Dr., Quality Coordination Office, Istanbul University, Beyazıt, Istanbul, Turkey

²Lecturer Dr., Sports Management Department, Istanbul University-Cerrahpasa, Avcılar, Istanbul, Turkey

***Corresponding Author:** feray.kucukbas@gmail.com, ORCID: 0000-0002-1647-8004

ABSTRACT

An increasingly competitive environment is formed in the world market because of many reasons, such as globalization, rapid developments in information technologies and economic changes. These developments also affect customer needs and expectations. Companies need to manage these changes and developments well to survive in this environment. It is impossible for sports sector not to be affected by these developments. When these institutions and organizations adopt quality and customer-oriented management approach in sports sector, this will ensure their success against their competitors, and also increase their market shares. In the present study, the feasibility and benefits of process management in sports businesses, which constitute the basis of Total Quality Management and Quality Management System studies, are summarized.

KEYWORDS: Process, process management, sports, sports businesses, quality management system

INTRODUCTION

Today's businesses are trying to survive in the intensely competitive environment with the effects of technological developments and globalization. These developments also diversified the possibilities of consumers to like and choose. This forces businesses to be active in many fields, such as analyzing customer needs and expectations well to achieve superiority over their competitors, providing quality products and services to achieve customer satisfaction, and ensuring efficiency by using the existing resources most efficiently. Businesses perform some activities when they produce their products or services. The identification and effective management of these activities is important in terms of the success of the business and the quality of their products and services. Accurate identification and efficient management of the processes enabling the products or services to be produced and delivered pose an important issue, which will bring benefits to businesses.

Process and Process Management

The process is a series of activities in which inputs are turned into outputs, and interact with each other.¹ Processes are the transactions with which business inputs are turned into business outputs. They cover three basic types of activities, which are "activities that create value, in other words, which are important for the customer, activities providing workflow, and control activities."² The inputs activating processes or enabling their transformation/change can be raw materials, products, semi-finished products, as well as information, services, and data. Outputs are the products or services that emerge as a result of several processes of inputs. Outputs can be the final products that will cover the requests and needs of customers, or the output of one process can be the input of another process. The resources employed in the process are the elements contributing to the transformation of inputs into outputs. Activities, which constitute another component of the process, are the works which must be performed to ensure that the processes achieve the intended targets and the desired output.¹ Identifying, understanding, and managing the interconnected processes in businesses contributes to the organizations in achieving the desired goals in terms of effectiveness and efficiency. In this way, it becomes easier to control the relations of processes and their attachment to each other.³ In addition, benefits, such as catching improvement opportunities by focusing on key processes, ensuring that process outputs are consistent and predictable, improving performance with effective process management, ensuring effective resource use, and maintaining the trust of customers are achieved with process-based management.⁴ Process management is a discipline, which accepts processes as its main assets in organizations and ensures that organization performance is improved continuously by monitoring processes. Processes can be monitored and the relevant variabilities can be controlled with process management, and business resources can be effectively used by identifying realistic targets by using the data obtained from the measurement of processes. Processes can be created gradually in a business. The first one among these stages is the "Main Processes", which are high-level processes with strategic significance and direct effects on the main targets of the organization. The other level is the "Processes", which constitute the main processes and which are related to each other. The "Sub-Processes" are activities, which constitute the processes and include two or more functions. The "Process Activities", which is the last stage, constitute the activities of sub-processes.⁵ Defining processes is important for understanding them. For this reason, special inputs and outputs should be determined for each process when defining them, the process should be able to answer the question "what", not "how", the focus should be on targets and results, and all processes should also be focused on covering customer requirements directly or by contributing to other processes.⁶ First of all, the main targets and the main processes of the organization should be identified, the targets of each process should be identified separately, and connections between these process targets and main targets should also be established. The contribution of the processes and sub-processes to the main targets of the organization should be identified. Also, the beginning and the end of the specified processes should be identified, and their relations with other processes should be clearly defined. The relations between the activities constituting the process must also be identified.⁷

Process Features

The key features of the process can be addressed in five groups, which are;⁵

- **Identifiability:** According to this feature, it is expected that the basic elements of the process are identifiable. The inputs that constitute the process are evaluated under several categories, such as suppliers from which inputs are provided, outputs, customers using these outputs, customer expectations, process performance, etc.
- **Measurability:** This is the ability to monitor the process by measuring with the help of performance indicators.
- **Repeatability:** This means that the process can provide the same output continuously.
- **Controllability:** Continuous monitoring of the process performance.
- **Creating Added Value:** This is the positive effect of the outputs of the process on clients.

Measuring and Monitoring of Process Performance

Monitoring of a process or activity is possible by measuring and analyzing the relevant data. Process performance must be measured to understand the degree to which processes contribute to organizational targets and to what extent the outputs expected from the process are achieved. Performance measurement had great importance also to see the results of improvements to the process. When performance indicators are determined, firstly, organization objectives must be determined and associated with each process. Then, the performance indicator for the process should be determined.

Performance indicators are monitored with several control criteria, which are measurements made during the procedures in the process. The mistake-free realization of process activities and the compliance of process output with the previously determined criteria are guaranteed with the help of these.¹

The success of the process is related with the degree to which performance indicators achieve the predefined targets. Also, the results provide input for improvement activities. Process management is based on the PDCA (Plan, Do, Check, Act) cycle.

When process management is addressed with the PDCA Cycle Approach;³

- **Plan:** Providing the resources that are required for processes to achieve results in line with organizational policies and customer requirements.
- **Do:** Implementation of these plans.
- **Check:** Monitoring the processes in terms of organizational policies, objectives, conditions, and planned activities, and reporting the results.
- **Act:** Implementation of the activities to improve performance when needed.

Performance indicators may have quantitative or qualitative characteristics. However, it must definitely have the SMART features. The SMART features here are;⁸

S-Specific: The identified targets should be specific to the work performed, and should be identified with consensus, be "specific (concrete)"; and what is expected from the indicator should be understood by the employees.

M-Measurable: The identified targets should be "measurable". How target success will be measured must be identified. When the indicator is "quantitative", measurement becomes easier. More care should be paid to "qualitative" indicators.

A-Achievable: "Achievable" targets must be identified. The targets should not be very easy, and neither should they be in a difficulty level that cannot be achieved.

R-Reasonable: The identified targets should be "realistic/reasonable".

T-Time-Bound: A certain time limit must be identified for the targets to be achieved (three months, one year, etc.).

Process Management in Sports Businesses

Economic and commercial structures were shaped again, and sports sector was affected with globalization. Sport was reformatted with global businesses with important roles in sports community. The most important phenomenon accelerating the globalization of sports was cultural interaction, which is made easier with technological developments and mass media.

Sports and sports-related activities have important roles in the economic structure; and for this reason, changes in economic indicators can also affect sports industry, and may even trigger a change in these indicators in some cases. The world economy is undergoing a rapid and major change with today's technological developments. This transformation is reflected in sports organizations, causing significant changes. For this reason, it is an inevitable fact that sports industry also follows these developments and organizes its structure in this respect.⁹ It is possible to argue that sports, which pose an important and large industry that cannot be separated from the competitive environment of today's world, is an indispensable element for societies. How sports organizations are managed has great importance to perform the function of a structure, which is integrated into life completely. Sports organizations need good management to survive in their environments, to perform activities effectively, and to adapt to internal and external environmental conditions quickly. In today's globalized world, sports are considered as a great means of acquisitions and advertising and continue to have increasing economic importance nowadays. Sports clubs, which are the most basic building blocks of sports, are turning into large companies. Sports, which have such a dynamic structure, needs to be managed like professional companies to strengthen the competitive aspect and increase the level of profit and income.¹⁰ Sports, which pose a social institution, also has social duties and functions.¹¹ It is possible for sports to perform these functions with good management and organization. Sports administrations of countries must change in time to adapt to the requirements of the present age. The effective and efficient operation of sports organizations depends mostly on good management. Sports businesses constitute mainly service-producing businesses, which need to adopt the principles of a quality management system applying in the developing world order to ensure customer satisfaction by improving service quality, cover customer demands and needs, and acquire superiority to their competitors.¹⁰ Sports organizations are generally customer-centered because of their place in the service sector. With these characteristics, customer satisfaction must always be considered. Customers prefer the same service again if they feel satisfied with the service they receive. For this reason, the quality of the service provided has great importance in sports organizations. Process management is based on the most effective determination of the relations between inputs and outputs to cover the requirements and expectations of customers.¹² A business process is the total of the stages which one or more inputs become outputs to provide value for the customer. With the simplest meaning, processes

answer the question of "what the business does" for customers. Processes appear as a result of the analyses of the successive changes in situations. In other words, a process is the sum of the activities which inputs become outputs by changing the status of one or more assets.⁵ The process approach constitutes the basis of the Total Quality Management philosophy, and ISO 9001 Quality Management System with the aim of systematic continuous improvement of products or services. Since they focus on processes which constitute the whole, it is easier to identify all the factors which might cause mistakes, and it is possible to reach solutions in shorter times with measures that will be taken and the improvement activities that will be implemented. ISO 9001:2015 Quality Management System standard encourages "the application of a process approach to create, implement and improve the effectiveness of quality management system to increase customer satisfaction". In today's world, where a rapid change is experienced with technological developments, sports are also developing in terms of form. Although these developments may not change the rules of sports, they reveal the need for management understanding, which allows information to be addressed rapidly and in different ways. Since the service sector characteristics are different, production and consumption take place simultaneously; and since the customer receiving the service is part of the process, it becomes impossible to store service-related mistakes or quality deficiencies; and for this reason, it becomes important to define all the steps that constitute sports services clearly, check whether they work effectively, and monitor them with improvements at necessary points, to ensure customer satisfaction and business success.

Table 1: Process Interaction Evaluation Table (The Case of a Sports Club)

Process	Ticket Transactions	Data Processing	Legal Transactions	Internal Auditing	Administrative and Financial	Human Resources	Media and Communication	Advertising and Marketing	Purchasing	Travel Organization	Records, License and Accreditation	Operating Stadiums	Identifying Administration and Targets
Ticket Transactions													
Data Processing													
Legal Transactions													
Internal Auditing													
Administrative and Financial Transactions													
Human Resources													
Media and Communication													
Advertising and Marketing													
Purchasing													
Travel Organization													
Records, License and Accreditation													
Operating Stadiums													
Identifying Administration and Targets													

1: Ineffective

2: Indirect Interaction

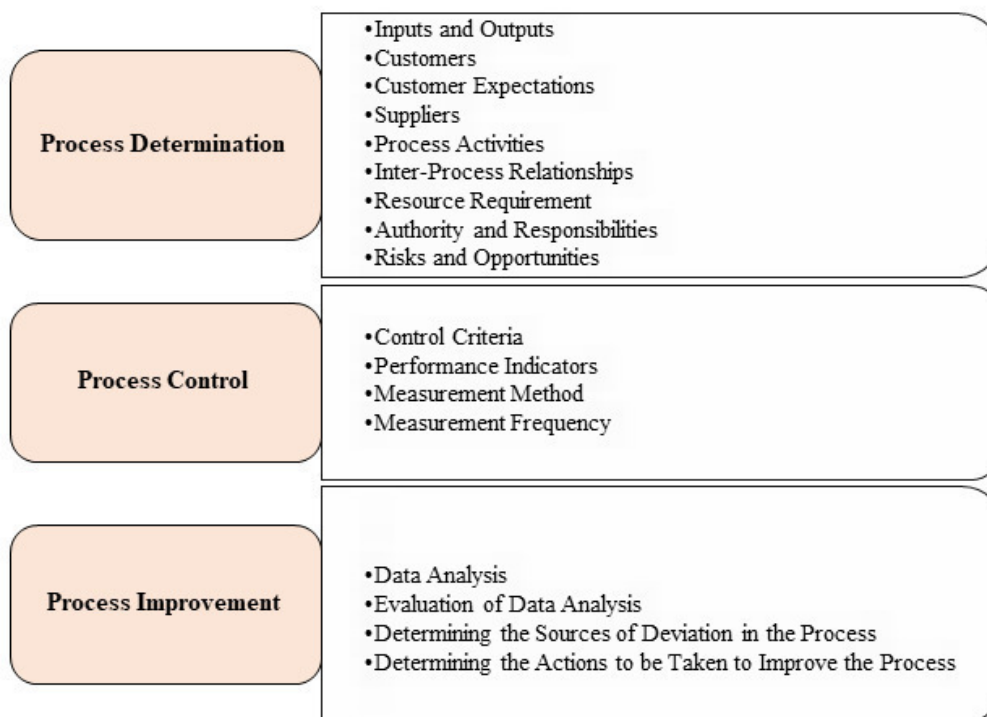
3: Direct Interaction

(The interaction level between the processes can be evaluated with using of 1, 2 or 3 level).

When processes are identified in process management, the following considerations should be taken into consideration;³

- The inputs of the process and expected outputs,
- The order of the processes, and their interactions with each other,
- The performance indicators and measurement methods of processes,
- The resources required,
- Responsibility and authority,
- Risks and opportunities,

- Evaluation and improvement work

Figure 1: Process Management

The formation of an entire management approach in an organization occurs with a process approach. With process-based management application, the following are ensured;^{13,14,16}

- As a result of the processes of measuring and monitoring, results are achieved in process performance and effectiveness.
- Continuous and regular monitoring of processes contributes to the effective use of resources and to achieving opportunities for continuous improvement.
- Process management ensures the organization focuses on the customer. With the customer-oriented processes, customer satisfaction is ensured, and services can be improved.
- Identifying business processes clearly makes it easier to identify points that require improvement.
- It is easier to detect and minimize activities which do not bring value to the main processes.
- Good process design and management shortens the speed with which products or services are offered to the market.
- It is ensured that departments understand each other and communicate effectively in the management of successive processes.
- Instead of considering what or who is causing problems, the process focuses on regulating the process and finding solutions.
- Mistakes are prevented before they occur by bringing a systematic approach to business activities.
- It is ensured that the factors affecting quality adversely are determined in the processes.

It is possible to separate sports management into several sub-branches such as the management of sports organizations, sports clubs, or sports facilities. Although the work fields and the organization types are diversified, the principles of management science must be based on sports management to ensure effective and efficient management.¹⁵ For this reason, using process management practices in sports businesses will bring benefits on the way that leads to achieving business goals.

CONCLUSION

In today's globalized world, the dynamics in the socio-cultural and economic structure are changing at a rapid pace. It is possible that businesses protect their assets and achieve long-term success under challenging competitive conditions with an effective management system. Organizations should understand their clients well, and provide them with products or services exceeding their expectations to survive. Ensuring customer satisfaction is the most effective method that brings superiority in the competitive environment. Sports, which constitute one of the sectors too important to be separated from the competitive environment we live in, has become an integral part for societies all over the world and has been integrated into the lives of humans everywhere. The sports sector, which has become a giant industry in time, also has many institutions and organizations. For sports businesses to exist in a growing competitive environment successfully, they must adopt a quality management approach in the changing and developing world order. The process-oriented approach, which constitutes the basis of the Total Quality Management and Quality Management System, provides organizations a rational structure. It is possible for the products or services to provide maximum benefit to customers by understanding customer expectations and improving production or service processes accordingly. All processes constituting the organization are determined, the processes are addressed with all relevant details, and it becomes possible to achieve the predefined targets by providing continuous improvement through measurement and monitoring with process management. It also becomes easier to identify activities that do not bring benefits

with process-oriented management, and the points that cause the problem can be determined objectively based on the obtained data. The application of process management, which is a part of the quality management approach accepted worldwide, in the production of products and services in sports organizations will provide a proactive approach for the organization. In this way, the points that need to be improved will be identified without causing any disruptions, and overcome without causing any problems with the help of the prevention mechanism.

ACKNOWLEDGEMENTS

This study was not supported by any institution or organization.

CONFLICT OF INTEREST

Conflict of interest declared none.

REFERENCES

1. TSE, n.d.. TS EN ISO 9001:2015 Risk Tabanlı Proses Yönetimi Eğitimi (Eğitim Notu). TSE Eğitim Dairesi Başkanlığı.
2. Soydan, S., 2006. Sürec Yönetimi ve İyileştirilmesi Üzerine Bir Uygulama. Yüksek Lisans Tezi, Dokuz Eylül Üniversitesi, Sosyal Bilimler Enstitüsü, Toplam Kalite Yönetimi Anabilim Dalı, İzmir.
3. TSE, 2015. TS EN ISO 9001:2015 Kalite Yönetim Sistemleri-Sartlar.
4. TSE, 2016. TS EN ISO 9001:2015 Kalite Yönetim Sistemi Temel Eğitimi (Eğitim Notu). TSE Eğitim Dairesi Başkanlığı.
5. Okay, I., 1999. İşletmelerde Sürec Yönetimine Gecis ve Uygulama Sonuçları. Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.
6. Hammer, M., Stanton, S.A., 1995. Değişim Mühendisliği Devrimi: Ne yapmalı, Ne yapmamalı. Sabah Kitapları Yayınları, İstanbul.
7. Miles, R. E., Snow, C.C., 1994. Fit, Failure, and the Hall of Fame: How Companies Succeed or Fail. Maxwell Macmillan International, New York.
8. Işıkcık, E., 2008. Performans Ölçümü, Yönetimi ve İstatistiksel Analizi. İstanbul Üniversitesi İktisat Fakültesi Ekonometri ve İktisat Dergisi, 7, 1-23.
9. Devecioglu, S., 2017. Yükselen Deger Spor Ekonomisi. Available from: <http://lesportmagazine.com/2017/09/27/doc-dr-sebahattin-devecioglu-yazdi-yukselen-deger-spor-ekonomisi/>
10. Devecioglu, S., Yücel, A. S., 2012. Spor Sektörü ve Altı Sigma Yönetim Modeli. SPORMETRE Beden Eğitimi ve Spor Bilimleri Dergisi, X (1), 17-24.
11. İlkın, M., Tanır, H., Özdemir, M., 2018. Socialization Effect of Physical Activity in Students Who Need Special Education. Asian Journal of Education and Training, 4(2), 128-131.
12. Sendikici, P., 2009. Sürec Yönetimi Ve Hizmet Sektöründe Bir Uygulama. Yüksek Lisans Tezi, Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü, Toplam Kalite Yönetimi Anabilim Dalı, İzmir.
13. Stevens, J., Dowdle, P., McCarty, B., Daly, D.C., 2003. Process-Based Management The Road To Excellence. Journal of Cost Management, 17 (4), 12-19.
14. Gonca, A., 2008. Sürec Yönetiminde Kalite Yönetim Prensiplerinin Uygulanması Üzerine Bir Araştırma. Yüksek Lisans Tezi, Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü, Ekonometri Anabilim Dalı, İzmir.
15. Ferkins L., Shilbury, D., McDonald G., 2005. The Role of the Board in Building Strategic Capability: Towards an Integrated Model of Sport Governance Research. Sport Management Review, 8 (3), 195-225.
16. Yurtseven, E., Vehid, S., Bosat, M., Koksall, S., Yurtseven C.N., 2018. Assessment of Ambient Air Pollution in Istanbul during 2003-2013, Iran J Public Health, 47(8), 1137-1144.

RISK EVALUATION FOR SPORTS ACTIVITIES IN COVID-19 PANDEMIC**CEMİLE NİHAL YURTSEVEN*¹ & FERAY KÜCÜKBAS DUMAN²**¹Lecturer Dr., Sports Management Department, Istanbul University-Cerrahpasa, Avcılar, Istanbul, Turkey²Lecturer Dr., Quality Coordination Office, Istanbul University, Beyazıt, Istanbul, Turkey***Corresponding Author:** cny@iuc.edu.tr, ORCID: 0000-0001-8201-0752**ABSTRACT**

Due to the Covid-19 (Coronavirus disease) global pandemic, which began in December 2019, and which has affected the whole world and Turkey, the world and Turkey faced unexpected situations never encountered before. According to the data released by the World Health Organization (WHO), a total of 103.201.340 confirmed cases were reported; and 2.237.636 people died because of coronavirus (as of 03.02.2021) in 223 countries worldwide. Coronavirus pandemic forced the established entertainment life to review media consumption habits and the dynamics of the sports sector. International organizations were also postponed to later dates because of the risk of global pandemics. Major events among these were European Aquatics Championships, Euro 2020, Tokyo Olympics and Paralympics, Eurocup, Euroleague, Formula-1, London Marathon, Wimbledon and World Athletics Indoor Championships. The damaging (effect) of the factor should be determined in risk assessment by considering the rate at which the factor is faced in the society and the sensitivity of the society. In general, the risk is abbreviated with the letter "R", and is calculated as a result of multiplying the probability and the effect. The purpose of this calculation is to make implementation plans by predicting the necessary measures that must be taken when expected or unexpected situations occur. Covid-19 Pandemic, which has affected the sports industry in terms of economy, international relations, social life, physical activity, various sectors of industry, together with the whole world, continues with its effects. This new structure where entertainment has changed in all demographic dimensions to virtual instead of reality hosts opportunities as well as threats. Sports ecosystem should analyze the pandemic period process very well, and make immediate action plans for future crises; and sports industry should design to find creative alternative paths with innovative solutions.

Keywords: Covid-19 global outbreak, Sports and Covid-19, Risk Assessment.**INTRODUCTION**

Pandemics spreading internationally and completely to continents are called "Pandemics", and need three conditions to be declared a Pandemic by the WHO (World Health Organization):

1. If it spreads in a sustainable way and easily among individuals,
2. The emergence of a new virus and a sub-type of it,
3. If it is infected among individuals rapidly and causes serious diseases, this situation is considered as "Pandemic".¹⁻²

Pandemic processes express global outbreaks. With this concept, they affect cultural, political and social areas, especially economics.³ Global pandemics affect economic dynamics and the economy globally, directly and negatively. Unfortunately, it ended the face-to-face communication and relations of individuals for an indefinite period, and prevented the basic habits of individuals; and unfortunately, made it compulsory to change these basic habits. There are many sectors always involving face-to-face communication and interaction of individuals. Entertainment, media and sports, as a whole, is one of the sectors affected by the pandemic process at a very high level. Events in which a large number of people come together with face-to-face communication speeds up the rate at which the virus spreads, and the spread can become uncontrollable in a very short time. In epidemic processes in which social distancing is the most important measure, these crowded activities faced cancellation because of their high risks. Cultural and sporting activities, and some habits, such as the protection of social distancing and cleanliness sensitivity, which are very frequently expressed and said to be important during every pandemic period, have been expressed in many ways in the Covid-19 (Coronavirus) pandemic process.⁴ Coronavirus disease (Covid-19), which is expressed as a novel type of virus, is a type of virus that begins with shortness of breath and fever in the individual, causing respiratory infection, and is infected from individual to individual with contact and droplets, and can then go as far as the death of the patient. Due to Covid-19 (Coronavirus disease) global pandemic, which began in December 2019, and which has affected the whole world and Turkey, the world and Turkey faced unexpected situations never encountered before. Coronavirus first caused the global pandemic on December 12, 2019, in Wuhan, China, and has been shared with the world press that it is dangerous enough to cause the death of the person after shortness of breath and high fever infecting from animals to people.⁴ Approximately two months after this date, the novel coronavirus started in European countries and then in America, spreading to all countries of the world at a very rapid rate. Italy was the country that had the highest number of cases and deaths among all European countries. Coronavirus cases were first detected in Turkey in March 2020 with the rapid increase in European countries and with the rise in the number of cases. The rapid increase of the virus and the resulting increased number of deaths caused the deterioration and collapse of healthcare systems in most countries, and the unfortunate insufficient intensive care units of hospitals resulted in the deaths of even healthcare workers; and therefore, coronavirus outbreak was officially declared as "Pandemic" by the WHO (World Health Organization) as of March 11, 2020.⁵

According to the data released by the World Health Organization (WHO), a total of 103.201.340 confirmed cases were reported; and 2.237.636 people died because of coronavirus (as of 03.02.2021) in 223 countries worldwide.⁵ In Turkey, as in the entire world, serious measures were taken because of the pandemic. When the first case was detected by the Turkish Ministry of Health in Turkey on March 11, 2020, primary and secondary schools and university students were suspended from education without a preset period on March 13, 2020; and many business institutions and organizations, stores, malls and all other places where individuals would socialize were suspended activities temporarily in the scope of various measures. People were encouraged to stay at home as of March 16, 2020, with the slogan "Stay at home for your health" all over Turkey.⁶ A number of measures were initiated requiring the limitations of individuals and were expressed a lot by experts to prevent the rapid spread of coronavirus. Soon after, these suggestions were not mere suggestions and serious limitations were enacted. Coronavirus pandemic forced the established entertainment life to review media consumption habits and the dynamics of the sports sector. Urgent measures to be taken in this respect were imposed and implemented rapidly all over the world after Covid-19 pandemic was found to have serious effects.⁷ Football organizations, which are among the organizations that have the highest share in sports industry, were also canceled or suspended all over the world. Because of these measures, the emerging consequences, which involved many factors, resulted in serious and unprecedented risks. It was first observed that the negative consequences of this were experienced in the media sector, and serious revenue losses were faced. Many risk factors such as the number of cases and mortality rates of countries caused that different measures were taken for countries. International organizations were also postponed to later dates because of the risk of global pandemics. Major events among these were European Aquatics Championships, Euro 2020, Tokyo Olympics and Paralympics, Eurocup, Euroleague, Formula-1, London Marathon, Wimbledon and World Athletics Indoor Championships.⁸ These emergencies might affect the health, safety and well-being of individuals (confusion, emotional isolation, insecurity,) and communities (both individual and professional athletes stay away from physical activities, economic losses occur, job losses, and school closures are faced), which can turn into a series of emotional responses (i.e. distress or psychiatric conditions) in athletes infected with the disease, and unhealthy behaviors and public health directives (i.e. curfew limitations, social space limitations) in the general population.⁹

How should the Risk Assessment Process Be Analyzed in Sports Activities?

The damaging (effect) of the factor should be determined in risk assessment by considering the rate at which the factor is faced in the society and the sensitivity of the society. In general, the risk is abbreviated with the letter "R", and is calculated as a result of multiplying the probability and the effect. The purpose of this calculation is to make implementation plans by predicting the necessary measures that must be taken when expected or unexpected situations occur.¹⁰ A risk management process needs to be established in order to evaluate risks. These processes can be summarized in five basic steps as a) determination, b) evaluation, and c) assessment of risks and deciding on measures to be taken, d) recording the findings and implementing control measures, e) auditing, monitoring, reviewing, and when necessary, making improvements. Risk assessment teams must be established to determine all the processes in these steps. It is extremely critical that this team includes event-specific experts to evaluate possible events. The evaluation team prepares the questions to be used, which may vary depending on the probability of facing the factor, who the group/groups that will be affected are, when, why, and how the society may be exposed to the factor.¹¹ The risk score is created by scoring the answers given to the questions in the risk assessment.¹⁰ National Focal Points (NFPs). A risk table is created to understand the evaluation more easily. In this table, the probability of the event is written to the row, and the effect of the event is written in the column, and the risk levels are determined with color codes.¹²

Table 1. Risk level based on the probability and effect of an event¹⁰

EVENT	FACTOR			
Probability	Very low	Low	Moderate	High
Very low	Very low risk	Low risk	Low risk	Moderate risk
Low	Low risk	Low risk	Moderate risk	Moderate risk
Moderate	Low risk	Moderate risk	Moderate risk	High risk
High	Moderate risk	Moderate risk	High risk	High risk
Very high	Moderate risk	High risk	High risk	Very high risk

The reliability of risk assessment is extremely important and depends on the qualified and complete status and accuracy of the information. Risk assessment, which is a dynamic assessment, can vary according to time and place. It is necessary to evaluate the risks realistically and manage them simultaneously with appropriate intervention tools for a risk assessment to be successful in sports activities. Repeating the risk assessment in previously agreed time periods is important especially for the pandemic risks in sports activities.¹² National Focal Points (NFPs).

A Sample Sports Activity Risk Analysis

When it is considered that there is a stadium in which a sporting activity will be organized, it is first necessary to determine and analyze the risks in the stadium. To do this, measures should be considered against the risk of not maintaining social distancing during the entry and exit of the stadium. The risk of pandemic infection because of the lack of ventilation in closed areas in the

stadium should also be considered. It is necessary to evaluate this type of infection through air as high risk, to ensure seating hygiene in the stadium, and to avoid high-risk situations that may arise against infection with contact among people. Asymptomatic individuals who do not show Covid-19 (Coronavirus) symptoms in the sports activity in the stadium should be determined with test algorithms against the risks of infecting other employees. It must be considered to include informative plates showing risk situations and precautions to be taken in areas such as WC., etc. against infections that may occur with the contact in public areas where sports activities are performed. When the probability and violence situations in the risk management assessment given here are considered, the organization of competitions without audience arises as a result of this analysis as a precaution because it is calculated that such sports activities will carry high risk because of the high probability and violence levels.

An Overview on Sports Industry in Covid-19 Process

Sports sector appears to be a narrow area when compared to other sectors; in actual fact, it is a continuously rising sector involving a wide range of products and logistic sub-sectors as well as other sectors, and add value in this respect. Sports sector has a function that is the chain of social and economic development as well as its social function. It is an industry in which individuals show interest in their free times or follow it by creating free time for themselves. Sports, which have important roles for the economy of various countries, have always influenced people engaged in sports both at the professional level and at individual level in pandemic period. Several sports activities and exercises could not be performed because of the factors considered as a risk in sports centers due to the pandemic, and sports activities in the world were postponed or even cancelled by decisions taken by governments together with various measures to avoid the spread of the virus. Global and local sports events, such as global championships, Olympic games, major sports organizations, Euro 2020, and amateur and professional competitions were also affected by these cancellation decisions. Sports were affected both individually and in the organizational dimension from this global pandemic and was hit hard by the pandemic in the sense of organization.¹³ It was perceived by individuals that leagues were not mere sporting events, their effects on the consumption created by sports and on production spread to much wider ranges in the short term, medium-term, and long term, and revealed the need to accommodate too many stakeholders for sports organizations.¹⁴ Sports activities require effective and timely decision-making in pandemic periods. With the role of organizations mediating the integration of communities, it is necessary to control all processes of the pandemic and to take complete measures. Fans, sponsors, and markets where teams present the objects in which they represent their teams, and also players are primary stakeholders in sports. The transportation and hospitality sector and those working in this sector are included as the secondary stakeholders. When sports are evaluated, evaluations should be made in terms of economic and socio-psychological factors.¹⁵ Football appears to be the most affected sport in sports sector, which has a lot of followers and which is most affected compared to other branches in Covid-19 (Coronavirus), which is a global pandemic. After the pandemic decision was made, games were decided to be played without fans as an example of risk management processes in sports. During social activities or after interventions that may occur in the rooms of athletes during the injury of athletes in competitions and training, athletes share their own objects such as water bottles and towels, the increasing number of Covid-19 cases in some athletes tested positive for Covid at the end of games, for foreign sports managers to postpone or even cancel sports competitions has revealed how important risk management is in sports in the face of the rapid increase of the pandemic.¹⁶ In this context, the discontinuing sports organizations disrupted many sectors in terms of the revenues in sponsorships and advertisements, taxes from broadcasts, bets and claims sector, transportation, paid to broadcast, communication. When it is considered that the cost of cancelled competitions to sponsors and organizers is too high, the extent of the losses, which the entire sports industry must compensate for in the long term, becomes more understandable.⁸ The rules teams have to follow in the pandemic process were announced on May 29, 2020 in Turkey and the Turkish Football Federation decided that TFF 1st league, Super League and Turkish Cup matches would be played completely without spectators, there would be a doctor in all competitions, the temperature of the athletes and the technical staff would be measured before entering to stadiums, and in the same way, these measurements would apply for everyone entering the stadium.¹⁷ In addition to these, the members of the media were required to have "Covid.C-19 PCR Test" and "Antibody Test" in approved laboratories accredited by the Turkish Ministry of Health under the monitoring of the Association of Authors of Turkey in the competitions to be held two days before each competition. The clubs in the football branch are also required to undergo the test protocol applied to the members of the media two days before the planned competition together with all their support and technical teams, all the players in the team, all the officials involved in the games. Prevention of the risks that may be faced was reduced to the lowest level with the measures taken in advance shows how important the analysis and evaluation of risks is in sports.¹⁷ The global value of the sports industry increased by 45% within the four years after 2011, and when the year 2018 is considered, it was determined to be \$471 billion. When the condition before Covid-19 pandemic period is evaluated, the increase in sports industry has been at a very high level. It is speculated that there will be significant contractions in each part and area of the sports industry with the pandemic process.¹⁸

Risk Analysis for the Sports Sector after Covid-19 Pandemic

Sports have an integrated effect among individuals.¹⁹ In this sector, which is diversified in terms of team and individual sports, the evaluations regarding the professional and amateur activities in this sector are interconnected. After the limitations and regulations because of the pandemic process, serious risks emerged affecting people and clubs negatively in terms of performing all collective sports activities, including training in sports sector, and depending on this process, stagnation can be observed for a long time.²⁰ Another issue that attracts attention is the implementation of measures to protect the general health of individuals. Socialization, as is known, is the formation of many complex factors. It includes socialization and individual learning.²¹ Since health literacy and health awareness of most individuals in Turkey is very low, it plays a big role in the difficulty of this process. There is a high risk that there will be difficulties in implementing important and critical measures that will be taken at the professional athlete level in line with the protection of the health of individuals, audience, and fans, who play sports with amateur

spirit. Although return dates were announced for various leagues and sports organizations, sectoral contraction and reduction in the income levels of the sports industry, firstly in advertising revenues and in terms of sponsorships are among the expected possibilities. Based on this sectoral reduction and contraction, clubs and professional athletic activities will be affected negatively.²² Commercial contracts of unfinished sports organizations (i.e. copyrights, sponsorships, licensed products and combined ticket sales) will cause trouble for sports clubs in all terms. Sports sector has many problems both commercially and legally in legal dimension (such as insurance policies).²³ Since it is difficult to keep the performances of athletes at the highest level on a regular long-term basis, it will negatively affect the satisfaction of the audience when viewed in the context of professionalism. Also, sports clubs and sports industry may need to offer their activities in different ways to keep the interest of the audience alive. Professional athletes who always take part in competitions with spectators will need motivation with psychological support to perform in a quality manner and adapt to this situation without receiving the support of the audience for a long and indefinite time. In this context, it is an important issue for club managers and coaches to show extra interest because this will increase the cost and pose great risks.²³ The digitization factor increased rapidly and accelerated the digitalization process of sports with the pandemic period. Digital use has been a prominent concept for conditions, which will prevent the implementation of group sports at the individual and professional levels.²⁴⁻²⁵ It is argued that economic contraction and crises are expected in the sports sector after the pandemic process. When the fact that leagues were postponed or restarted in many countries is considered, sponsorship and broadcast revenues will also arise a very important problem between the parties in the future. When the precautionary and savings decisions from sponsorship investments are considered, a decrease in the number of sponsors will also be inevitable. Sport is an industry that hosts very large stakeholders, providing its revenue sources with sponsorships. In this context, when sponsors such as airlines and tourism-travel companies try to withdraw from the sports industry by arguing their losses, this will increase the economic contraction in the sector.²⁶ The probability of sports clubs paying athletes high sums like in their former conditions also decreased in the continuation of this economic contraction in the future. In this context, when it is predicted that nothing will be the same after the pandemic, the contracts of athletes create a different issue which will be highly affected in this regard. The demand for a review of player contracts is one of the other issues in the face of the contraction in sports sector. When it is considered that sports clubs have difficulties even in paying taxes based on their obligations arising from past contracts, it seems inevitable that they will have regulatory requests from governments in the short term.⁷ Since large-scale organizations were canceled together with Olympics and regional and international sporting events, the psychology and physical performance of the athletes who will participate in these sports organizations were affected negatively, and the inability or decrease in their incomes to be earned through these events caused that new risk factors will emerge. In terms of athletes and teams that did not complete their preparations, the cancellation or suspension of the organizations, and the positive risk that this risk factor poses to athletes and teams caused optimistic comments on the other hand. Place arrangements will also be needed in sports organizations that were decided to be replayed. Considering that the competitions scheduled to be replayed will be played without an audience, it is compulsory to rearrange the dressing and shower rooms of athletes according to the rules of social distancing and to take institutional measures to maintain personal distance during the competitions.²⁷ National and international federations mentioned the measures that should be taken by announcing the "new sporting rules" of each sports branch depending on their characteristics and had to determine the basic safety standards and to ensure that these rules were implemented. With these measures, the purpose was to minimize risk levels, which may occur to best protect the health and safety of professional athletes. At an organizational level, the return of sports industry to its own resources, cost-effective and strategic management of sports clubs, and the shift of the classical management approach of the past to professional management appear to be proper deductions for sports. Sports ecosystem should analyze the pandemic period process very well, and make action plans for future crisis conditions. Sports industry should make designs to find creative alternative routes with innovative solutions. In this respect, the first alternative that comes to mind is e-sports. However, the first thing to do is to attract the fans of traditional sports clubs to this area and to expand e-sports. Although the support and incentives in the field of sports by the state pleased the stakeholders in the sector, it should be considered that people may turn into political polemics, where e-sports are not welcome in the eyes of narrow-income individuals and for large masses.²⁸ However, sports sector has positive impacts on the psychological and physical health of individuals; and contributes to the young generation to acquire self-confidence, improve their sporting and artistic activities, and improve their personality traits. Sports sector is considered as an educational tool contributing to the long term in terms of the well-being and peace of the mind of the society, and states should support this educational tool.⁷ Logistical support is essential in the light of new regulations that will be adopted by various healthcare sector-related organizations and governments regarding the safe working conditions for future sporting events in the field of safety, healthcare and labor force in sports federations, clubs, and organizations all around the world. These organizations can provide guidance in terms of international standards and protocols. To give an example for these important arrangements, to ensure that athletes who prepare for the Olympics strictly comply with their nutrition, resting times, and work schedules, the training programs of athletes should be planned, their corona virus-related concerns and fears should be considered, psychological support should be provided for athletes to eliminate coronavirus psychology easily and quickly or to return to normal, to provide financial support for athletes who lose their jobs because of Covid-19 or who lost their incomes, to direct athletes with social media, to ensure that athletes follow the current information, to follow training programs, share International Olympic Committee current release with athletes from social media, to make athletes free from inconvenient environments, share new ways of coronavirus protection with managers, coaches and athletes, and allow sports system officials to be online in extraordinary conditions are examples of general regulations.²⁹⁻³⁰⁻³¹ Also, it will be very important to have the support of sports media so that society can learn, accept, and implement new rules. Pandemic process in the sports sector required the transformation into digital as in other sectors.³²

CONCLUSION:

In conclusion, Covid-19 Pandemic, which has affected the sports industry in terms of economy, international relations, social life, physical activity, various sectors of industry, together with the whole world, continues with its effects. This pandemic in our

world has taught us that it is necessary to continuously work in these problem areas, especially in healthcare, education, agriculture and animal husbandry, economy to be prepared for other pandemics and the risks that may be posed in this regards. Various risks and risk factors which may be brought by such outbreaks should be calculated in advance, and precautions should be taken in this regard. For example, it is necessary that safe food production and a food safety chain are created. It is also necessary to protect water resources and ensure a balanced safe water supply. From a health viewpoint, it is necessary to take measures that can be taken against risks that may occur. Proper policies should be prepared and implemented for integrated healthcare policies and strategies. Economic development, diversification of livelihoods and fair income distribution are required. It is required that proper policies that will be involved in the relations between the integrity of ecosystems and the health system are determined and implemented, the existence of various industries and the protection of these types of industry is protected (i.e. sports industry when considered in terms of a source of income). Sports events, which are performed collectively rather than individually, are among the first areas to be banned in the fight against the pandemic. When the risk of protecting the health of spectators and athletes, limiting and spreading the pandemic is considered, it is clear how important the sports sector is. The pandemic process paved the way towards the digitalization and remote access in sports together with new social relation patterns, a new concept of entertainment, new sports organizations will form the basis for the emergence of new values and value chains in the process until normalization in the pandemic. This new structure where entertainment has changed in all demographic dimensions to virtual instead of reality hosts opportunities as well as threats. Sports ecosystem should analyze the pandemic period process very well, and make immediate action plans for future crises; and sports industry should design to find creative alternative paths with innovative solutions.

CONFLICT OF INTEREST

Conflict of interest declared none.

REFERENCES

- Sehdev PS. The origin of quarantine. Clinical infectious diseases: an official publication of the Infectious Diseases Society of America. 2002;35(9):1071-1072. doi: 10.1086/344062.
- WHO (World Health Organization) [Internet]. What Is a Pandemic?; 2010 [Cited on 2020, November 5]. Available from: <https://www.who.int/csr/don/en/>
- Cınar F, Müserref O. Türkiye'de COVID-19 Pandemisine Yönelik Stratejilerin SWOT Analizi ile Değerlendirilmesi. Sağlık ve Sosyal Refah Araştırmaları Dergisi. 2020;2(2):1-11.
- WHO (World Health Organization) [Internet]. Coronavirus/Health topics; 2020 [Cited on 2020 December 22]. Available from: https://www.who.int/healthtopics/coronavirus#tab=tab_1
- WHO (World Health Organization) [Internet]. WHO Coronavirus Disease (COVID-19) Dashboard; 2021 [Cited on 2021 03 February]. Available from: <https://covid19.who.int/>
- T.C. Sağlık Bakanlığı [Internet]. Yeni koronavirus hastalığı Covid-19, 2020 [Updated on 2020 June 03; Cited on 2020 December 16] Available from: <https://covid19.saglik.gov.tr/TR-66300/covid-19-nedir-.html>
- Bulduklu Y. COVID-19 Süreci ve Sonrası: Medya-Eğlence ve Spor Sektörü. Ed.: M. Seker, A. Ozer, C. Korkut, Küresel Salgının Anatomisi: İnsan ve Toplumun Geleceği. Ankara: Türkiye Bilimler Akademisi; 2020. s.1035-106.
- Ozili PK, Arun T. Spillover of COVID-19: impact on the Global Economy. SSRN Electronic Journal, doi: 10.2139/ssrn.3562570. Available at SSRN 3562570, 2020.
- Pfefferbaum B, North CS. Mental health and the Covid-19 pandemic. New England Journal of Medicine. 2020;383(6):510-512.
- ECDC, European Centre for Disease Prevention and Control. Technical Document: Operational guidance on rapid risk assessment methodology. 2011
- İnandı T, et al. COVID-19 Salgını özelinde karar vericiler için risk değerlendirme yaklaşımı. Sağlık ve Toplum Dergisi (Özel Sayı). 2020;s:27-38.
- World Health Organization, et al. Rapid risk assessment of acute public health events. World Health Organization, 2012.
- FIFA [Internet]. COVID-19 Football Regulatory Issues; 2020 [Updated on 2020 April 07, Cited on 2020 December 18]. Available from: <https://img.fifa.com/image/upload/zyqtt4bxgupp6pshcrtg.pdf>
- Midiaresearch, Mulligan, M. [Internet]. How COVID-19 will affect the media industries; 2020 [Updated on 2020 March 23; Cited on 2020 December 21]. Available from: <https://www.midiaresearch.com/blog/how-covid-19-will-affect-the-media-industries>
- Kutlu R. Yeni Koronavirus Pandemisi ile İlgili Öğrendiklerimiz, Tanı ve Tedavisindeki Güncel Yaklaşımlar ve Türkiye'deki Durum. Turkish Journal of Family Medicine and Primary Care. 2020;14(2):329-344.
- Ozdemir M, Tanır H, İlkim M, Seker T. Sports injuries in 15-17 year-old male athlete students participating on school teams. Turkish Journal of Sport and Exercise. 2018;20(2):44-48. doi:10.15314/tsed.443493
- TFF [Internet]. Covid-19 Salgını Nedeniyle Ara Verilen Süper Lig, TFF.1. Lig Ve Ziraat Türkiye Kupası Müsabakalarına İlişkin Talimat; 2020 [updated on 2020 March 23; Cited on 2021 January 26]. <https://www.tff.org/Resources/TFF/Documents/TALIMATLAR/Covid-19-Salgini-Nedeniyle-Ara-Verilen-Super-Lig-TFF-1-Lig-ve-ZTK-Musabakalarina-%C4%B0liskin-Talimat.pdf>
- Hall, S. World Economic Forum [Internet]. This is how COVID-19 is affecting the world of sports; 2020 [updated on 2020 09 Apr; Cited on 2021 January 26] Available from: <https://www.weforum.org/agenda/2020/04/sports-covid19-coronavirus-exercise-spectators-media-coverage/>
- Akyol B, İlkim M. Socialization of Disabled People with Sports Activities and Their Problem Encountered in Participating in Sports Activities. Turkish Journal of Sport and Exercise. (2018); 20(2):100-104. doi:10.15314/tsed.452256

20. Türkmen M, Ozsarı A. Covid-19 salgını ve spor sektörüne etkileri. *International Journal of Sport Culture and Science*. 2020;8(2):55-67.
21. Ilkim, M., Tanir, H., & Ozdemir, M. Socialization Effect of Physical Activity in Students Who Need Special Education. *Asian Journal of Education and Training*. 2018;4(2):128-131.
22. Halabchi, Farzin; Ahmadinejad, Zahra; Selk-ghaffari, Maryam. COVID-19 Epidemic: Exercise Or Not To Exercise; That Is The Question. *Asian J Sports Med*, 2020;11(1): e102630.
23. Colucci, M., Rapacciuolo, D., Sethna, R. & Cottrell, S. A comparative analysis of the measures adopted in 25 jurisdictions around the world to counter the effects of COVID-19 on the football industry. *Coronavirus And Its Impact on Football A Sports Law And Policy Centre And Lawinsport Joint Survey* (Eds: M. Colucci, S. Cottrell ve R. Sethna), SLPC. 2020;(1):11.
24. Evans, Adam B., et al. Sport in the face of the COVID-19 pandemic: towards an agenda for research in the sociology of sport. 2020:85-95.
25. Keskin H. The Future of the Sectors and the Change of the Firms in the Post-pandemic Period. *Reflections on the Pandemic*, 441.
26. Chiliz, COVID19 Spor endüstrisi için hem tehdit hem fırsat.2021 [Cited on 2021 January 21] Available from: <https://www.chiliz.com/tr>
27. Muñoz, MD. & Meyer T. Infectious diseases and football – lessons not only from COVID- 19. *Science and Medicine in Football*.2020;4(2):85-86.doi: 10.1080/24733938.2020.174942
28. Yesil M.M. Media, Sports and Entertainment Industry in the Post-pandemic Period. *Reflections on the Pandemic*, 959.
29. Bas, D. et al. The impact of COVID-19 on sport, physical activity and well-being and its effects on social development.2020.
30. Yurtseven E, Vehid S, Bosat M, Koksai S, Yurtseven CN. Assessment of Ambient Air Pollution in Istanbul during 2003-2013. *Iran J Public Health*. 2018;47(8):1137-1144.
31. Vehid S, Enes A, Sayılı U, Cetinkaya E, Sıdika S, Yurtseven E. Health-Related Quality of Life in Adults Over 45 Years: A Cross Sectional Study from Istanbul.*Florence Nightingale Hemsirelik Dergisi*.2018;26(3):149-157.
32. Yurtseven E, Vehid S, Bosat M, Sümer E, Akdeniz I, & Tahirbegolli B. Assessment of Knowledge And Attitudes Toward Complementary And Alternative Medicine (Cam) Amongst Turkish Medical Faculty Students. *African Journal of Traditional, Complementary and Alternative Medicines*.2015;12(5): 8-13. <https://doi.org/10.21010/ajtcam.v12i5.2>

EFFECTS OF EXERGAMES AND KANGOO JUMPS TRAINING ON STRENGTH IN 14-22 YEARS OLD HEARING IMPAIRED SEDENTARY WOMEN

CİHAT KORKMAZ^{1*} and MANOLYA AKIN²

¹Sport Science Faculty, Mersin University, Mersin, Turkey.

² Sport Science Faculty, Mersin University, Mersin, Turkey.

Corresponding Author: korkmaz.cihat68@gmail.com

ABSTRACT

In this study, it was aimed to evaluate the effect of Nintendo-Wii and Kangoo Jumps training on strength variables of sedentary female aged between 14-22. 38 hearing impaired with close disability levels were divided into three groups as Nintendo-Wii, Kangoo jumps and the control group without any practice. Nintendo-Wii and Kangoo Jumps training methods were done for 1 hour twice a week for 8 weeks. In the research, a pre-test-post-test control group model was used. At the end of the 8-week training program, same measurements were applied again the development levels of the groups and the differences between the groups were analyzed. LaFayette brand digital hand dynamometer was used for strength measurement. Quadriceps and dorsal flexion strength measurements were made. In the research; the time consists of two different levels as pre-test and post-test, and the group consists of three levels: Nintendo-Wii, Kangoo Jumps and control. Two-way analysis of variance was used for repeated measurements in order to examine the common effect of measurements made at different times in different groups. A significant difference was found between pre-test and post-test scores of right, left dorsiflexion and left quadriceps strength measurements ($p < 0.05$). On the other hand, the change in right and left dorsiflexion scores obtained from the measurements taken over time in different groups, is significant ($P_{\text{group} * \text{measurement}} < 0.05$). As a result; Balance training on the stable and moving ground has been effective in strength development. The connection between strength and balance that are observed in different sports branches and non-hearing impaired individuals was also observed in hearing-impaired participants in our study.

Keywords: Hearing impaired, Exergame, Kangoo Jumps, Quadriceps Flexor, Dorsal Flexor, Strength

1. INTRODUCTION

Hearing impairment is defined as the inability to perceive speech and environmental sounds.¹ Since auditory stimuli direct visual behavior, hearing impaired children cannot adequately develop their ability to direct the eyes, head and body to environmental stimuli.² For these reasons, hearing-impaired children may have deficiencies in motor functions such as balance and walking.³⁻⁶ Hearing-impaired individuals have a limited level of participation in physical activities, and that leads to a decrease in their physical activity level, muscle strength, cardiovascular endurance, balance and sportive performance.⁷⁻⁹ However, sports activities enable these individuals to gain the dexterity of daily life, orientation and mobility by improving their physical fitness and psychomotor skills.¹⁰ It has been observed that the damaged vestibular coordination structures of the hearing impaired people improve and their balance skills increase when such sports activities are made into a habit.¹¹⁻¹³ Exergames, based on today's developing technologies; offers a variety of activities related to strength, flexibility, balance and dance skills. They also provide individual feedback based on basic anthropometric measurements.¹⁴ Nintendo-Wii fit is an exergame designed for everyone, combining fitness and entertainment.¹⁵ Experts now say that there is a need for the development of new and high-quality physical education programs that contribute to the youth maintaining the optimal level of motor activity and increasing their motivation for regular exercise.¹⁶ According to ¹⁷; Kangoo Jumps shoes are one of the innovative type of training that will help improve the quality of physical activities of students. On the other hand, due to its design, Kangoo Jumps shoes reduce mobility in the ankle joint and muscle activation amplitude so they affect the strength generation during shock absorption.¹⁸ Kangoo Jumps shoes are one of the favorite type of equipment in dynamic balance training because they reduce the pressure on joints and contribute positively to postural control during exercises.¹⁷ Problems that may occur in muscle control and balance due to the effect of the vestibular system in hearing-impaired people also negatively affect muscle strength and motor functions.¹⁹ Balance performance and muscle strength in different branches vary according to the needs of the sports branch.²⁰ There are many studies in the literature examining the relationship between lower extremity muscle strength and balance performance. These studies revealed that lower extremity muscle group (ankle, hip, leg) strength are extremely important in demonstrating balance skill.^{21,22} However, these studies are mostly conducted with healthy individuals and they are studies that examine the effect of muscle strength on balance ability. Since the effect of balance training on the development of muscle strength is examined in our study, as the content it differs from other studies. In addition, there isn't a similar study with these features in the literature because this study was carried out with the hearing impaired. It is also a matter of curiosity that to what extent the training on stable ground and playing ground will affect the strength values. About this subject, there are studies on the balance of children²³, but there are no studies of that for the hearing-impaired. For these reasons, in this study, it was aimed to examine the effect of Nintendo-Wii balance board and Kangoo Jumps training on the muscle strength variable, which were carried out to increase the dynamic balance skills of the hearing impaired individuals and to maintain postural stability.

2. MATERIALS AND METHODS

In our study a pre-test / post-test model was used and Nintendo-Wii balance board was applied on stable ground and Kangoo Jumps balance training on a dynamic ground that allows anterior-posterior movement were applied.

2.1. Research Group

38 hearing-impaired female students, studying at İbn-i Sina Special Education Vocational High School in Toroslar district of Mersin province, voluntarily participated in the study by getting permission from their parents with the consent form according to the Helsinki Criteria after obtaining the necessary legal permissions from the Mersin Provincial Directorate of National Education. The ethical committee decision of the study was taken by the Mersin University Social and Humanities Ethics Committee with decision number 2018/004 and dated 16.01.2018. Hearing-impaired students between the ages of 14-22 who had not been involved in any sports before and who did not have neurological and orthopedic disorders in the last 6 months participated in the study.

2.2. Data Collection Tools

2.2.1. Nintendo-Wii Fit Balance Games

In the Nintendo-Wii Fit game console that helps improve the sense of balance; there are head ball, ski slalom, ski jumping, table tilt, walking on a stretched rope, balance bubble, penguin strap and snowboard slalom games.²⁴

The participants played different Nintendo Wii games an hour per day twice a week for 8 weeks. The training program in Table 1 and photographic image in Picture 1 were given below.

Table 1. 8 weeks training program

Week	Video Games
1.	Head Ball - Ski Slalom - Ski Jumping
2.	Table Tilt - Walking on the Rope - Balance Balloon
3.	Penguin Slide - Snowboard Slalom - Head Ball
4.	Ski Slalom - Ski Jumping - Table Tilt
5.	Walking on Rope - Balance Balloon - Penguin Slide
6.	Snowboard Slalom - Head Ball - Ski Slalom
7.	Ski Jumping - Table Tilt - Walking on the Rope
8.	Balance Balloon - Penguin Slide - Snowboard Slalom



Picture 1. Nintendo-Wii trainings

2.2.2. Kangoo Jumps

An 8-week training program lasting 60 minutes twice a week (Tuesday-Thursday) was applied with Kangoo Jumps shoes that were invented to help reduce serious injuries in the joints by focusing on performance improving the performance of athletes.

Picture 2. Kangoo jumps training



2.2.3. Lafayette Hand-held Dynamometer Measurements

LaFayette brand digital hand dynamometer is a portable instrument sized 3.16 "x 5.11" x 1.6 "(8.03cm x 12.98cm x 4.1cm), with 3 easy-to-change heads, a rechargeable lithium-ion battery that can last for 6 hours and an LCD display with digital display. The device can give data such as peak power, time to peak power, total test time and average strength in kg, Newton and pounds and provides 150 data storage facilities. It also provides a selectable measurement time between 1-10 seconds.²⁵

2.2.4. Quadriceps and dorsal flexion strength measurements

For strength measurements; The test was initiated with the participants sitting on a flat surface with their hips and knees flexed at 90°, feet free and without support. Participants were verbally informed about the test application technique before starting the test. The dynamometer for quadriceps flexor strength measurement is placed perpendicular to the tibia. For dorsal flexor strength measurement, the dynamometer was placed on the metatarsals. During the test, the "make test" technique, which requires isometric contraction, was applied. (Make test is the protocol of the maximum applied strength against the device by the tested participant while the person making the measurement keeps the dynamometer constant). All measurements were taken from both legs of the participants twice, by the same researcher, with the same hand.

Picture 3. Strength measurements



2.2.5. Data Analysis

The arithmetic mean and standard deviation values of the strength measurements of the participants were determined. 95% confidence interval was used in statistical analysis and $\alpha = .05$ was accepted. Two-way analysis of variance was used for repeated measures to examine the common effect of measurements made in different groups and at different times.

3. RESULTS

The quadriceps and dorsal flexion strength descriptive statistics before and after training with different equipment are given in Table 2.

Table 2. Descriptive statics of the strength measurements

Groups	n	Right Dorsiflexion		Right Quadriceps		Left Dorsiflexion		Left Quadriceps	
		Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test	Pre Test	Post Test
Nintendo-Wii	3	27,67	33,86	25,41	27,16	29,77	35,03	25,17	27,22
Kangoo Jumps	5	28,02	33,46	29,04	30,12	29,98	33,63	26,79	30,38
Control	0	28,16	28,35	28,17	28,95	28,11	29,53	26,51	26,17

3.1. Right Dorsiflexion

Table 3. Pre-test, Post-test Two Way Anova Results

Source of Variance	KT	Sd	KO	F	P	η^2
Between subjects	33081,095	1	33081,095	693,084	,000	
Group(individual –group)	46,070	2	23,035	,483	,621	,027
Error	1670,559	35	47,730			
In-subjects						

Measurement	286,194	1,000	286,194	30,408	,000	,465
Group*measurement	117,178	2	58,589	6,225	0,005	0,262
Error	329,410	35,000	9,412			
P<0,05						

No significant difference was found between the right dorsiflexion scores of the students in the groups participating in different training sessions ($P_{\text{group}} > 0.05$). However, there is a significant difference between pre-test and post-test scores. In addition, when the effect of group and time variables is examined together ($P_{\text{group} * \text{measurement}} < 0.05$), the change in the right dorsiflexion scores of the students in different groups obtained from the measurements taken over time is statistically significant. While eta square value of time-variable is 0.262, interaction (group * time) variable is 0.465. According to the criteria determined by Cohen, it can be said that the effect size level of the group variable is small, the effect size of the measurement variable and the interaction variable (group * measurement) are high.

3.2. Right Quadriceps

Table 4. Pre-test, Post-test Two Way Anova Results

Source of Variance	KT	Sd	KO	F	P	η^2
Between subjects	29265,304	1	29265,304	990,444	,000	,966
Group(individual –group)	77,495	2	38,748	1,311	,282	,070
Error	1034,168	35	29,548			
In-subjects						
Measurement	53,584	1	53,584	1,904	,176	,052
Group*measurement	5,796	2	2,898	,103	,902	,006
Error	985,086	35	28,145			
P<0,05						

There was no significant difference between the right quadriceps scores of the students in the groups participating in different training sessions ($P_{\text{group}} > 0.05$). There is no significant difference between pre-test and post-test scores. When the effects of group and time variables are examined together ($P_{\text{group} * \text{measurement}} > 0.05$), there is no statistically significant difference in the right quadriceps values. The eta squared value of the time variable is 0.006 and the interaction (group * time) variable is 0.052. According to the criteria determined by Cohen, it can be said that the effect size level of the group is medium, measurement variable and interaction variable (group * measurement) is small.

3.3. Left Dorsiflexion

Table 5. Pre-test, Post-test Two Way Anova Results

Source of Variance	KT	Sd	KO	F	P	η^2
Between subjects	35532,662	1	35532,662	650,172	,000	,949
Group(individual –group)	81,099	2	40,550	,742	,484	,041
Error	1912,790	35	54,651			
In-subjects						
Measurement	438,481	1	438,481	26,699	,000	,433
Group*measurement	83,446	2	41,723	2,541	,093	,127
Error	574,804	35	16,423			
P<0,05						

No significant difference was found between the left dorsiflexion scores of the students in the groups participating in different training sessions ($P_{\text{group}} > 0.05$). There is a significant difference between pre-test and post-test scores. In addition, when the effects of group and time variables were examined together ($P_{\text{group} * \text{measurement}} > 0.05$), a statistically significant difference was found. While the eta square value of the time variable is 0.127, the interaction (group * time) variable is 0.433. According to the criteria determined by Cohen, it can be said that the effect size level of the group variable is small, the effect size of the measurement variable and the interaction variable (group * measurement) are high.

3.4. Left Quadriceps

Table 6. Pre-test, Post-test Two Way Anova Results

Source of Variance	KT	Sd	KO	F	P	η^2
Between subjects	27018,937	1	27018,937	826,208	,000	,959
Group(individual –group)	49,222	2	24,611	,753	,479	,041
Error	1144,581	35	32,702			
In-subjects						
Measurement	115,005	1	115,005	5,244	,028	,130
Group*measurement	92,520	2	46,260	2,109	,136	,108
Error	767,534	35	21,930			
P<0,05						

There was no significant difference between the left quadriceps scores of the students in the groups participating in different training sessions ($P_{\text{group}} > 0.05$). There is a significant difference between pre-test and post-test scores. Also, when the effects of group and time variables are examined together ($P_{\text{Group} * \text{measurement}} > 0.05$), no significant difference was found. According to the criteria determined by Cohen, it can be said that the effect size level of the group variable is small, the effect size of the measurement variable and the interaction variable (group * measurement) are medium.

4. DISCUSSION

In this study, in which we researched whether or not the modern dynamic balance training that applied on 14-22 age group hearing-impaired female sedentary exercises affects on strength variables, the difference between the pre-test post-test mean scores for three different groups was analyzed. A statistically significant difference was found between the pre-test and post-test scores of right, left dorsiflexion and left quadriceps strength measurements ($p < 0.05$). There was no significant difference in terms of time but a statistically significant difference in terms of the group. However, it is seen that the common effect of measurements made in different groups and at different times is significant. There are studies in the literature examining the relationship between balance skills and lower extremity muscle strength. In a study examining the effects of quadriceps and hamstring muscle strength on static and dynamic balance, it was found that quadriceps muscle strength had a positive relationship with balance performance²⁶. In their study with elite wrestlers²⁷, stated that balance performance has a significant relationship with knee muscle strength²⁸; described the positive relationship between strength and balance and they explained that the increase in muscle strength improves intramuscular and inter-muscular coordination by increasing the synergist and antagonist working capacity of the extensor and flexor muscles. Osteoarthritis in the knee joint is one of the most common complaints in the lower extremities. In patients with knee osteoarthritis; knee joint proprioception, dynamic balance and maximal quadriceps strength may be impaired. In a study with those with osteoarthritis, they concluded that in women with knee OA, knee proprioception and balance responses decreased due to weakness of quadriceps muscle strength.²⁹ Similar results were encountered as a result of studies conducted with disabled individuals. During these studies, modern dynamic balance training equipment was used. Exergames have been used as a rehabilitation tool to improve balance and functional movement in various populations.^{30,31} Another study stated that balance exercises with exergames are an effective method for improving the daily movements and dynamic balance skills of hearing-impaired individuals.³² They concluded that the 8-week Nintendo-Wii balance board training applied to the hearing impaired individuals between the ages of 9-14 improved the dynamic balance values.³³ According to teacher reports and MABC (Movement Assessment Battery for Children) test results, it was understood that the motor skills of hearing-impaired children were weaker than non-deaf children.³⁴ In a study conducted with individuals with and without hearing impairment, they measured the effects of antigravity muscle strength on balance by measuring strength and static balance measurement for different muscle groups. As a result, they concluded that adequate mobility, proper posture, flexibility and muscle strength are important variables in improving the balance reactions of the hearing impaired.³⁵ In their study, Karakoç et al. stated that regular balance and coordination training increases the performance of hearing-impaired athletes and that static and dynamic balance training affects their performance.³⁶

5. CONCLUSION

Specific sporty branch-trainings contribute to strength development and bring neuromuscular harmony with it. This situation is thought to contribute to the development of dynamic balance.³⁷ Our study, which we believe to improve the mobility skills of the hearing impaired in their daily lives, is similar to these studies when we look at the results. Studies in the literature show that training provides improvement. It is concluded that muscle strength is important in maintaining balance. As a result; balance training on the stable and moving ground has been effective in strength development. The connection between strength and balance that are observed in different sports branches and non-hearing impaired individuals was also observed in hearing-impaired participants in our study. We can say that balance training has been effective in the development of muscle strength. Better results can be achieved at the end of longer working periods.

6. CONFLICT OF INTEREST

Conflict of interest declared none

7. REFERENCES

1. Bienenstock MA, Vernon M. Classification by the states of deaf and hard of hearing students: It's not how much you hear, but where you live. *American annals of the deaf*. 1994;139(2):128-31.
2. Butterfield SA, Ersing WF. Influence of age, sex, hearing loss and balance on development of catching by deaf children. *Perceptual and Motor Skills*. 1988 Jun;66(3):997-8.
3. Potter CN, Silverman LN. Characteristics of vestibular function and static balance skills in deaf children. *Physical therapy*. 1984 Jul 1;64(7):1071-5.
4. Gayle GW, Pohlman RL. Comparative study of the dynamic, static, and rotary balance of deaf and hearing children. *Perceptual and Motor Skills*. 1990 Jun;70(3):883-8.
5. Rine RM, Lindeblad S, Donovan P, Vergara K, Gostin J, Mattson K. Balance and motor skills in young children with sensorineural hearing impairment: a preliminary study. *Pediatric Physical Therapy*. 1996 Jul 1;8(2):55-61.
6. Rine RM, Cornwall G, Gan K, LoCascio C, O'Hare T, Robinson E, Rice M. Evidence of progressive delay of motor development in children with sensorineural hearing loss and concurrent vestibular dysfunction. *Perceptual and motor skills*. 2000 Jun;90(3_suppl):1101-12.
7. Akinoğlu B, Nezire K. Determination of physical fitness level in children with hemiparetic and diparetic cerebral palsy. *Turkish J Physiother Rehabil* 2018;29:11-18.

8. Karakoc O. Muscle strength and flexibility without and with visual impairments judoka's. *Int Educ Stud* 2016a;9:12-17.
9. Karakoc O. The investigation of physical performance status of visually and hearing impaired applying judo training program. *J Educ Train Stud* 2016b;4:10-17.
10. Yildirim S, Yuksel R, Doganay S, Gul M, Bingol F, Dane S. The benefits of regular physical activity on hearing in visually impaired adolescents. *Eur J Basic Med Sci* 2013;3:17-21.
11. Azevedo MG, Samelli AG. Comparative study of balance on deaf and hearing children. *Rev CEFAC*. 2009;11(Supl 1):85-91.
12. Butterfield SA. Influence of age, sex, hearing loss, and balance on development of running by deaf children. *Perceptual and motor skills*. 1991 Oct;73(2):624-6.
13. Gheysen F, Loots G, Van Waelvelde H. Motor development of deaf children with and without cochlear implants. *Journal of deaf studies and deaf education*. 2008 Mar 1;13(2):215-24.
14. Sheehan DP, Katz L. The effects of a daily, 6-week exergaming curriculum on balance in fourth grade children. *Journal of Sport and Health Science*, 2013 Mar;2(3), 131-137.
15. <https://careers.nintendo.com/benefits-and-perks/>
16. Ennis CD. Educating students for a lifetime of physical activity: Enhancing mindfulness, motivation, and meaning. *Research Quarterly for Exercise and Sport*. 2017 Jul 3;88(3):241-50.
17. Mokrova T, Bryukhanova N, Osipov A, Zhavner T, Lobineva E, Nikolaeva A, Vapaeva A, Fedorova P. Possible effective use of Kangoo Jump complexes during the physical education of young students. *Journal of Physical Education and Sport*. 2018 Apr 1;18:342-8.
18. Hume PA, Gerrard DF. Effectiveness of external ankle support. *Sports Medicine*. 1998 May;25(5):285-312.
19. Streepey JW, Angulo-Kinzler RM. The role of task difficulty in the control of dynamic balance in children and adults. *Human movement science*. 2002 Oct 1;21(4):423-38.
20. Perrin P, Deviterne D, Hugel F, Perrot C. Judo, better than dance, develops sensorimotor adaptabilities involved in balance control. *Gait & posture*. 2002 Apr 1;15(2):187-94.
21. Deniskina NV, Levik YS. Relative contribution of ankle and hip muscles in regulation of the human orthograde posture in a frontal plane. *Neuroscience letters*. 2001 Sep 14;310(2-3):165-8.
22. Runge CF, Shupert CL, Horak FB, Zaiac FE. Ankle and hip postural strategies defined by joint torques. *Gait & posture*. 1999 Oct 1;10(2):161-70. Engel-Yeger B, Weissman D. A comparison of motor abilities and perceived self-efficacy between children with hearing impairments and normal hearing children. *Disability and rehabilitation*. 2009 Jan 1;31(5):352-8.
23. Demir A, Akin M. The Effect of Exergame Education on Balance in Children. *Malaysian Online Journal of Educational Technology*. 2020 Jul 1;8(3):100-7.
24. <https://careers.nintendo.com/benefits-and-perks/>
25. <https://lafayetteevaluation.com/products/lafayette-hand-held-dynamometer>
26. Çelenk Ç, Marangoz İ, Aktuğ ZB, Top E, Akil M. The effect of quadriceps femoris and hamstring muscular force on static and dynamic balance performance. *International Journal of Physical Education Sports and Health*. 2015;2(2):323-5.
27. Bulgay C, Polat SÇ. Elit seviyedeki güreşçilerin bacak kuvvetleri ve denge performansları arasındaki ilişkinin incelenmesi. *İnönü Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi*. 2017 Dec 25;4(3):59-67.
28. Liman N, Güzel NA. Aerobik-Step ve pilates egzersizlerinin kuvvet, esneklik, anaerobik güç, denge ve vücut kompozisyonuna etkisi. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*. 2008;13(4):3-12.
29. Mohammadi F, Taghizadeh S, Ghaffarinejad F, Khorrami M, Sobhani S. Proprioception, dynamic balance and maximal quadriceps strength in females with knee osteoarthritis and normal control subjects. *International Journal of Rheumatic Diseases*. 2008 Apr;11(1):39-44.
30. Mhatre PV, Vilares I, Stibb SM, Albert MV, Pickering L, Marciniak CM, Kording K, Toledo S. Wii Fit balance board playing improves balance and gait in Parkinson disease. *Pm&r*. 2013 Sep 1;5(9):769-77.
31. Taylor MJ, Shawis T, Impson R, Ewins K, McCormick D, Griffin M. Nintendo Wii as a training tool in falls prevention rehabilitation: case studies. *Journal of the American Geriatrics Society*. 2012 Sep;60(9):1781-3.
32. Kaya M, Saritas N. A Comparison of the Effects Balance Training and Technological Games on Balance in Hearing-Impaired Individuals. *Online Submission*. 2019 Mar;7:48-53.
33. Korkmaz C, Akin M. 9-14 Yaş Grubu İşitme Engelli Sedanterlerde Nintendo-Wii Balance Board Antrenmanlarının Dinamik Denge Üzerine Etkisi. *Spor Eğitim Dergisi*. 2019 Dec ;3(3):119-27.
34. Engel-Yeger B, Weissman D. A comparison of motor abilities and perceived self-efficacy between children with hearing impairments and normal hearing children. *Disability and rehabilitation*. 2009 Jan 1;31(5):352-8.
35. Kitiş A, Büker N, Eren KE, Aydın H. İşitme engelli kişilerde statik dengeyi etkileyen faktörlerin incelenmesi. *Journal of Kartal Training & Research Hospital*. 2015 Jan 1;26(1).
36. Karakoc O. The Investigation of Physical Performance Status of Visually and Hearing Impaired Applying Judo Training Program. *Journal of Education and Training Studies*. 2016 Jun;4(6):10-7.
37. Kesilmiş İ, Manolya A. Quadriceps ve Hamstring Kas Kuvveti Dinamik Denge Performansını Etkiler mi? *Türk Spor Bilimleri Dergisi*. 2020 Mar 3;1(1):1-7.

THE EFFECTS OF TECHNICAL AND TACTICAL CRITERIA ON SUCCESS IN 2016 FIVB WOMEN'S VOLLEYBALL WORLD CLUB CHAMPIONSHIP¹

Olcaç Mulazimoglu², Yakup Akif Afyon², Simge Girgin²

¹ World Sport Sciences Research Congress. 23-26 April 2017 poster presented, Manisa, Turkey

² Mugla Sıtkı Kocman University, Faculty of Sport Sciences, Mugla, Turkey

Corresponding Author: Yakup Akif Afyon, yaafyon@gmail.com.

ABSTRACT

In this study, it was aimed to investigate the technical and tactical criteria affecting the tournament success of the eight teams competed in the 2016 FIVB Women's World Club Championship. Data was collected from the official website of the International Volleyball Federation (FIVB), including the group matches (12 games) in the championship and the final matches (8 games) summing up 20 competitions. The winning points are analyzed in terms of sets, matches and tournament ranking statistics in terms of technical and tactical criteria regarding spike, block, serve, defense, set play and reception. Comparison analysis was done among match success and tournament success rank, technical-tactical criteria. Statistical significance level was taken as 0.05. It was found that there were significant differences in favor of the winning teams in terms of the number of spike points ($t=2.33$, $p=0.025$), the number of block points ($t=3.54$, $p=0.001$), the number of serve points ($t=2.95$, $p=0.005$) the criteria for dig error ($t=-4.35$, $p=0.000$) and reception error ($t=-3.09$, $p=0.004$). It was found that there was a significant difference in favor of the teams in the top ranks according to the criteria of the spike points ($F=3.28$, $p=0.01$) and the points from block ($t=4.27$, $p=0.002$) in terms of success rank. Consequently, the teams in the top rank in the tournament were more successful by the points from spikes and blocks and winning teams made less error of serve, dig and reception. Volleyball players and coaches are thought to be very important to prepare for success by considering these technical and tactical criteria.

Key words: match analysis, spike, block, serve, success

INTRODUCTION

As in other sports, game statistics provide very useful information about match performance in volleyball. Two types of important information are provided about the game, quantitative and qualitative. In order to reach qualitative information, video recordings need to be analyzed on the computer. The movements exhibited by the players in the match, team success, and technical elements are detailed and provide important information to help coaches.² Quantitative statistics are recorded throughout the game and players' performance and all actions can be evaluated instantly. The discovery of technical and tactical elements enables these elements to be developed and training programs organized according to this information.¹ Analyses are mostly formed as a player, team or opponent in matches, according to criteria consisting of technical movements or tactical elements, and when the match is considered successful and unsuccessful in terms of period, set, halves or match result. There are actions and phases specific to volleyball that repeat during the match. These can be shown as serve, reception, set, spike, block and dig.¹² The fact that each player successfully displays all these criteria in the match as required.⁶

Rabaz et al. (2013) reported that the efficiency of serve, defense, setting and spike was higher in the winning teams in the analyses made by young volleyball players in their matches. Previous researches, especially the three final movements in volleyball, serve, spike and block are of great importance in success.¹¹ Detailed statistics and analysis of matches in high-level tournaments will give players and coaches important information about the future. In this study, it is aimed to examine the numbers, sets, tournament ranking statistics, spike, block, serve, defense, setting and reception technical and tactical criteria that affect the tournament success of eight teams competing in the 2016 FIVB Women's World Clubs Championship (WWCC).

METHOD

Competition analysis and statistical evaluations were used in the research. In this research, the match statistics of eight teams competing in the 2016 WWCC were evaluated. A total of 20 match datas obtained from the FIVB official website were evaluated, of which 12 were group matches and 8 were qualifying matches. The matches were played in two groups with 4 teams (group A, group B) with single match system. Group A: Eczacıbaşı Vitra Istanbul (Turkey) Pomi Casalmaggiore (Italy), Rexona Ades (Brazil) and Manila PSL (Philippines). Group B: Vakıfbank Istanbul (Turkey), Bangkok Glass (Thailand), Hisamitsu Springs (Japan) and Volero Zurich (Switzerland). The teams that ranked in the first two in their group qualified for the semi-finals. After the semi-final matches played over a single match using the cross match method, the victorious teams were entitled to play the final. At the end of the tournament, Eczacıbaşı Vitra Istanbul defeated Pomi Casalmaggiore in the final and became the champion in the 2016 FIVB WWCC. Ranking of the teams, the average age, height, body weight, attack height and block height of the players in the teams are shown in Table I.

Table I. Team success ranking, some physical, game features

Ranking	Teams	Age (year)	Height (cm)	Length (cm)	Body Weight (kg)	Attack Height (cm)	Block Height (cm)
1	Eczacibasi Vitra Istanbul	27.6	185.53		71.93	295.93	286.73
2	Pomi Casalmaggiore	28.53	183.23		71.07	306.84	282.23
3	Vakifbank Istanbul	25.14	186.42		69.92	300.64	291.42
4	Volero Zürich	28.4	187.86		73.6	305.8	291.66
5	Rexona-Sesc Rio	27.46	180.93		68.73	295.2	278.13
6	Hisamitsu Springs Kobe	25.35	176.1		66.15	294.2	281.9
7	Bangkok Glass	26.6	174.6		63.6	278.35	270.6
8	PSL-F2 Logistics Manila	26.5	179.2		66.05	282.25	273.65

Statistical analysis

The average points won by the teams in the sets according to their success ranking and the average points in the won and lost sets are shown in the graph. Comparison statistics (one-way ANOVA) between team-ranking were applied for scoring points from spike, block and serve. Multiple comparison analyzes (Post-Hoc) were conducted to find the source of the difference between teams. Comparison statistics (independent sample t-test) of technical actions (point from spike, block, serve, dig error and reception error) according to match winning and losing status were made. The significance level was accepted as 0.05 in the evaluations.

RESULTS

Chart 1 shows the average of the number of teams in the sets according to the success order. The average number of the championship team seems lower than the teams in the 2nd and 3rd places. The average number trends of the teams vary especially among the teams that share the first places. In Chart 2, although the number averages of the victorious teams are seen as high compared to the defeated teams, the average number of defeated teams won in the sets (19.8) is quite high.

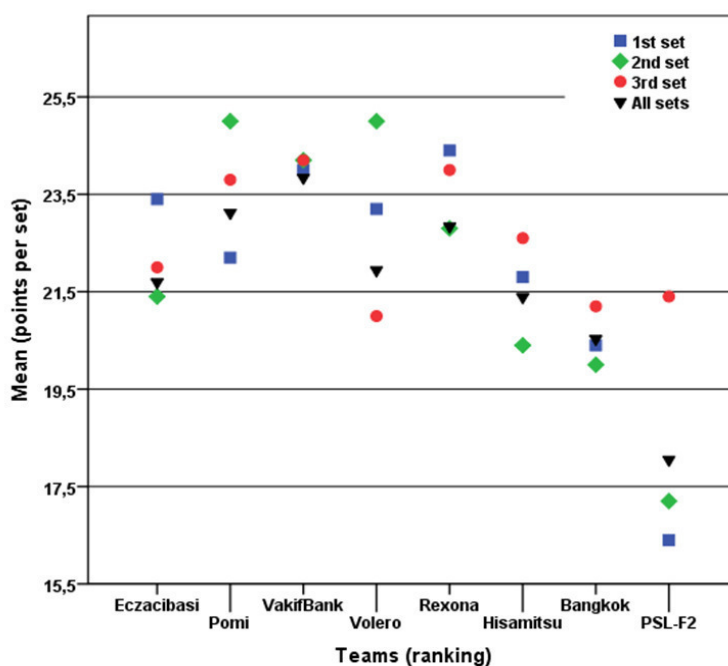


Chart 1. Average points of teams in sets in order of success

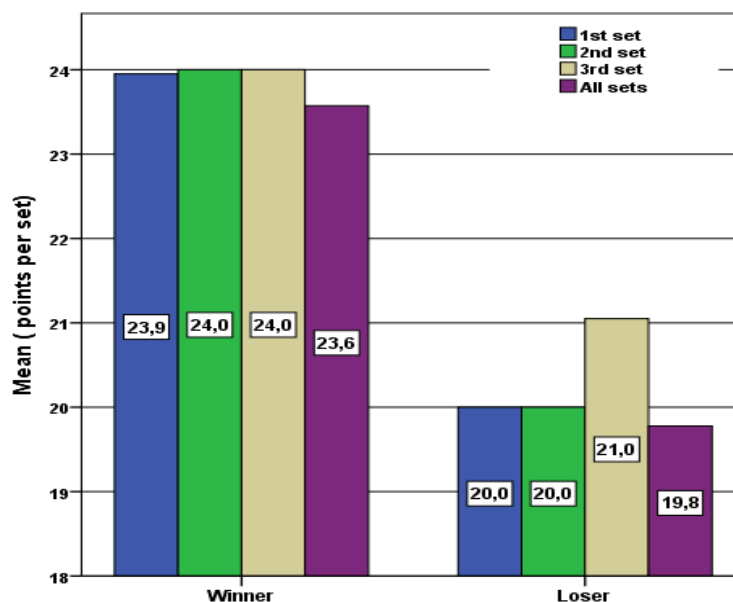


Chart 2. Points distribution of winning and losing teams by sets

According to the success order of the tournament result, a significant difference was found between the average number of spikes ($F = 3.28$; $p = 0.01$) and the block ($F = 4.27$; $p = 0.00$). It was found that the teams higher in the rankings at the end of the tournament won more points than the spike and the block. No significant difference was found between the successful serve percentages of the teams ($p > 0.05$) (Table 2).

Table 2. Comparison of teams according to the ranking of spike and block points and percentage of successful serve variables

Ranking	Teams	Score from spike		Score from block		successful serve %	
		Mean	SD	Mean	SD	Mean	SD
1	Eczacıbaşı	52.40	10.69	12.60	5.46	9.11	4.43
2	Pomi	45.00	12.61	10.60	4.83	6.58	1.22
3	Vakıfbank	55.40	5.32	15.60	8.62	5.79	.85
4	Volero	47.60	6.19	9.00	1.87	6.13	3.06
5	Rexona	51.80	12.83	13.40	5.55	5.67	4.29
6	Hisamitsu	45.80	12.40	5.80	3.11	5.87	1.42
7	Bangkok	35.20	7.36	3.80	1.79	5.61	3.28
8	PSL-F2	34.60	2.70	4.40	2.61	8.11	4.28
	Average	45.98	11.26	9.40	6.00	6.61	3.13
	F	3.28*		4.27**		0.83	
	p	0.01		0.00		0.56	
	Source difference	of*1-3-4-5 > 7-8		**1-3-5 > 6-7-8 **2 > 7-8 **3 > 4		null	

* $p < 0.05$ and ** $p < 0.01$ level of significance

The average point from the "spike", "block" and "serve" in winner teams was significantly higher than the loser teams ($p < 0.05$). At the same time, winner teams made significantly less dig error and reception error (Table 3).

Table 3. Comparison of technical actions according to teams' win and loss status

Criteria	Match	N	Mean	SD	t	p
Score from spike	Win	20	49.90	8.25	2.33*	0.03
	Lose	20	42.05	12.64		
Score from block	Win	20	12.35	5.84	3.54**	0.00
	Lose	20	6.45	4.63		
Score from serve	Win	20	6.60	2.98	2.95*	0.01
	Lose	20	4.15	2.21		
Dig error	Win	20	25.20	8.04	-4.35**	0.00
	Lose	20	35.50	6.90		
Reception error	Win	20	4.60	2.46	-3.09*	0.01
	Lose	20	7.30	3.05		

* $p < 0.05$ ** $p < 0.01$ level of significance

DISCUSSION

The score averages of the teams that won the match and ranked high in the tournament were higher than the sets. The reason for this is that they perform better technical actions such as spikes and blocks, which is one of the important results of the present study. The decisive criteria are that the victorious teams scored more than spike, block and serve compared to the defeated ones, and the dig errors and reception errors were less. In previous studies, these three criteria emphasize the importance of success in volleyball. The serve shot may not immediately score a number, but it can be advantageous against the opponent in the game process following a good serve. The effective service, which reduces the opponent's attack quality, also

increases the effective block performance of the opponent's attack. effective service also facilitates defense actions.¹² Defensive actions are the most important criterion for determining the team's performance. The quality of dig and reception determines the quality of the set game, and the quality of the setting determines the quality of the spike.⁵ In previous studies based on match analysis, it was revealed that the prominent technical actions of superior teams are effective passing and defense (Miskin et al., 2010) and effective spike.¹¹ Besides, it is emphasized that defensive understanding and actions are important determinants of game success. Marcelino et al. (2011), in their study analyzing men's world cup matches, categorized teams as high, middle and low level. They listed the determining factors in the success of the teams as follows; a) It was the criterion that effective block actions (triple block) significantly affected the success of the match in the matches between the top two-level teams, b) In the lower two-level team's encounter, the points scored by the setter's attack were higher for the winning teams, c) The low number of single or double block actions of the losing teams affected the losing, d) Block strategy (triple block, close to setter), type of service (spike serve) and effective service criteria revealed a difference in the match of a high and a low team.

CONCLUSION

As a result, action data analysis of the matches played in top level volleyball tournaments reveals the game strategies and technical qualities of the players and teams. In this study, it has been revealed that the numbers gained from spike, block and service actions, as well as doing fewer dig errors and reception errors, have a significant effect on the success of the teams. It will be useful for trainers and athletes to evaluate their training setup and match strategies in the light of this information.

REFERENCES

1. Asterios, P., Kostantinos, C., Athanasios, M., & Dimitrios, K. (2009). Comparison of technical skills effectiveness of men's National Volleyball teams. *International Journal of Performance Analysis in Sport*, 9(1), 1-7.
2. Coleman, J. (1992). Some new thoughts about the evaluation of blocking. *Coaching Volleyball*, Special edition, 10-12.
3. Coleman, S.G.S., Benham, A.S., & Northcott, S.R. (1993). A three-dimensional cinematographic analysis of the volleyball spike. *Journal of Sport Sciences*, 11; 295-302.
4. Häyrynen, M., Hoivala, T., & Blomqvist, M. (2004). Differences between winning and losing teams in men's European top-level volleyball. *In Proceedings of VI Conference Performance Analysis* (Vol. 168177).
5. Hughes, M., & Daniel, R. (2003). Playing patterns of elite and non-elite volleyball. *International Journal of Performance Analysis in Sport*, 3(1), 50-56.
6. Luhtanen P, Belinskij A, Häyrynen M, & Vääntinen T. A (2001) Comparative tournament analysis between the Euro 1996 and 2000 in soccer. *International Journal of Performance Analysis in Sport*, 1(1):74-82.
7. Marcelino, R., Mesquita, I., & Afonso, J. (2008). The weight of terminal actions in Volleyball. Contributions of the spike, serve and block for the teams' rankings in the World League 2005. *International Journal of Performance Analysis in Sport*, 8(2), 1-7.
8. Marcelino, R., Mesquita, I., & Sampaio, J. (2011). Effects of quality of opposition and match status on technical and tactical performances in elite volleyball. *Journal of sports sciences*, 29(7), 733-741.
9. Marelić, N., Rešetar, T., Zdražnik, M., & Đurković, T. (2005, September). Modelling of situation parameters in top level volleyball. In 4th International Scientific Conference on Kinesiology "Science and Profession-Challenge for the Future": Proceedings book (p. 459).
10. Miskin, M. A., Fellingham, G. W., & Florence, L. W. (2010). Skill Importance in Women's Volleyball. *Journal of Quantitative Analysis in Sports*, 6(2).
11. Palao, J. M., Manzanares, P., & Ortega, E. (2009). Techniques used and efficacy of volleyball skills in relation to gender. *International Journal of Performance Analysis in Sport*, 9(2), 281-293.
12. Palao, J.M, Santos, J.A, Ureña, A. (2004). Effect of team level on performance in volleyball. *International Journal of Performance Analysis in Sport*, 4(2):50-60.
13. Quiroga, M. E., García-Manso, J. M., Rodríguez-Ruiz, D., Sarmiento, S., De Saa, Y., & Moreno, M. P. (2010). Relation between in-game role and service characteristics in elite women's volleyball. *The Journal of Strength & Conditioning Research*, 24(9), 2316-2321.
14. Quiroga, M. E., Rodríguez-Ruiz, D., Sarmiento, S., Muchaga, L. F., Da Silva Grigoletto, M., & García-Manso, J. M. (2012). Characterisation of the Main Playing Variables Affecting the Service in High-Level Women's Volleyball. *Journal of Quantitative Analysis in Sports*, 8(1).
15. Rabaz, F. C., Castuera, R. J., Arias, A. G., Domínguez, A. M., & Arroyo, M. P. M. (2013). Relationship between performance in game actions and the match result. A study in volleyball training stages. *Journal of Human Sport and Exercise*, 8(3); 651-59.
16. Tilp, M., Koch, C., Stifter, S., & Ruppert, S.G. (2006). Digital game analysis in beach volleyball. *International Journal of Performance Analysis in Sport*, 6(1), 140-148.

SP-39

A METAPHOR: DOES COVID-19 IS AN OBSTACLE FOR ADOLESCENT ATHLETES?

NAZMI BAYKÖSE^{*1}, GIZEM CEYLAN², ATAKAN YAZICI³

1. Faculty of Sport Science , Akdeniz University, Antalya, Konyaaltı – 07070, Turkey.

2. Faculty of Sport Science , Mus Alparslan University, Mus, Center – 49250, Turkey

3. Faculty of Sport Science , Gazi University, Ankara, Yenimahalle – 06560, Turkey

Corresponding author: nazmibaykose@gmail.com

ABSTRACT

The aim of this study is to determine the perceptions of adolescent athletes regarding the concept of 'covid-19' with the help of metaphor. Participants of the study composed of 95 female and 60 males total 155 athletes ($X_{Age} = 13,26 \pm 1,66$ years) from different sports branches who live in a various province in Turkey. In the research, a "metaphor form" was prepared as a data collection tool to determine the participants' perceptions of the concept of COVID-19. According to form is "COVID-19 from the participants; Because" they were asked to complete the sentence. In research collected metaphors was used as descriptive tools that qualitative research model content analysis used. The research data reliability was found that 94%. The findings demonstrated participants produce 52 metaphor. The metaphors collected under 4 categories. These metaphors were collected in 4 categories. According to the metaphors, it was determined that the participants mostly developed metaphors related to the concept of covid-19 in the categories of "social effects" and "psychological effects", followed by "health effects" and "physical effects". The most metaphors produced by the participants were listed as restraint, imprisonment, not being free, boredom, illness, inaction, death and virus. Result of this study determined that participants used vivid, lifeless, abstract and concrete metaphors for "covid-19". In this study, results demonstrated that adolescent athletes define, perceive and commodify Covid-19 as a concept that completely changes the routine of their lives and affects their lives in terms of physical, psychological, social and health.

KEYWORDS: Covid-19, Adolescent Athletes, Metaphor, Qualitative Research method

INTRODUCTION

The year 2020 was a year that left important marks in people's lives. It was a year where we witnessed the whole world come together in the process of examination and innovation, cooperating against the virus, helping each other and taking lessons. The covid-19 pandemic process, which the world health organization tried to explain with the title of "an unprecedented year", was a scenario that people could not even dream of but only could be talked about in case of a possible pandemic situation. Emerging as a deadly and contagious virus, covid-19 led humanity to pass through hard times by infecting people when they come together, but can not be defeated without uniting. Covid-19, which started in Wuhan, China at the end of 2019 and affected almost all countries of the world, negatively affected the psychology, social life, economy and education of almost every society. Therefore, countries had to take certain measures to fight against the virus. In this context, athletes, who generally paid attention to a healthy lifestyle, had less illness rate than the young and general population. Although athletes were faced with a lower risk of death in severe diseases, necessary measures were also taken in the sports community to slow down the pandemic, and organizations that would bring large human populations together were postponed for a while due to the fact that

Covid-19 is a virus with a high risk of death¹. Since the beginning of March 2020, all major sports leagues and tournaments were delayed or canceled for a while due to COVID-19². On March 24, 2020, the International Olympic Committee announced that the Olympic and Paralympic Summer Games Tokyo 2020 was postponed to 2021³. Many national and international sports organizations were also decided to be postponed indefinitely, especially the Summer Olympics and the European Football Championship to be held in 2020⁴. Covid-19 affected the whole world as well as deeply shaking all sports communities at their core. The abrupt cessation of sports activities, postponement or cancellation of the competitions had a negative impact on the athletes mentally, physically and socially. It is important that athletes who could not train in this period had fear of performance decrease, anxiety, disturbance, stress, emotional confusion and aggressiveness⁵, as well as interruptions in their training programs creating negative effects on the respiratory system and exercise capacity in the short/long term⁶. In addition, although the athletes did not have Covid-19, the cancellation or postponement of the competitions caused the athletes to lose income and indirectly caused them to be affected by the pandemic⁷. In the light of this information above, the pandemic process that caused important changes in our lives also affected the athletes significantly. In particular, lockdown of children under the age of 18 affected them both physically and psychologically. In this context, the aim of this study is to determine the perception of adolescent athletes on how they see and identify covid-19 virus, what they think about it and what they associate the virus with by using the method of metaphors. Metaphor is basically a tool for explaining certain properties of an object or event. Metaphors are one of the powerful and intelligent ways of conveying the findings. A strong metaphor can mean a lot with a single phrase⁸. Thus, many similar but different point of views can be reached. It can also transform psychological insights into messages that are easily understood⁹. When the literature is examined, it is possible to find studies on metaphors in the field of sports sciences^{9, 10, 11, 12, 13, 14, 15}. However, it was observed that the aforementioned studies are mostly related to sports and different sports branches. Therefore, our study is important both in terms of trying to explain the perception of the concept of covid-19 from the perspective of adolescent athletes in these days since we are still in pandemic process, and also in terms of providing a different perspective to the researches for athletes in this age group during the pandemic process.

MATERIALS AND METHODS

Research model

The qualitative research model was used in this study, and the phenomenology approach, which is one of the qualitative research designs, was used. Creswell¹⁶ stated that while a narrative research reports stories about the experiences of one or several people, the phenomenological study expresses the common meaning of the real-life experiences of several people with a phenomenon or concept. Yıldırım and Şimşek¹⁷ stated that phenomenology design is a state of focusing on phenomena that we are aware of but do not have an in-depth and detailed understanding.

Study group

Patton⁸ states that "the rationale and power of purposeful sampling lies in encompassing information-rich situations." Therefore, criterion sampling, among purposeful sampling methods, was preferred in the selection of the study group, as information-rich situations have a critical importance for the purpose of the research; because the criterion we chose for purposeful sampling directly reflects the purpose of our study and guides the identification of information-rich situations¹⁸. In this context, 155 volunteer adolescent athletes from several branches (volleyball, basketball, football, gymnastics, swimming, badminton) in different provinces of Turkey were included in this study conducted in 2021. The average age of the adolescent athletes that participated in the study was determined to be $13,26 \pm 1,66$.

Data collection tool

In this study, the data were obtained with a metaphor form consisting of a semi-structured question prepared by the researcher. It was seen that this semi-structured form is frequently used especially in studies related to metaphor^{19, 12, 15}. The questions in the form were prepared through "Google Forms" and it was aimed that the survey would reach the participants more easily. The introductory text of the questionnaire and an online form link were sent to the athletes through their e-mail addresses and social media applications. The survey was open to access for 15 days, and was stopped after the data entry was over and the data set was made ready for statistical analysis. In this context, each adolescent athlete was asked to write a metaphor for the concept of covid-19 and explain the reasons for writing these metaphors with a sentence. In the form, each adolescent athlete was asked to fill in the sentence "Covid-19 is like..., Because..." regarding the covid-19 perceptions of the athletes.

Data analysis

During the analysis of the data, the forms were first given numbers from 2 to 156 collected from the participants. Content analysis was used to analyze the data obtained. Yıldırım and Şimşek¹⁷ defined it as "The main purpose in content analysis is to reach the concepts and relationships that can explain the data collected" and interpreted it as revealing the facts that may be hidden in the data through content analysis. The interpretation and categorization of the data was carried out in five stages using²⁰. These stages are; (1) coding and sorting phase, (2) sample metaphor image compilation phase, (3) category development phase, (4) verification of validity and reliability phase, and (5) data transfer to SPSS package program for quantitative data analysis. In the first phase, the expressions expressed by the participants and whether the answers given were appropriate or not, were examined. Accordingly, one inappropriate answer was met and the answer given by Participant 106 was removed from the study. After checking for missing or incorrect forms, metaphors were tabulated. In the phase of numbering the forms, metaphors were numbered between K2 and K157. During the formation of the categories, metaphors specified for the concept of covid-19 were placed in the relevant categories. In validity and reliability phase; "sense of reality, border crossing, and the use of ethical relationships"²¹ were relied upon and opinions were presented objectively. The answers obtained from the athletes, the analysis process and the relationship between the resulting codes and categories were directly conveyed by participant

expressions¹⁶. In order to ensure the reliability of the research, the researchers, unaware of each other, coded and categorized during the coding process, and then the consensus among coders was reached²². In addition, these data were analyzed by 3 field experts; the codes and categories obtained were reviewed and was put into its final form. Also for the reliability of data analysis; The formula $[\text{Consensus} / (\text{Consensus} + \text{Disagreement}) \times 100]$ was used²³. In this study, 52 metaphors were stated, and 3 metaphors (experience, disorder, change) emerging as disagreement were determined. According to this formula, the reliability of the study was found to be 94% $[49 / (49 + 3) \times 100 = 94\%]$. The result showed that the desired reliability level was reached in the study. In the last 2 phases, the metaphors were stated together with their frequency, and the own expressions of the participants and participant numbers in the findings section in the table.3; as an example, was indicated as (K17). Finally, the metaphors were interpreted together with the expressions of the participants.

FINDINGS

This section presented that types and categories of metaphors state of adolescent athletes about the concept of covid-19.

Table 1: Metaphors Developed by Adolescent Athletes Regarding the Concept of "Covid-19"

Metaphor Ranking	Metaphore Name	f	Metaphor Ranking	Metaphore Name	f
1	Restraint	+ 17	27	Change	+ 2
2	Imprisonment	+ 11	28	Danger	+ 2
3	Not being free	+ 10	29	Breathlessness	+ 2
4	Boredom	+ 9	30	Flu	+ 2
5	Illness	+ 8	31	Experience	+ 1
6	Dead	+ 6	32	Magnet	+ 1
7	Virus	+ 6	33	Separation	+ 1
8	Inaction	+ 6	34	Mosquito	+ 1
9	Nightmare	+ 5	35	Cocoon	+ 1
10	Face an abstacle	+ 5	36	impossibility	+ 1
11	Anti-social	+ 5	37	Gum	+ 1
12	Lock in the house	+ 4	38	Conviction	+ 1
13	Untrained	+ 4	39	Azrael	+ 1
14	Unhealthiness	+ 3	40	Remain paralysed	+ 1
15	Lesson	+ 3	41	Halt	+ 1
16	Unhappiness	+ 3	42	Aggressiveness	+ 1
17	Lost	+ 2	43	Productivity	+ 1
18	Staying somewhere	+ 2	44	Monstar	+ 1
19	Missing	+ 2	45	Delay	+ 1
20	Tiredness	+ 2	46	Bothering	+ 1
21	Irregularity	+ 2	47	Put on Weight	+ 1
22	Time	+ 2	48	Threat	+ 1
23	Patience	+ 2	49	Microbe	+ 1
24	Desperation	+ 2	50	Captivity	+ 1
25	Cyber world	+ 2	51	Challenge	+ 1
26	Mask	+ 2	52	Milestone	+ 1
Total Opinion					155

According to Table 1; It is observed that adolescent athletes produced 52 types of metaphors for the concept of "covid-19" and expressed 155 views for this. Restraint metaphor has the highest frequency (17). Apart from this, the frequency of metaphors of imprisonment (11), not being free (10), boredom (9), illness (8) is higher than others.

The classification of adolescent athletes into four categories when their views on the concept of "covid-19" are evaluated together with their explanations is demonstrating in Table 2.

Table 2: Distribution of the Metaphors Stated by Adolescent Athletes for the Concept of 'covid-19' by Categories

Categories	Number of Metaphors (f)	%
Physiological Effects	14	9,03
Social Effects	64	41,30
Psychological Effects	40	25,80
Health Effects	37	23,87
TOTAL	155	100

Table 3: According to categories metaphor and explanation examples

Category	Metaphor (f)	Quotations from the explanation examples of adolescent athletes;

Physiological Effects	Inaction(6) Untrained(4) Tiredness (2) Put on Weight (1) Remain paralysed (1)	Inaction; Cause being locked in houses immobilized us. (K102) Untrained; we cannot get into training in sports. (K14) Tiredness; stopping doing nothing exhausts the body more. (K18) Remain paralysed; you live, you have desires and dreams but you feel like can't walk. (K32)
Social Effects	Restraint (17) Imprisonment (11) Not being free (10) Face an abstacle I (5) Lock in the house (4) Anti-social (5) Staying Somewhere (2) Cyber World (2) Captivity (1) Conviction (1) Halt (1) Cocoon (1) Milestone (1) Productivity (1) Bothering(1) Delay (1)	Restraint : the fact that life always has to be at home and the time to go out. (K90) Imprisonment; If you get covid-19, you'll be imprisoned at home. Even if you are not infected, you will be imprisoned at home to avoid being caught. (K60) Not being free; Our freedom has been restricted because many things are prohibited. We are unable to do things that we did before, freely and comfortably. (K37) Anti-social; I cannot participate in any activity and cannot meet anyone. (K22) Cocoon; because people mostly stay their homes. Their connections with the outside world have become limited. (K45) Productivity; I have more time now. (K25).
Psychological Effects	Boredom (9) Nightmare (5) Unhappiness (3) Lesson (3) Lost (2) Missing (2) Desperation (2) Irregularity (2) Time (2) Patience (2) Change (2) Separation (1) Aggressiveness (1) Monster(1) Challence (1) Impossibility (1) Experience(1)	Boredom; because we are at home boredom and inactivity overwhelm us. (K91) Nightmare; because we wouldn't believe even if we could dream. (K145) Unhappiness; Because I couldn't see my teammates for a long time and I was feeling unhappy because I couldn't spend time with them. (K153) Lesson; because now we understand better the value and appreciation of every moment we lived in the past. (K147) Patience; it taught that to wait patiently in the long term by following the rules. (K36) Monster; scary. (K88) Challenge; we are struggling with something invisible. (K100). Impossibility; made us impossible above all else. (K46)
Health Effects	Illness (8) Dead (6) Virus(6) Unhealthiness (3) Flu (2) Mask (2) Breathlessness (2) Danger (2) Magnet (1) Mosquito (1) Azrael (1) Gum (1) Threat(1) Microbe (1)	Illness; a disease that coughs and goes down to the lungs. (K112) Dead; because it killed almost everyone who got infected with. (K39) Unhealthiness; Sitting at home and eating unnecessary food made us unhealthy. (K40) Virus; an infectious disease. (K10) Breathlessness; Because the disease goes down to our lungs and makes it difficult for us to breathe. (K26) Gum; stuck and does not come off. (K6) Microbe; it doesn't appear, but we know it exists like microbes. (K130) Threat; prevent healthy life. (K21)

According to Table 3, when a total of 5 metaphors and their explanation specified in the "Physiological Effects" category are examined; Adolescent athletes emphasize that covid-19 pandemic is how physically affects their performance. In addition, when 16 metaphors and explanation sentences in the "Social Effects" category are examined; Participants stated that a pandemic affects social aspects more negatively. Also, 17 metaphors and explanation sentences specified in the category of "Psychological Effects" are examined; Adolescent athletes of covid-19 have produced metaphors stating that they are often negatively affected psychologically. When a total of 14 metaphors and explanation sentences expressed in the last category "health effects" are examined; the participants developed metaphors that illustrated us that their health is concerns. As participants statements that there is a concept that completely changes the routine of adolescent athletes, covid-19, and affects their lives in all aspects.

DISCUSSION

Metaphor involves talking about something and potentially thinking²⁴. This research allowed adolescent athletes to verbally express their thoughts on COVID 19. Accordingly, an analysis on the perceptions of athletes about COVID 19 was aimed. In the study, the metaphors produced by adolescent athletes regarding the concept of COVID 19 and the explanations of why they expressed this metaphor were determined. Explanatory sentences for the metaphors stated by the athletes were examined, and 51 metaphors were developed by the participants. The metaphor with the highest frequency was "be restricted" metaphor. Apart from this, the frequencies of the metaphors of imprisonment, not being free, boredom, illness were found to be higher than the others. When the findings were evaluated in the light of the findings in the literature about COVID-19, it is known that COVID-19 forced governments to take drastic measures all over the world. In this process, it was stated that quarantine policies were generally supported by the population to be very restrictive and efficient²⁵. Accordingly, the "restriction" metaphor was included in our research findings as a natural factor of the process. In addition to the metaphor of "restriction"; "imprisonment" and "not being free" metaphors were frequently mentioned by adolescent athletes similarly. Although these three metaphors seem different, we can understand the similarities between them. For example, the terms "imprisonment" and "unfreedom" are both concepts that contain restrictions of certain dimensions. All three of these concepts attribute to limits and restrictions. As a result of the general evaluations, it was determined that the metaphors produced by the participants fall under four different categories. These categories are; physiological effects, psychological effects, social effects and health effects categories. When a total of 5 metaphors and explanation sentences specified in the category of "physiological effects" were examined; adolescent athletes emphasized how covid-19 physiologically affected them during the pandemic process. When the metaphors in the physiological effects category were examined, the decreasing physical activity level stood out as a result of the COVID 19 process. Unfortunately, modern lifestyle behaviors are known to urge physical immobility and inaction²⁶. In addition, one of the most fundamental effects of the Covid 19 process was that these bad lifestyle behaviors increased with individual or government-enforced quarantine measures aimed at reducing the spread of COVID-19. These conditions brought significant difficulties in staying physically active. During isolation periods, it was stated that, according to WHO²⁷ PA (Physical Activity) recommendations, people had better maintain their health by following the recommendations for 150 minutes of medium intensity or 75 minutes of high intensity PA or a combination of both²⁶. For children / adolescents, recommendations included high or medium intensity PA at least 60 minutes a day²⁸. In line with this information, it was thought that changing routines and decreasing physical activity level caused an increase in the sense of tiredness and being untrained in adolescent athletes. When 15 metaphors and explanation sentences in the category of "social effects" were examined; the participants stated that covid-19 affected them more from social aspects during the pandemic process. When evaluated in the context of social effects, two sub-categories can be mentioned as positive and negative, under social effects category. These subcategories are positive social effects and negative social effects. For example, metaphors such as anti-social, imprisonment, be restricted, not being free, imprisonment and captivity emphasized the obligations of the Covid 19 process. On the other hand, it was seen that the sanctions brought about by the process were commodified IN THE FORM of productivity and the opportunity to spend more time in cyber world. In the metaphor study of Bozkurt²⁹ in which he examined the experiences gained by primary school students during the pandemic, he stated that students produced positive and negative metaphors regarding the COVID 19 process. In this context, when the contents of the positive and negative metaphors reflected in our research findings were examined, it can be interpreted that the COVID 19 process slowed down the intense and fast living conditions and thus individuals had the chance to devote more time to themselves. When a total of 17 metaphors and explanation sentences stated in the category of "psychological effects" were examined, adolescent athletes produced metaphors stating that covid-19 generally negatively affected them psychologically. It should not go unnoticed that there were also positive metaphors compared to negative ones even though they are less. As stated by Szabo et al.³⁰, families had the opportunity to spend much more time together with their children than they normally did during the COVID 19 process, and this situation reflected in the findings of our research with adolescent athletes. It is such that the process had positive sides as well as its negative sides. It was thought that what underlied beneath negative perceptions about this process was fear. Metaphors such as desperation, unhappiness, lost, nightmares and monsters are basically metaphors related to fear. In order to understand the psychological and psychiatric consequences of the pandemic, it is suggested that emotions such as fear and anger involved should be considered and observed³¹. Fear is a primitive defense mechanism that is fundamental to survival and involves a variety of biological preparation processes to respond to potentially threatening events. However, when it is chronic or disproportional, it becomes harmful and can be a key component in the development of various psychiatric disorders^{32, 33}. In this context, it was thought that it is important to support adolescent athletes psychologically during the ongoing pandemic process. It should be kept in mind that athletes with higher levels of physical activity compared to their non-athlete peers may have been more psychologically affected by the process. When the total of 14 metaphors and explanation sentences stated in the category of "health effects" were examined; participants developed metaphors that showed us their background of health knowledge on COVID 19 even though COVID 19 seemed to be related to anxiety and fear metaphors in terms of their health. It appeared to be addressed by adolescent athletes in the context of an infectious disease and virus. Among the most basic metaphors of COVID 19 lied the possibility that it is contagious and may result in death. When the literature was reviewed, it was stated by many scientists that COVID 19 is a deadly epidemic^{34, 35, 36, 37}. Accordingly, "dead metaphor" brought preventative health behaviors to mind along with a metaphor such as the "mask metaphor". In this case, it can be said that the metaphors produced by adolescent athletes on this subject and COVID 19 had behavioral effects in terms of health in behavioral manner as it is valid for many people.

CONCLUSION

As a result, adolescent athletes emphasized that Covid-19 is a concept that completely changed the routine of their lives and affected their lives in terms of physiological, psychological, social and health as can be understood from the explanation statements regarding the metaphors obtained. In line with these results, it can be said that the COVID 19 process was a multifactorial obstacle for adolescent athletes. Based on these findings, it is thought that the relevant institutions and organizations will do whatever is needed to be done within this regard.

REFERENCES

1. Toresdahl BG. & Asif IM. (2020). Coronavirus disease 2019 (COVID-19): considerations for the competitive athlete. *Sports Health*, 12(3):221-224.
2. Futterman M., Panja T., Keh A. (2020). As Coronavirus Spreads, Olympics Face Ticking Clock and a Tough Call. *The New York Times*. <https://www.nytimes.com/2020/03/05/sports/olympics/coronavirus-tokyo.html>. (Date of access: 30.01.2021).
3. Joint statement from the international olympic committee and the tokyo 2020 organising committee. <https://www.olympic.org/news/joint-statement-from-the-international-olympic-committee-and-the-tokyo-2020-organising-committee>. (Date of access: 30.01.2021).
4. Mor A., Acar K., Arslanoglu E. (2020). Covid-19 and Nutrition Approach in Athletes. *Atatürk University Journal of Physical Education and Sport Sciences*. 22(2). <https://dergipark.org.tr/en/pub/ataunibesyo/issue/55659/735309>
5. Sahinler, Y, Ulukan, M, Ulukan, H. (2020). Investigation of the Aggression Levels of the Students of the Faculty of Sport Sciences Engaging in Physical Activity in the Covid-19 Process. *Mediterranean Journal of Sport Sciences*, 3 (1), 171-184. <https://doi.org/10.38021/asbid.748273>
6. Kocak, U, Ozer Kaya, D. (2020). COVID-19 Pandemic, Sports, Athlete's Triangle: Interactions and Recommendations. *Izmir Kâtip Çelebi University Journal of Health Sciences Faculty*, 5 (2), 129-133. <https://dergipark.org.tr/en/pub/ikcusbfd/issue/55773/738730>.
7. Timpka, T. (2020). Sports health during the SARS-Cov-2 pandemic. *Sports Medicine* 50:1413–1416. <https://doi.org/10.1007/s40279-020-01288-7>
8. Patton, M. Q. (2015). *Qualitative research and evaluating methods: Integrating theory and practice* (4th ed.). Sage.
9. Spandler H., Mckeown M., Roy A., Hurley M. (2013). Football metaphor and mental well-being: An evaluation of the It's a Goal! programme. *Journal of Mental Health*, 22(6), 544-554. <https://doi.org/10.3109/09638237.2013.819420>
10. Kurtipek, S., Çelik, O. B., Gumus, H., ve Yılmaz, B. (2017). Metaphorical perceptions of camp leaders working under the ministry of youth and sports on the concept of youth. *Ovidius University Annals, Series Physical Education and Sport/Science, Movement and Health*, 17(2), 359-368. <https://www.analefefs.ro/anale-fefs/2017/i2s-pe-autori/KURTIPEK%20Serkan.pdf>
11. Argan, M., Özgen, C., Yetim, G. ve Çakır, K. D. (2018). Metaphor in football news Use of the content analysis for the newspapers in Turkey. *Academic Journal of Social Research*. 6(71), 321-333.
12. Dursun M., Arı C., Adas SK., Ulun C. (2019). Metaphoric Perceptions of Individuals Working in Sports Organizations about Leader Concept. Oktay Kizar (Ed.), In *Research Articles in Sport Sciences* (s.199-214). Ankara: Gece Akademi.
13. Kurtipek, S. (2019). About the sports club concept of individuals who are members of sports clubs Determination of perceptions: a metaphor analysis study. *The Journal of Sportmeter Physical Education and Sport Sciences*. 17(1), 209-145. <https://doi.org/10.33689/spormetre.474481>
14. Adas SD., Dursun M., Arı C., Ulun C. (2020). Metaphoric Perceptions of Personnel Working in Sports Organizations Regarding the Concept of Manager. Oktay Kizar (Ed.), In *Research Articles in Sport Sciences* (s.179-197). Ankara: Gece Akademi.
15. Kozak M., Bayrakdar A., Karaman M., Zorba E. Determination of the perceptions of individuals engaged in regular physical activity on the concept of wellness: A metaphor analysis study. *African Educational Research Journal*, 2020. 8 (1), s. 43-48. <https://doi.org/10.30918/AERI.8SI.20.006>
16. Creswell, J.W. (2007). *Qualitative inquiry and research design: Choosing among five traditions* (2nd ed.). Thousand Oaks, CA: Sage.
17. Yildirim, A. ve Simsek, H. (2016). *Qualitative research methods in the social sciences*. 10th Edition. Ankara: Seçkin Publishing, 47, 242-246, 272.
18. Merriam, S. B. (2002). Introduction to qualitative research. *Qualitative research in practice: Examples for discussion and analysis*, 1(1), 1-17.
19. Kurtipek, S., Celik, O. B., Yılmaz, B. ve Yenel, I. F. (2016). Determination of the thoughts of national team athletes on the concept of doping: a study of metaphor. 10 (2), 318-327. Retrieved from <https://dergipark.org.tr/tr/pub/bsd/issue/53483/711946>
20. Saban, A. (2009). The mental images that teacher candidates have about the concept of student. *Turkish Journal of Educational Sciences*, 7(2), 281-326. Retrieved from <https://dergipark.org.tr/en/pub/tebd/issue/26107/275061>
21. Lincoln Y.S., Lynham, SA., Guba, E.G. (2011). Paradigmatic controversies, contradictions, and emerging confluences. In N.K.Denzin., Y.S.Lincoln (Eds.), *The sage handbook of qualitative research* (4th ed., pp.97-128). Thousand Oaks, CA:sage.
22. Silverman, D. (2005). *Doing qualitative research: A practical handbook* (2nd ed.). London: Sage.
23. Miles, M. B., Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.
24. Semino, E. (2021). "Not Soldiers but Fire-fighters"—Metaphors and Covid-19. *Health Communication*, 36(1), 50-58. <https://doi.org/10.1080/10410236.2020.1844989>
25. Bargain, O., & Aminjonov, U. (2020). Trust and compliance to public health policies in times of COVID-19. *Journal of Public Economics*, 192, 104316. <https://doi.org/10.1016/j.jpubeco.2020.104316>
26. Bowden Davies, K. A., Pickles, S., Sprung, V. S., Kemp, G. J., Alam, U., Moore, D. R., ... & Cuthbertson, D. J. (2019). Reduced physical activity in young and older adults: metabolic and musculoskeletal implications. *Therapeutic advances in endocrinology and metabolism*, 10, 2042018819888824. <https://doi.org/10.1177/2042018819888824>
27. World Health Organization (2020). A year without precedent: WHO's COVID-19 response. Taking stock of all that's been achieved – and the partnerships working to end the pandemic. Date of access: 30.01.2021 Saat: 16.01. <https://www.who.int/news-room/spotlight/a-year-without-precedent-who-s-covid-19-response>.

28. Norton, S., Matthews, F. E., Barnes, D. E., Yaffe, K., & Brayne, C. (2014). Potential for primary prevention of Alzheimer's disease: an analysis of population-based data. *The Lancet Neurology*, 13(8), 788-794. [https://doi.org/10.1016/S1474-4422\(14\)70136-X](https://doi.org/10.1016/S1474-4422(14)70136-X).107.
29. Bozkurt, A. (2020). Images and perceptions of primary school students towards distance education during coronavirus (covid-19) pandemic: a metaphor analysis. *Uşak University Journal of Educational Research*, 6(2), 1-23. <https://doi.org/10.29065/usakead.777652>
30. Szabo, T. G., Richling, S., Embry, D. D., Biglan, A., & Wilson, K. G. (2020). From helpless to hero: Promoting values-based behavior and positive family interaction in the midst of COVID-19. *Behavior analysis in practice*, 13(3), 568-576. <https://doi.org/10.1007/s40617-020-00431-0>
31. Ornell, F., Schuch, J. B., Sordi, A. O., & Kessler, F. H. P. (2020). "Pandemic fear" and COVID-19: mental health burden and strategies. *Brazilian Journal of Psychiatry*, 42(3), 232-235. <http://dx.doi.org/10.1590/1516-4446-2020-0008>
32. Garcia, R. (2017). Neurobiology of fear and specific phobias. *Learning & Memory*, 24(9), 462-471. <http://doi:10.1101/lm.044115.116>
33. Shin, L. M., & Liberzon, I. (2010). The neurocircuitry of fear, stress, and anxiety disorders. *Neuropsychopharmacology*, 35(1), 169-191. <http://doi:10.1038/npp.2009.83>
34. Bradley, B. T., Maioli, H., Johnston, R., Chaudhry, I., Fink, S. L., Xu, H., ... & Marshall, D. A. (2020). Histopathology and ultrastructural findings of fatal COVID-19 infections in Washington State: a case series. *The Lancet*, 396(10247), 320-332. [https://doi.org/10.1016/S0140-6736\(20\)31305-2](https://doi.org/10.1016/S0140-6736(20)31305-2)
35. Guo, T., Fan, Y., Chen, M., Wu, X., Zhang, L., He, T., ... & Lu, Z. (2020). Cardiovascular implications of fatal outcomes of patients with coronavirus disease 2019 (COVID-19). *JAMA cardiology*, 5(7), 811-818. <http://doi.org/10.1001/jamacardio.2020.1017>
36. Dorward, D. A., Russell, C. D., Um, I. H., Elshani, M., Armstrong, S. D., Penrice-Randal, R., ... & Lucas, C. D. (2020). Tissue-specific tolerance in fatal Covid-19. *medRxiv*. <https://doi.org/10.1101/2020.07.02.20145003>
37. Wu, F., Zhao, S., Yu, B. et al. (2020). A new coronavirus associated with human respiratory disease in China. *Nature* **579**, 265–269. <https://doi.org/10.1038/s41586-020-2008-3>

SP-40

SELF-ESTEEM LEVEL AND ANGER CONTROL IN TRAINERS (AN EXAMPLE FROM ANKARA)

Hakan SUNAY^{*1}, Erdal BAL², Bayram KAYA³, Recep CENGİZ⁴

¹Ankara University Faculty of Sport Sciences, Ankara, Turkey, e-mail: hsunay@ankara.edu.tr

²University of Health Sciences, Department of Exercise and Sport Sciences, Istanbul, Turkey, e-mail: balerdalbilim@gmail.com

³Ankara University Faculty of Sport Sciences, Ankara, Turkey, e-mail: bayramkaya400@gmail.com

⁴Celal Bayar University Faculty of Sport Sciences, Manisa, Turkey, e-mail: rcengiz1965@gmail.com

Corresponding author: hsunay@ankara.edu.tr

ABSTRACT

The concept of self can be defined as the thoughts, perceptions and attitudes of the individual related to himself. The self is a very important concept which starts with adolescence and continues throughout life, and is very important for early adulthood. Self-esteem is a person's personal valuation of himself by evaluating the attitudes and behaviours of people around him towards the individual along with his own personality traits. The development of self-esteem and anger control of trainers can be considered as an important factor for them to become more successful trainers. The purpose of this study was to investigate the self-esteem and anger values of 404 trainers in various branches in Ankara according to the variables of gender, type of sport played, age, level and length of service. The population of the research consisted of 98 female and 306 male trainers in Ankara in 2019. A survey research method was used. Data were collected using the Self-Esteem Inventory (SEI) developed by S. Coopersmith and the four-point Likert-type Adolescent Anger Rating Scale (AARS) developed by Burney. The validity and reliability study of the scales used for the study was conducted and it was decided that the scales were valid and reliable. In the analysis of the data, arithmetic mean, frequency distribution and standard deviation values were used, and T-test, ANOVA test, Scheffe multiple comparison and Pearson correlation tests were performed.

As a result it was concluded that female trainers had higher self-esteem than male trainer, whereas male trainers had higher anger control than female trainers. It was concluded that anger level decreased as self-esteem level increased. In general, it was concluded that the self-esteem levels of the trainers were moderate and that the anger evaluation means were normal.

Keywords: Self-esteem, anger, trainer.

1. INTRODUCTION

The concept of self can be defined as an individual's thoughts, perceptions and attitudes related to himself. Defined the self as a formation which appears as a result of interaction with the environment with the characteristics that come from birth as a dimension of personality.¹ There are different types of self, such as the self which includes the characteristics known by the individual ("personal self"), the self which shows how one is perceived in society ("social self"), and the self which shows how one wishes to be ("ideal self").² The self is a very important concept which starts with adolescence and continues throughout life, and is very important for early adulthood.³ Self-esteem is an individual's personal valuation of himself by evaluating the attitudes and behaviours of people around him towards the individual along with his own personality traits.⁴ Stated that self-esteem is an individual's expression of his feelings and thoughts about his 'self' or himself.⁵ There are many factors that have an effect on self-esteem. The first of these that come to mind appear as a person's successes or failures as important factors affecting his self-esteem.⁶ In addition to these, a person's competences and abilities are also regarded as significant factors that affect his self-esteem.^{7,8} Low self-esteem causes psychological and behaviour disorders such as anxiety, loss of motivation, suicidal behaviours, eating disorders, and depression.⁹ Self-esteem can be regarded as an individual's negative or positive attitude towards himself. While anger is sometimes short-term and beneficial for a person, at other times, it can be very violent, intense and destructive. Anger expressed in this way can bring a person to vent it with verbal and physical attacks. People express their anger by continually criticising others or stifling it with a joke. On the other hand, expressing one's anger in more constructive

ways leads people to understand one another better by bringing them closer together.¹⁰ There are two important reasons for aggressive behaviour; the first is the discomfort and suffering of the person who is harassed, while the second is the dispossession of something owned by the person. Hence, hostile and instrumental aggression confront us. In hostile aggression are impulses that emerge in situations like humiliation and annoyance of other person.¹¹ A person's loss of temper may lead to a decrease in his self-esteem. Deffenbacher (1992) reported that anger can significantly lower a person's self-esteem.^{12,13} The exact opposite of this situation can also be considered. Self-esteem can eliminate negative situations by averting our anger. In this case, the self-esteem that trainers have acquired can also avert their anger. The development of trainers' self-esteem and anger control can be considered as an important factor in their becoming more successful trainers. Therefore, the positive/negative effects of self-esteem and anger control can be regarded as an inevitable consequence. If it is considered that trainers with high self-esteem have control over their anger and that they have self-confidence, it can be expected that they will be independent and successful in decision making. People with high self-esteem feel a greater need to carry out their duties successfully.¹⁴ High level of self-esteem plays an important role in achieving success in sporting activities.¹⁵

4. MATERIAL AND METHOD

The aim of this study is to examine the self-esteem level and anger values of 404 trainers employed in various branches of sport in Ankara, according to the variables of gender, type of sport played, age, level and length of service. The population of the research consisted of 404 trainers (98 female, 306 male) employed in Ankara in the year 2019. As the research type, a descriptive model was taken as the basis. In the study, the self-esteem and anger control levels of trainers in the province of Ankara were examined in terms of certain variables, and the relationship between these two variables was also investigated. A survey research method was used. As data collection tools, the Self-Esteem Inventory (SEI) developed by Coopersmith and the four-point Likert-type Adolescent Anger Rating Scale (AARS) developed by Burney were used. The SEI developed by Coopersmith, which consists of 25 questions, is made up of options such as "Like Me" (Yes) and "Unlike Me" (No). In the AARS developed by Burney, 10 of the 41 items consist of options in the form "Hardly Ever", "Sometimes", "Often" and "Very Often". In the Self-Esteem Scale, if items 1, 4, 5, 8, 9, 14, 19 and 20 are indicated as "Like Me" (Yes), a score of 4 is given, while if items 2, 3, 6, 7, 10, 11, 12, 13, 15, 16, 17, 18, 21, 22, 23, 24 and 25 are indicated as "Not Like Me" (No), they are given a score of 4; in the opposite case, a score of 0 is given. The highest score that can be obtained from the scale is 100, while the lowest is 0. In the analysis of the data obtained in the study, statistical software was used. For the analysis of the obtained data, arithmetic mean, frequency distribution and standard deviation values were used, and T-test, ANOVA test, Scheffe multiple comparison and Pearson correlation tests were performed.

Table 1 : Normality Hypothesis

Factor	SKEWNESS	KURTOSIS	KOLMOGOROV- SMIRNOV
Self-Esteem Scale	-.735	1.857	2.379
Anger Rating Scale	.637	1.901	2.226

The skewness and kurtosis values, which were examined to see whether the data were normally distributed or not, were determined to be between $-2 < X < +2$ (Sencan, 2002) for the self-esteem scale and anger control scale. We can say that this result shows that the data are normally distributed. As a result of the Kolmogorov-Smirnov Z test, since the significance value was $p > 0.05$, it was decided to perform a parametric test.

Table 2 : Reliability Coefficients

Factor	Reliability Coefficient (Cronbach Alpha)
Self-Esteem Scale	.710
Anger Rating Scale	.683

For scale reliability, the Cronbach alpha coefficients were found to be .710 for the self-esteem scale and .683 for the anger control inventory.

Table 3: General Information about the Trainers

Personal Information	Sub-Groups	Frequency (f)	Percentage (%)
Gender	Female	98	24.3
	Male	306	75.7
	Total	404	100
Type of Sport Played	Team Sport	176	43.6
	Individual Sport	228	56.4
Age	18-22	42	10.4
	23-29	170	42.1
	30-39	108	26.7
	40-49	63	15.6
	50 and over	21	5.2

	Total	404	100
Level	1st Level	135	33.4
	2nd Level	231	57.2
	3rd Level	22	5.4
	4th and 5th Level	16	4.0
	Total	404	100
Length of Service	1-3 years	180	44.6
	4-6 years	115	28.5
	7-9 years	47	11.6
	10-12 years	62	15.3
	Total	404	100

Personal information about the trainers is given in Table 3. When the trainers were examined according to gender, it was seen that 75.7% of the trainers were male and 24.3% were female. When the trainers' type of sport played was examined, it was seen that 43.6% of the trainers played team sports and 56.4% played individual sports. According to age, 10.4% of trainers were aged 18-22, 42.1% were aged 23-29, 26.7% were aged 30-39, 15.6% were aged 40-49, and 5.2% were aged 50 and over. When the trainers were examined according to the level variable, it was determined that 33.4% of the trainers were first level, 57.2% were second level, 5.4% were third level, and 4% were fourth and fifth level trainers. In terms of length of service, it was seen that 44.6% of the trainers had 1-3 years, 28.5% had 4-6 years, 11.6% had 7-9 years and 15.3% had 10-12 years of service as trainers.

Table 4: Self-Esteem Level Scale Score Values

Self-Esteem Values	Persons	Minimum	Maximum	X	Sd
	404	40	100	68.45	.138

According to Table 4, when the self-esteem level values of the trainers were examined, it was concluded that mean self-esteem level scores were 68.45 and that consequently, the trainers' self-esteem levels were moderate. In terms of scores obtained from the scale, scores between 10-30 indicate low self-esteem, scores between 30-70 reveal moderate self-esteem, while scores between 70-100 indicate high self-esteem.¹⁶

Table 5: Anger Control

	N	Minimum	Maximum	Mean	Sd
Anger Rating Scale	404	1.00	3.60	2.014	.338
1-Hardly Ever	2-Sometimes	3-Often	4-Very Often		

According to Table 5, the trainers' mean anger control scores were found to be 2.014, which shows that their anger control was within a normal range.

Table 6: T-test according to Gender

	Gender	N	Mean	Sd	T	P*
Self-Esteem	Female	98	1.6122	.13837	3.623	.000
	Male	306	1.5548	.13593		
Anger Rating	Female	98	1.9382	.29749	-2.567	.011
	Male	306	2.0384	.34758		

According to Table 6, when the relationship between the trainers' self-esteem and their gender was examined, a statistically significant difference in favour of women was found ($p < 0.05$). When the relationship between the trainers' anger evaluation and their gender was examined, however, a statistically significant difference in favour of men was found ($p < 0.05$).

Table 7: T-test according to Type of Sport Played

		N	Mean	Sd	T	P
Self-Esteem	Team Sport	176	1.5393	.15124	-3.815	.000
	Individual Sport	228	1.5915	.12354		
Anger Evaluation	Team Sport	176	2.0622	.36046	2.526	.012
	Individual Sport	228	1.9769	.31635		

According to Table 7, when the trainers' self-esteem and anger evaluation were examined according to the type of sport that they played, a statistically significant difference was found ($p < 0.05$). This difference was determined to be in favour of those playing individual sports for self-esteem but in favour of team sports for anger control.

Table 8: ANOVA Test according to Age

		N	Mean	Sd	F	P*	Tukey
Self-Esteem	Between Groups	5	.272	.068	3.634	.006	Age 30-39—age 40-49 Age 18-22
	Within Groups	399	7.466	.019			
Anger Evaluation	Between Groups	5	.652	.163	1.430	.223	
	Within Groups	399	45.525	.114			

According to Table 8, when the relationship between the trainers' self-esteem and anger rating values were examined according to the age variable, a statistically significant difference was found for the self-esteem variable ($p < 0.05$), while a statistically significant difference was not found for the anger evaluation variable ($p < 0.05$). In the Scheffe analysis, which was performed to determine between which groups there was a difference in trainers' self-esteem according to the age variable, a statistically significant difference was found between the 30-39 and 40-49 age groups and the 18-22 age group in favour of the 30-39 and 40-49 age groups.

Table 9: ANOVA Test according to Level

		N	Mean	Sd	F	P*
Self-Esteem	Between Groups	4	.101	.034	1.755	.155
	Within Groups	400	7.637	.019		
Anger Evaluation	Between Groups	4		.042	.364	.779
	Within Groups	400		.115		

As shown in Table 9, according to the level variable, a statistically significant difference could not be found between the level variable and the self-esteem and anger evaluation variables of the trainers.

Table 10: ANOVA Test according to Length of Service

		N	Mean	Sd	F	P*
Self-Esteem	Between Groups	4	.063	.021	1.096	.351
	Within Groups	400	7.675	.019		
Anger Evaluation	Between Groups	4	.155	.052	.449	.718
	Within Groups	400	46.022	.115		

According to Table 10, a statistically significant difference could not be found between the length of service variable and the self-esteem and anger evaluation variables of the trainers.

Table 11: Correlation between Self-Esteem and Anger Evaluation of Trainers Participating in Study

		Self-Esteem	Anger Evaluation
Self-Esteem	Pearson Correlation	1	-.196**
	P		.000
	N	404	404
Anger Control Inventory	Pearson Correlation	-.196**	1
	P	.000	
	N	404	404

** . Correlation is significant at the 0.01 level (2-tailed).

According to Table 11, when the correlation between the self-esteem and anger evaluation of the trainers participating in the study was examined, a significant, negative relationship between the trainers' self-esteem and anger evaluation was determined ($P < 0.05$). It can be said that when the trainers' self-esteem increased, their anger rating values decreased, whereas when self-esteem decreased, anger rating values increased.

3. DISCUSSION

When the data obtained for determining the trainers' self-esteem levels were examined, it was concluded that the mean self-esteem level scores were 68.45, and that consequently, the trainers' self-esteem levels were moderate. When the data obtained for determining the trainers' anger control were examined, it was concluded that the mean scores were 2.014, and that therefore, the trainers' mean anger evaluation scores were normal.

When the relationship between the trainers' self-esteem and gender was examined, a statistically significant difference was found in favour of women, whereas when the relationship between their anger control and gender was examined, a statistically significant difference was found in favour of men ($p < 0.05$). In the studies conducted^{17,18} a significant difference was found between athletes' self-esteem and gender in favour of women, which shows parallelism with our study. In the studies, the relationship between university students' self-esteem and gender was found to be significant in favour of males.^{19,20,21} In the studies made a significant relationship between athletes' self-esteem and gender could not be found.^{22,23,24,25} When the trainers' self-esteem and anger control values were examined according to type of sport played, a statistically significant difference was found ($p < 0.05$). While this difference was in favour of those playing individual sports regarding self-esteem, it was in favour of those playing team sports with regard to anger control. We can conclude that self-esteem levels of trainers dealing with individual sports were higher, while trainers dealing with team sports had better control of their anger. In the study carried out the finding that players of team sports had higher levels of self-esteem supports the findings of our study.²⁶ When the trainers' self-esteem and anger control values were examined according to the age variable, a statistically significant difference was found ($p < 0.05$). The source of the difference was between the 30-39 and 40-49 age groups and the 18-22 age group, and the difference was significantly in favour of the 30-39 and 40-49 age groups. We can say that self-esteem levels were higher in older trainers than in young trainers. In terms of the anger control variable, however, a statistically significant difference could not be found ($p > 0.05$). While the studies made by and show parallelism with our study^{27,28,29}, a statistically significant difference could not be found between self-esteem and the age variable in the studies conducted.^{30,31,32} When we investigated the trainers' self-esteem and anger control variables to see whether there was a relationship with the level and length of service variables, no significant correlation could be found.

4. CONCLUSIONS AND RECOMMENDATIONS

When the relationship between the trainers' self-esteem and anger control was examined, it was determined that there was a significant, negative correlation between the trainers' self-esteem and anger control. It was concluded that an increase in the trainers' self-esteem enabled them to distance themselves from an angry disposition, whereas a decrease in their self-esteem caused them to become more bad-tempered. In conclusion, it was determined that female trainers had higher levels of self-esteem than male trainers, whereas male trainers had higher levels of anger control than female trainers. It was concluded that although trainers in individual sports had higher self-esteem than those in team sports, their levels of anger control were lower. It can be said that self-esteem values of older trainers were higher than those of young trainers. It was concluded that as levels of self-esteem increased, anger levels decreased. In general, it was concluded that the trainers' self-esteem levels were moderate, while their mean anger ratings were normal.

- 1-Various seminars and courses can be organised with the aim of increasing trainers' self-esteem and anger control.
- 2-The same research can be applied to the same group in different places.
- 3-To enable a different perspective on this research, different variables to those used in the research can be used.
- 4-A seminar related to self-esteem and anger control can be organised by experts with the organisation of youth and sports directorates for trainers in the province where they are located.
- 5-Courses on the subject of self-esteem and anger control can be given in sports training departments of universities.

5. THANKS

We would like to thank the valuable participants who played an important role in conducting this research.

6. AUTHORS CONTRIBUTION STATEMENT

Dr. Hakan SUNAY conceptualized and collected the data. Dr. Hakan SUNAY and Bayram KAYA analyzed it. Necessary The design of the article was designed by Erdal Bal and Dr. Recep CENGİZ did it. After all the authors contributed to the results and discussion.

REFERENCES

- 1.Ozturk S, Isitme, Gorme ve Ortopedik Engelli İlköğretim Öğrencilerinin Benlik Kavramlarının Özel Eğitim Okullarına veya Kaynaştırma Eğitimine Devam Etme Durumlarına Gore Incelenmesi Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü Çocuk Gelismesi ve Eğitimi Programı Yüksek Lisans Tezi Ankara; 2006.
- 2.Oz F, Benlik kavramı. Sağlık Alanında Temel Kavramlar, İmaj İç ve Dış Ticaret Aş.,Ankara; 2004. s.83-111.
- 3.Schwab J.J, James D, Harmeling M, Body image and medical illness. *Psychology in Spai*; 2002. 6(1),s. 83-95.
- 4.Acak M, Karademir T, Kahramanmaraş sütçü imam üniversitesi engelli öğrencilerin benlik saygılarının bazı değişkenlere göre incelenmesi. İnönü Üniversitesi Eğitim Fakültesi Dergisi; 2011. 12(2),s. 165-179.
- 5.Carl S, Depression, body image and self-esteem as a function of sports participation among male and female adolescents. *Dissertation Abstracts In ernational*; 2001. s. 62 -3.
- 6.Rosenberg M, Society and adolescent self-image. Princeton: New Jersey: Princeton University Press; 1965.
- 7.Guindon MH, Toward accountability in the use of self-esteem consruct. *journal of counseling and development*; 2002. 80(2), s.204-213.
- 8.Turanlı P, Orta Yetişkinlikte Evlilik Uyumu İle Benlik Saygısı Ve Bağlanma Stilleri Arasındaki İlişkinin Saptanması, Maltepe Üniversitesi, Sosyal Bilimler Enstitüsü, Psikoloji Anabilim Dalı, Yayımlanmamış Yüksek Lisans Tezi; 2010.
- 9.Oz R, Yılmaz H, Akcay N, *Tip I Diyabetli Çocuklarda Benlik Saygısını Etkileyen Faktörler*, Uluslararası İnsan Bilimleri Dergisi;2009. Cilt:6 Sayı:1.

- 10.Cuceloglu D, İnsan ve Davranışı. İstanbul: Remzi Kitapevi; 1998.
- 11.Baygul E, Ergenin Öfke Tepkilerinin İncelenmesi. Yayınlanmamış Yüksek Lisans Tezi. Uludağ Üniversitesi; 1997.
- 12.Deffenbacher L, J, McNamara K, Stark R, Sadabell P.M, "a Comparison of Cognitive- behavioral and Oriented Group Counseling for General Anger Reduction". Journal of Counseling and Development; 1990. 69.s. 167-172.
- 13.Balkaya, F, "Öfke:Temel Boyutları, Nedenleri ve Sonuçları". Türk Psikoloji, Yazıları; 2001. S.19-22.
- 14.Bandura A, Self-Efficacy: The Exercise Of Control. New York: W. H. Freeman Company; 1997.
- 15.Turedi E, Ozyeterlik, benlik saygısı ve atılganlık düzeyi ilişkisi cinsiyet ve deneyim süresi açısından resmi okul ve özel okul öğretmenleri üzerine bir araştırma. Toros Üniversitesi Sosyal Bilimler Enstitüsü Psikoloji Ana Bilim Dalı,Yüksek Lisans Tezi; 2015.
- 16.Yılmaz Ş, Afyon Kocatepe Üniversitesi Sağlık Bilimleri Enstitüsü Plastik Ve Rekonstrüktif Cerrahi Hastalarında Preop Ve Postop Dönemde Beden İmajı Ve Benlik Saygısının Değerlendirilmesi Cerrahi Hastalıkları Hemşireliği Anabilim Dalı Yüksek Lisans Tezi; 2009.
- 17.Duran K.S, 9.10.11 Yaşındaki çocukların Zihinsel Gelişim ve Benlik Saygısına Ailenin Sosyo-Ekonomik Düzeyinin Etkisi, Maltepe Üniversitesi Sosyal Bilimleri Enstitüsü, Yüksek Lisans Tezi, İstanbul; 2007.
- 18.Ozkan A. O, Ozen A, Öğrenci Hemşirelerde Boyun Eğici Davranışlar ve Benlik Saygısı Arasındaki İlişki. TSK Koruyucu Hekimlik Bülteni; 2008. 7, 1, s.53- 58.
- 19.Makinen M, Puukko-Viertomies R.L, Lindberg N, Siimes A.M, Aalberg, V. Body Dissatisfaction And Body Mass İn Girls And Boys Transitioning From Early To Mid-Adolescence: Additional Role Of Self- Esteem And Eating Habits. BMC Psychiatry;2012. s.12, 35.
- 20.Joshi S, Srivastava R, Self-Esteem And Academic Achievement of Adolescents. Journal of the Indian Academy of Applied Psychology; 2009. s. 35, 33-39.
- 21.Ata, N.R. Ludden, B.A. Lally, M.M, The Effects Of Gender And Family, Friend, And Media Influences On Eating Disorders And Body Image During Adolescence. Journal of Youth and Adolescence; 2007. 36, s.1024-1037.
- 22.Aygun, F.D, Elit Buz Hokeyi Sporcularının Benlik Saygısı Ve Karar Verme Düzeylerinin İncelenmesi, Ağrı İbrahim Çeçen Üniversitesi Sosyal Bilimler Enstitüsü Beden Eğitimi Ve Spor Anabilim Dalı, Yüksek Lisans Tezi; 2018.
- 23.Secer İ, İlbay B.A, Ay İ, Çiftçi M, Yatılı İlköğretim Okullarındaki Öğrencilerin Benlik Saygılarının İncelenmesi. Sakarya Journal of Education;2012. Sayı 3, s. 1-17.
- 24.Yılmazel G, Gunay O, Çorum İli Kargı İlçesinde Öğrenim Gören 12-17 Yaş Arasındaki Öğrencilerde Özsaygı ve Depresyon. Sağlık Bilimleri Dergisi Journal of Health Science;2012. 21(1), s.20-29.
- 25.Tam L.C, Lee H.T, Har M.W, Pook L.W, Perceived Social Support And Self-Esteem Towards Gender Roles: Contributing Factors in Adolescents. Asian Social Science; 2011.7 (8), s.49-58.
- 26.Cebi M, Yamak B, & Öztürk M, 11-14 Yaş çağındaki çocukların spor Yapma alışkanlığının duygu kontrolü üzerine etkilerinin incelenmesi. Amasya Üniversitesi Eğitim Fakültesi Dergisi; 2016. s.468-482.
- 27.Yuzgec S, Benlik Saygısı ile Mistik Tecrube Arasındaki İlişki Uzerine Bir Arastırma. Marmara Üniversitesi Sosyal Bilimler Enstitüsü, Yüksek Lisans Tezi.; 2014.
- 28.Maoano C, Ninot G, Billard J, Age And Gender Effects On Global Self-Esteem and Physical Self-Perception in Adolescents. European Physical Education Review; 2004. 10 (1), s.53-69.
- 29.Marcotte D, Fortin L, Potvin P, Papillon M, Gender Differences in Depressive Symptoms During Adolescence: Role Of Gender-Typed Characteristics, Self-Esteem, Body Image, Stressful Life Events, And Pubertal Status. Journal Of Emotional And Behavioral Disorders; 2002. 10 (1), s.29-42.
- 30.Kucuk P, Üniversite Öğrencilerinde sosyal kaygı düzeyi ile benlik saygısı düzeyi ilişkisinin incelenmesi. Beykent Üniversitesi Sosyal Bilimler Enstitüsü, Yüksek Lisans Tezi, İstanbul; 2016.
- 31.Ozkan İ, Benlik Saygısını Etkileyen Etkenler. Düşünen Adam Dergisi;1994. 7 (3), s.4-9.
- 32.Yıldırım T, Cırak Y, Konan N, Öğretmen Adaylarında Sosyal Kaygı, İnönü Üniversitesi, İnönü Üniversitesi Eğitim Fakültesi Dergisi;2011. 12, (1), s. 85-100.

RELATIONSHIP BETWEEN DECISION-MAKING STYLES AND COGNITIVE FLEXIBILITY LEVELS OF SPORTS SCIENCE STUDENTS

Nuriye Seyma KARA^{*1}, Ahmet DONMEZ², Mehmet Çağrı CETİN³

1. Hatay Mustafa Kemal University, Department of Physical Education and Sport, Hatay/Turkey.

ORCID ID: 0000-0003-0460-2263

2. Sakarya University of Applied Sciences, Graduate Education Institute, Department of Physical Education and Sport Teaching, Sakarya/Turkey.

ORCID ID: 0000-0001-6754-4369,

3. Mersin University, Faculty of Sport Science, Mersin/Turkey.

Orcid ID: 0000-0001-7667-2143

Corresponding author: nseymasar@gmail.com

ABSTRACT

This study was conducted to determine the relationship between decision-making styles and cognitive flexibility levels of sports science students. The study was conducted using the relational screening model. The population of the study consists of the students engaging in sports who are studying at sports sciences faculty of Sakarya University of Applied Sciences and Bartın University, and the sample consists of 290 students in sports sciences, including 107 women and 183 men, who are selected by the criteria sampling method, which is one of the purposeful sampling methods, from this population. As a data collection tool, the "Personal Data Form", "Melbourne Decision Making Scale" "Cognitive Flexibility Scale" were used. Descriptive statistics, Pearson correlation and simple linear regression analyses were applied to the data. According to research results, positive significant relationships were found between the levels of cognitive flexibility of the students engaging in sports and self-esteem and careful decision-making in decision-making; while negative significant relationships with avoidant, suspensive, and panic decision-making. In addition, it has been found that cognitive flexibility positively predicts self-respect and careful decision-making in decision-making, however, it negatively predicts avoidant, suspensive, and panic decision-making. Consequently, it was concluded that there was a significant relationship between the cognitive flexibility levels and decision-making styles of sportspersons; in addition, their cognitive flexibility levels had a significant effect on their decision-making styles.

KEYWORDS: Decision-making style, Cognitive flexibility, Sports science, Student.

INTRODUCTION

Considering that sport is a concept that requires competition and rivalry, there is a parallelism between making the right decision at the right time during the competition by the sportspersons and their ability to make the necessary moves. As a matter of fact, the decision-making style of the sportspersons determines the move they will make. In this regard, decision-making takes an important place in sports, as in many parts of life, such as politics, management, the environment, and school. Today, the games in many sports branches are now played in a way both faster and more technical and tactical. The sportspersons need to make new decisions in a game due to the changing dynamics of the game during the competition, and the unexpected changes, especially in collective sports and in the game system or in rallies¹. Decision means consciously choosing one of the different possible movements². Decision making is defined as the process of satisfactorily reduction of doubts and uncertainties while making the appropriate choice between options³. The learned habitual response pattern exhibited by an individual when confronted with a decision situation is called a decision-making style⁴. Cognitive flexibility in relation to decision-making is a condition in which an individual's being aware of the fact that there are suitable options and accessible alternatives for every given situation, being willing to be flexible and feeling competent about adapting the situation and being able to be flexible⁵. In cognitive behavioral therapy (CIS), cognitive flexibility is defined as the fact that a person evaluates a situation from many different perspectives and then adapts to the requirements of the situation. It is the opposite of dogmatic, rigid, and intransigent behavior⁶. In other words, it can also be defined as an individual's adaptation capacity⁷. From this point of view, it can be said that there is a relationship between decision-making style and cognitive flexibility. Neurologically, it is emphasized that Serotonin, called the neurotransmitter in the brain, plays an instrumental role in regulating decision-making functions associated with the ventromedial and orbital areas of the frontal cortex. This role of Serotonin is especially evident in the decision-making process in choosing which might be the best outcome⁸. In addition, dopamine, another neurotransmitter, also has an important influence in the decision-making process. Because it was stated that the mesocorticolimbic dopamine system plays an important role in situations requiring cognitive flexibility in reward-related learning and in adapting behavior to new conditions^{9,10}. In relation to sports, neurogenesis in the hippocampus and lateral cerebral ventricular regions of the brain, i.e. the formation of neurons from neural stem and progenitor cells, and furthermore, the fact that exercise plays a very active role in this process are known¹¹. The fact that the brain can be reshaped and re-organized throughout life, responding to physical and cognitive stimuli, is now widely accepted. In this context, it has been clearly demonstrated that lack of physical and cognitive stimuli leads to the deterioration of neurons, especially as age increases [cited by¹²]. From this perspective, exercise is very important for neurological health. Considering the effect of sports on neurotransmitters, it is known that sports increase central nervous system neurotransmitters such as noradrenaline (NA), dopamine (DA), and serotonin (5-HT). Neuradneralin is associated with being alert, while dopamine plays a leading role in rewarding motivated behavior. Serotonin, on the other hand, is thought to be associated with happiness and well-being¹³. Considering the effect of neurotransmitters on cognitive flexibility and decision-making, serotonin plays an instrumental role in regulating the decision-making functions of the frontal cortex.

Dopamine, on the other hand, allows behavior to adapt to new conditions in situations that require flexibility in the mesocorticolimbic system in connection with cognitive flexibility. Therefore, the increase in these neurotransmitters with sports can have a positive effect on cognitive flexibility and decision-making. In light of this information, the aim of this study is to determine the relationship between the decision-making styles of sports science students and their level of cognitive flexibility.

METHOD

In this section, the explanations about the model of the research, the population and sample of the research, the collection of data, the measurement tools and the processes of analyzing the data are provided.

Model of Research

This research, which examined the relationship between decision-making styles and cognitive flexibility levels of sports science students, was designed using the "relational screening model". Relational screening models are the "research models that aim to determine the existence and/or level of co-variation between two or more variables"¹⁴.

Population and Sample of the Study

Sports science students studying at Sakarya University of Applied Sciences and Bartın University constitute the population of the study. A total of 290 sports science students, 107 women and 183 men, who were selected by the criterion sampling method, which is one of the purposeful sampling methods, from this population and who regularly played sports for at least 1 year, are made up of the sample.

Table 1. Percentage and frequency distributions related to demographic characteristics of the students participating in the study

Gender	(n)	%
Female	115	36.5
Male	200	63.5
Years for Engagement in Sports	(n)	%
Between 1 and 5 years	102	35.2
Between 6 and 10 years	139	47.9
11 years and above	49	16.9

Table 1 demonstrates the demographic characteristics of sports science students who participated in the research. It is found that 36.5% (n=115) of the students are female while 63.5% (n=200) of them are male. Regarding the engagement in sports of the students, it is found that 35.2% (n=102) of the students engaged in sports between 1-5 years; 47.9% (n=139) of them between 6-10 years; and 16.9% (n=49) of them 11 years and above.

Collection of Data

The data of the study were obtained from the sports sciences students of Sakarya University of Applied Sciences and Bartın University in October and December of 2019 - 2020 academic fall semester. Before the data collection process, the students were told of the purpose and importance of the study in the classroom. After the oral explanation, the scale forms were distributed to the students who wanted to participate voluntarily in the study and so the data were collected.

Data Collection Tools

"Personal Information Form", "Decision-Making Styles" and "Cognitive Flexibility" questionnaires are used as the measurement tools in the study. Detailed information about measurement tools is described below.

Personal Information Form

"Personal Information Form" has been prepared by researchers to determine demographic information of the sports science students. The personal information form aims to provide information such as students' gender and sports engagement years.

Melbourne Decision Making Questionnaire (MDMQ I-II)

The decision-making questionnaire (the "Melbourne Decision Making Questionnaire") was developed by Mann et al.¹ in a cross-cultural study covering six countries to compare the self-esteem and decision-making styles of university students in decision-making. The measurement tool was adapted to Turkish by Deniz¹⁶ in order to determine the decision-making styles of Turkish university students and to conduct comparative studies with other country students. The Melbourne Decision Making Questionnaire consists of two parts. Part I: Aims to determine self-esteem (self-confidence) in decision making. It consists of six items and three items (2, 4, 6) are scored reversely. The "True" answers given to the scoring items is scored with 2 points, the "Sometimes True" answer is scored with 1 point, and the "Not True" answer is scored with 0 point. The maximum score can be taken from the questionnaire is 12. High scores indicate high self-esteem in decision making. Part 2, on the other hand, consists of 22 items and measures decision-making styles. It has four sub-factors¹⁶. The sub-items of the factor are as follows.

1. Careful Decision-Making: 2, 4, 6, 8, 12, 16.
2. Avoidant Decision Making: 3, 9, 11, 14, 17, 19.
3. Suspensive Decision Making: 5, 7, 10, 18, 21.
4. Panic Decision Making: 1, 13, 15, 20, 22.

As a result of the study, the Cronbach Alpha reliability coefficient of the measurement tool was found to be .62 for self-esteem in decision-making; .66 for careful decision-making; .72 for avoidant decision-making; .71 for suspensive decision-making and .63 for panic decision-making.

Cognitive Flexibility Questionnaire

The "Cognitive Flexibility" questionnaire used in the scope of the study was developed by Bilgin¹⁷. The questionnaire consists of 19 items. Questionnaire items consist of adjective pairs (e.g., "I can, I can not", "I am successful, I am unsuccessful"). The scores obtained from the questionnaire range from 19 to 95. The increase in the scores obtained from the scale suggests that the individual is getting closer to cognitive flexibility. In reliability studies on the scale, the Cronbach Alpha coefficient found for the entire questionnaire to be .92¹⁷. As a result of the study, the Cronbach Alpha reliability coefficient of the measurement tool is found to be .93.

Analysis of the Data

The data collected from students were individually checked and transferred to a computer environment to prevent possible coding errors and make them ready for analysis. The data was tested for normality before being analyzed. In the normality test, skewness and kurtosis values of the data were examined. As a result of the statistical operation, the data is determined within the range of $-2 < \dots < +2$. Evidence can be presented that these determined values correspond to the normal distribution¹⁸. Parametric tests were preferred because the data showed normal distribution. Descriptive statistics, person correlation and regression technique were used in the evaluation of the data. Significance level is taken as .05. The data is analyzed using SPSS software package.

FINDINGS

This part of the study includes statistical analyses and interpretations of the data obtained within the scope of the study.

Table 2. Results of the relationship between cognitive flexibility and decision-making styles of students participating in the study

		Self-Esteem in Making Decision	Careful Decision-Making	Avoidant Decision Making	Suspensive Decision Making	Panic Decision Making
Cognitive Flexibility	r	.33	.19	-.31	-.23	-.38
	p	.00**	.00**	.00**	.00**	.00**

Table 2 includes the pearson correlation analysis, which shows the results of the relationship between cognitive flexibility and decision-making styles of sports science students. As a result of the analysis, it is determined that there is moderate significant relationships in positive direction ($r=.33$) between cognitive flexibility and self-esteem in decision making, low significant relationship in positive direction ($r=.19$) between cognitive flexibility and careful decision making, moderate significant relationships in negative direction between cognitive flexibility and panic decision-making ($r=-.38$) and avoidant decision-making ($r=-.31$), low level significant relationships in negative direction between cognitive flexibility and suspensive decision-making ($r=-.23$).

Table 3. Simple linear regression results on how cognitive flexibility of the students participating in the study predicts their decision-making styles

Dependent Variables	B.	Std. Error	β	t	R	R^2_{adj}	F
Self-Esteem in Making Decision	.06	.01	.33	5.89*	.33	.11	34.74
Careful Decision-Making	.03	.01	.19	3.38*	.19	.03	11.37
Avoidant Decision Making	.07	.01	.31	-5.62*	.31	.10	31.59
Suspensive Decision Making	.04	.01	.23	-4.03*	.23	.05	16.26
Panic Decision Making	.07	.01	.37	-6.87*	.37	.14	47.15

$p < .05$ Independent Variables = Cognitive Flexibility

Table 3 contains five simple linear regression analysis results to determine whether sports science students' cognitive flexibility predicts their decision-making style. According to the results of the analysis, it was found that cognitive flexibility significantly predicts decision-making styles. It is determined that cognitive flexibility explains self-respect in decision-making by 11%; careful decision-making by 03%; avoidant decision-making by 10%; suspensive decision-making by 5%, and panic decision-making by 14%.

DISCUSSION

This study was prepared to determine the relationship between decision-making styles and cognitive flexibility levels of sports science students. In this part of the study, it is aimed to discuss the relationship between the cognitive flexibility levels and decision-making styles of students and how their cognitive flexibility affect their decision-making styles.

As a result of the analysis conducted to determine the relationship between cognitive flexibility and decision-making styles, it was concluded that as cognitive flexibility increases, there is an increase in self-respect and careful decision-making, the lower dimensions of decision-making styles, and a decrease in the dimensions of avoidant decision-making, suspensive decision-making, and panic decision-making. The reason for this result can be explained as follows. Cognitive flexibility is defined as the ability of the mind to change its perception of events depending on changing environmental conditions. The individuals who have this ability exert themselves and have the characteristics of being able to change their negative thoughts with relatively positive or harmonious thoughts, discover new ways to solve problems and feel competent in this regard¹⁹. Based on this point, the individuals with cognitive flexibility are willing to try new ways in communicating, adapt behaviors to meet contextual needs when they encounter situations that occur for the first time²⁰. In this context, the individuals who are cognitively flexible rely on their ability to act effectively. As a matter of fact, self-sufficiency is the most important building block of cognitive flexibility. In addition, even if the individual is aware that there are other alternative behavioral options in any situation and is willing to be flexible, he/she must believe that he/she has self-confidence in order to show the desired behavior. As a result, the fact that the individuals with a cognitive structure achieve positive results due to the decisions made by thinking about appropriate alternatives in the face of a situation can increase the individual's self-esteem and careful decision-making in the decision-making process as reducing avoidant decision-making, suspensive decision-making and panic decision-making. As a matter of fact, a flexible structure requires pressing the problems, looking for ways to solve them, and not making sudden decisions. Considering the effect of sports on neurotransmitters, it is known that exercise causes an increase in neurotransmitters called serotonin and dopamine, which are effective in the brain's cognitive flexibility and decision-making processes. Serotonin is an important monoamine neurotransmitter found in the central and peripheral nervous system of mammals²¹. Today, it is known that it plays an active role in cardiovascular system, central nervous system and gastrointestinal system. Dopamine, on the other hand, has the roles and functions of controlling movement and behavior, supporting memory, attention, learning and understanding, balancing sleep and mood [cited by ²²]. Due to the increase in these neurotransmitters, it can be said that cognitive control, which occurs in the way of the brain's decision-making process and strategies, becomes important in long-term activities^{23,24}. In a literature review regarding the outcome obtained, no research examining the relationship between cognitive flexibility and decision-making styles of individuals engaged in sports was found. Looking at similar research, Bilgiç and Bilgin²⁵ concluded that as cognitive flexibility levels increases, logical decision-making scores also increases, but as cognitive flexibility levels increases, impulsive, dependent and indecisive strategy scores decrease. As a result of the analysis conducted to determine the impact of students' cognitive flexibility levels on decision-making styles, it was concluded that cognitive flexibility has a significant impact on self-esteem and careful decision-making in decision-making, and that it has a negative significant impact on avoidance, suspensive, and panic decision-making. In other words, as cognitive flexibility increases, the individual's level of avoidance, suspensive and panic decision-making decreases. As for the result, the following explanation can be made. Cognitive flexibility means creating new solutions to the problem encountered, making decisions by minimizing the negative aspects of the events. In this respect, the individuals who are aware of alternatives and options in the face of unexpected situations are cognitively more flexible than those who are not. The individuals with high levels of cognitive flexibility are aware of the feelings and thoughts of others. According to Ellis and Dryden²⁶, a person has a number of criteria for maintaining his psychological health, such as caring for himself and society, tolerance, self-orientation, accepting uncertainties, participation, self-acceptance, taking risks, realistic expectations, high frustration threshold, and handling his own responsibility, and one of these criteria is flexibility. Accordingly, healthy and mature individuals tend to be more flexible in their thinking and they exhibit an approach that is open to change, non-inflexible, and pluralistic in their view of other people. They do not set strict rules for themselves and others, because adhering to strict, biased and unchangeable rules will make it difficult to be happy. As a matter of fact, the flexibility of cognitive processes increases the likelihood that negative emotions will be felt less²⁷. As a result, being cognitively flexible enables an individual to have high self-esteem and be solution-oriented rather than avoiding the problem when he/she faces with an adverse situation, and also prevents him/her from making avoidant, suspensive, and panic decisions. Five decision-making styles were defined in the decision-making style distinction made by Mann, Harmoni, and Power²⁸. These are; Self-confident; the individual trusts his/her decisions and is optimistic, vigilance; the individual thinks about every option before making decisions, panic; the individual expresses that he/she is nervous and stressed during the decision-making process, cop-out; the individual postpones the decisions, complacency; the individual cannot solve the problem and follows others. In this case, considering the characteristics of people with cognitive flexibility, they are listed as being aware of options for the problem, able to effectively cope with unexpected and difficult situations, able to produce alternative ideas, and willing to adapt to new situations^{29, 30, 5, 31}. At the same time, these people can be assertive, responsible, interested, able to explain the meaning of their experiences by considering themselves adequate in interpersonal relationships, and they are willing to try new ways of communication and adapt to meet needs when faced with unusual situations²⁰. In this context, it is possible to say that cognitive flexibility has a significant impact on decision-making styles. Evaluating the outcome from the point of view of sports, it is known that sports cause an increase in serotonin release in the decision-making areas of the brain and dopamine release in the hypothalamus region. There are two mechanisms by which physical activity increases brain serotonin. First, motor activity increases the rate and frequency of neuronal firing of serotonin in the brain, causing an increase in its release and synthesis. Second, regular exercise increases the level of tryptophan, i.e. the amino acid used in the production of serotonin, in the brain²². Considering the effect of dopamine, cognitive processes are of great importance, especially in terms of executive functions. The changes in dopamine levels can negatively affect these functions³². For this reason, an increase in serotonin and dopamine levels with the engagement in sports can positively affect a person's healthier cognitive structure and decision-making processes.

CONCLUSION

The literature review indicated that there is no research examining the effect of the cognitive flexibility levels of individuals engaging in sports on their decision-making style. Consequently, it was concluded that there was a significant relationship between the cognitive flexibility levels and decision-making styles of sportspersons; in addition, their cognitive flexibility levels had a significant effect on their decision-making styles. It is recommended that the researches with larger sample groups as well

as the researches to determine the relationship of decision-making and cognitive flexibility with sports branches are carried out in the future studies.

REFERENCES

1. Keleş S., Altıntaş A., & Asçı FH. (2013). Sporcuların karar verme stillerinin belirlenmesi. *CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi*, 8(1), 21-27.
2. Sánchez ACJ., Calvo AL., Buñuel PSL., & Godoy SJL. (2009). Decision-making of spanish female basketball team players while they are competing. *Revista de Psicología del Deporte*, 18(3), 369-373.
3. Tekin M., Özmütlu İ., & Erhan SE. (2009). Özel yetenek sınavlarına katılan öğrencilerin karar verme ve düşünme stillerinin incelenmesi. *Atatürk Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi*, 11 (3), 42-56.
4. Scott SG., & Bruce RA. (1995). Decision-making style: The development and assessment of a new measure. *Educational and psychological measurement*, 55(5), 818-831.
5. Martin MM., & Rubin RB. (1995). A new measure of cognitive flexibility. *Psychological Reports*, 76(2), 623-626.
6. Bochner AP., & Kelly CW. (1974). Interpersonal competence rationale, philosophy and implementation of a conceptual framework. *Speech Teacher*, 23, 279-301.
7. Payne JW., Bettman JR., & Johnson EJ. (1993). *The adaptive decision maker*. Cambridge University Press.
8. Irak M. (2012). Serotonin bilişsel işlevlerdeki rolü. *Türk Psikoloji Yazıları*, 15(29), 13.
9. Clarke HF., Dalley JW., Crofts HS., Robbins TW., & Roberts AC. (2004). Cognitive inflexibility after prefrontal serotonin depletion. *Science*, 304(5672), 878-880.
10. Schultz W. (2002). Getting formal with dopamine and reward. *Neuron*, 36(2), 241-263.
11. Van Praag H., Kempermann G., & Gage F. H. (1999). Running increases cell proliferation and neurogenesis in the adult mouse dentate gyrus. *Nature neuroscience*, 2(3), 266-270.
12. Satman MC. (2018). Fiziksel aktivite: Bilinenin çok ötesi. *SPORMETRE Beden Eğitimi ve Spor Bilimleri Dergisi*, 16(4), 158-178.
13. Lin TW., & Kuo YM. (2013). Exercise benefits brain function: the monoamine connection. *Brain sciences*, 3(1), 39-53.
14. Karasar N. (2018). *Bilimsel araştırma yöntemleri: Kavramlar, ilkeler ve teknikler*. (32.Baskı). Ankara: Nobel Yayın Dağıtım.
15. Mann L., Radford M., Burnett P., Ford S., Bond M., Leung K., Nakamura H., Vaughan G., & Yang KS. (1998). Cross-cultural differences in self-reported decision-making style and confidence. *International Journal of Psychology*, 33(5), 325-335.
16. Deniz ME. (2004). Üniversite öğrencilerinin karar vermede öz saygı karar verme stilleri ve problem çözme becerileri arasındaki ilişkinin incelenmesi üzerine bir araştırma. *Eğitim Araştırmaları Dergisi*, 4(15), 23-35.
17. Bilgin M. (2009a). Developing a cognitive flexibility scale: Validity and reliability studies. *Social Behavior and Personality: An international journal*, 37(3), 343-353.
18. George D., & Mallery P. (2001). *SPSS for windows step by step: A simple guide and reference 10.0 update*. (3. Baskı). Boston: Allyn and Bacon.
19. Gülüm İV., & Dağ İ. (2012). Tekrarlayıcı Düşünme Ölçeği ve Bilişsel Esneklik Envanterinin Türkçeye uyarlanması, geçerliliği ve güvenilirliği. *Anatolian Journal of Psychiatry/Anadolu Psikiyatri Dergisi*, 13(3), 216-223.
20. Martin MM., & Anderson C. M. (1998). The cognitive flexibility scale: Three validity studies. *Communication Reports*, 11(1), 1-9.
21. Ganong WF (2005). *Synaptic and junctional transmission*. In *Review of Medical Physiology*, 22 edn, pp 85–127. Ed. WF Ganong. New York: The McGraw-Hill Companies.
22. Terlemez M. (2019). Spor aktivitesinin özgüven, serotonin ve dopamine etkisi. *International Journal of Social Science*, 2(2), 1-6.
23. Gandevia SC. (2001). Spinal and supraspinal factors in human muscle fatigue. *Physiological reviews*, 81(4), 1725-1789.
24. Martin K., Meeusen R., Thompson KG., Keegan R., & Rattray B. (2018). Mental fatigue impairs endurance performance: a physiological explanation. *Sports Medicine*, 48(9), 2041-2051.
25. Bilgiç R., & Bilgin M. (2016). Ergenlerin cinsiyet ve öğrenim kademesi düzeylerine göre bilişsel esneklik düzeyleri ile karar stratejileri arasındaki ilişkinin incelenmesi. *Uşak Üniversitesi Eğitim Araştırmaları Dergisi*, 2(2), 39-55.
26. Ellis A., & Dryden W. (2007). *The practice of rational emotive behavior therapy*. Springer publishing company.
27. Corey G. (2008). *Psychological guidance, theories and practises of psychotherapy*. (T. Ergene, Translator). Ankara: Mentis Publishing. (Original work was published in 2005). s.311.
28. Mann L., Harmoni R., & Power C. (1989). Adolescent decision-making: The development of competence. *Journal of adolescence*, 12(3), 265-278.
29. Altunkol F. (2011). Üniversite öğrencilerinin bilişsel esneklikleri ile algılanan stres düzeyleri arasındaki ilişkinin incelenmesi. Yüksek Lisans Tezi. Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü, Adana.
30. Bilgin M. (2009b). Bilişsel esnekliği yordayan bazı değişkenler. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, 36(3), 142-157.
31. Stahl L., & Pry R. (2005). Attentional flexibility and perseveration: Developmental aspects in young children. *Child Neuropsychology*, 11(2), 175-189.
32. Karoum F., Chrapusta S. J., & Egan MF. (1994). 3-Methoxytyramine is the major metabolite of released dopamine in the rat frontal cortex: Reassessment of the effects of antipsychotics on the dynamics of dopamine release and metabolism in the frontal cortex, nucleus accumbens, and striatum by a simple two pool model. *Journal of Neurochemistry*, 63(3), 972-979.

THE INFLUENCE OF PERSONALITY TRAITS IN STADIUM MARKETING

A. SELÇUK KÖYLÜOĞLU*, ALİ KELEŞ

Department of Marketing, Selcuk University, 42130, Konya, Turkey.

Corresponding author: selcuk641@gmail.com

ABSTRACT

The main purpose of this study is to examine the effect of personality traits on stadium marketing and customer satisfaction in stadiums. As for the data collection technique applied in the research, the e-questionnaire method that prepared on the internet was used. Two scales were used in practice. In the first stage, personality traits scale was applied to determine the personality traits of the participants. Secondly, the stadium marketing and customer satisfaction questionnaire consists of four dimensions. The scope of the study was limited to university students. A total of 377 students, who continue their education and training in different departments, participated in the research. The reliability and normality analyzes required in the analyzes applied in the study were made. Regression analysis and independent sample t-test, which are parametric due to the normal distribution, were applied in the study. According to the analysis results obtained in the study, there is a high level of positive relationship between personality traits and stadium marketing and customer satisfaction but it is not statistically significant.

KEYWORDS: Stadium Marketing, Personality, Event Marketing, Customer Satisfaction

INTRODUCTION

The concept of sports marketing was first used in Advertising Age magazine in 1978 and has gained significant influence in marketing terminology since then. The winds of change blowing in the world have influenced sports as well as many other fields, and paved the way for the conclusion of this development. Therefore due to its high impact potential, sports not only contained this effect within itself, but also mediated the change of many areas that interact with it.¹⁰ This effect has a unique place in the human psyche. For example, FC Barcelona and Real Madrid match, the two most successful teams of La Liga, means more than a football competition.²⁰ The statements made in this direction show that the scope of sports marketing under the roof of sports economy is wide and this is made up of many stakeholders. One of these stakeholders is stadium marketing. Production activity is not an expression used only for the production of goods, but also for the production of the service. In this respect, the concept of stadium is a sports field equipped to produce sports services. Sports services carried out both nationally and internationally are an economical product. Stadiums, on the other hand, are of vital importance in ensuring the continuity of these services as well as performing them. Blann⁴, argued that sports businesses can only deliver their products to their target audience with such marketing organizations. The "game" is accepted as the main product, as it is a game based on matches, competitions or activities held in stadiums. But there are also helpers who assist in the marketing of this basic product. Many factors such as shows during breaks and breaks before the game starts, food and beverage sales, individual activities contribute to this process. In this case, two features of stadium marketing emerge. While the marketing of sports products structured in stadiums is considered as the first feature, the marketing of sports goods and services and other products that support the marketing of these goods and services is considered as the second feature. So the essence of the statement here is based on the marketing of sports and marketing through sports.¹⁰

Another subject that forms the backbone of the study is personality traits that have a significant influence on consumer behavior.

- Why do some people like to watch sports that involve physical contact (rugby, boxing), while others prefer to watch sports that do not involve physical contact (volleyball, swimming)?
- Why do some people like to participate in individual sports while others prefer team sports?
- Why do some people like to do sports indoors, while others prefer outdoors?

The purpose of this experimental study designed on stadium marketing, which is a subtitle of sports marketing, is to examine the effect of personality traits, which are psychological factors in stadium marketing. After the introduction part, the conceptual framework of the study is given. Subsequently, researches on this subject were scanned. In the methodology part of the study, the research design was created, the experimental study design was constructed and the variables were made ready for use. As data, university students were used because they actively participate in sports activities in stadiums, as well as being good sports followers and displaying different psychological characteristics. The obtained findings were analyzed using SPSS 20 package programs and non-parametric tests, and analysis results were interpreted. As a result, it has been determined that there is no relationship between consumer characteristics and stadium marketing. In this direction, the limitations of the study were also mentioned and suggestions were made for future research on this subject.

LITERATURE

Stadiums are examined under two main headings according to their geometric forms and spatial order. According to their geometric forms, stadiums are lined up as horseshoe, oval and rectangular stadiums, while stadiums are divided into open and closed stadiums according to their spatial order. For example, rectangular stadiums are specially designed for football. Even

recently, stadiums are being built partially or fully closed.¹⁸ When it comes to stadium, it is quite natural that football comes to mind first. Because the fact that football first started in Europe in the 19th century and spread to the whole world over time, brought it far ahead of other sports types and ended the incarnation of stadiums that serve football. Victoria Ground Stadium, which was completed in 1878 in England, is an example only as it was allocated for the use of football.⁹ Apart from sportive activities, today's stadiums have become venues where the audience can spend more time in line with the expectations and needs, which is the main subject of this study. The fact that athletes and spectators become a market element, sporting activities turn into a more entertaining show, hosting organizations such as concerts and cultural activities other than competitions made stadiums look like workplaces.¹²⁻³¹ These statements clearly reveal that stadiums are now a completely commercial commodity and explain how reasonable it is to associate with marketing. The concept of "Sports World" by Smith, his approach to sports in a more holistic way, expressing that participation in sports is an institutional action rather than an individual, is tailored for this discourse.²⁹ The phrase "holistic" should be underlined, because sports directly affect their immediate surroundings as well as indirect effects on their distant environment. For example, when a new stadium is built, tens of thousands of people will spend millions to watch this competition. But the city where the match will be played approaches the issue from a broader perspective. Because the hotels, facilities, restaurants and workplaces in that city will do more business, more employment will be provided and in short, the local economy in particular will gain the macro economy in general. Thus, people whose income increases, by spending these earnings at other points, create a "multiplier effect" in the economy.²³ In the study on the subject, it was concluded that with a new stadium, team earnings increased and income increased.²⁶ This situation can be explained with the following basic profit function as follows: $\pi = R(w, A) - C_0 - C(w)$. Notations in the function; income, matches won, age of the facility where the team plays, independent expenses and dependent expenses. The income increases with the competitions won, but on the other hand, the income decreases with the age of the facility where the home team plays. The concept of personality has been defined in various ways in the literature.⁷⁻²⁴ The American Psychological Association defines personality as "psychological qualities that affect an individual's explicit and latent behavior patterns over time and in different situations." These psychological traits usually point to different personality traits such as behavior. Consequently, personality reflects individual differences, is consistent and persistent, and may change under certain circumstances and influences.¹⁷ Based on this definition, it can be said that researchers see personality as a whole, affecting the physical and psychological processes of the individual, with more dynamic and harmonious characteristics.²⁷ Since many factors affect personality development, this has yielded researchers to develop various models and theories on the subject.²⁷ Studies on personal factors in stadium marketing have been examined in the study literature. As a result of the investigations, the number of studies examining the effect of personal factors on stadium marketing is quite limited in the literature, since stadium marketing is a sub-title of sports marketing and its scope is narrow. In this respect, the present study is important in filling this gap in the literature. Therefore, while reviewing the literature, stadium marketing has been included under the title of sports marketing. It is understood that the studies are carried out by focusing on a dual distinction between those who participate in sports and the audience in line with the concept of consumer in sports.⁵⁻¹⁷⁻²² In the fiction of the literature, firstly sports fans and sports audiences were included, and then sports participants. Although there are opinions suggesting that personality has no connection with participation in sports and being a spectator, research reveals that such a relationship exists. A study that highlights the relationship between sports participation and personality was conducted by Partners. According to the study, golfers describe themselves as responsible and self-confident, with strong family ties, harmonious and intelligent. Although it is a game with a predominant individual aspect, it is also among the results that players see themselves as team players.²⁸ The relationship between sports audience and personality traits has been examined by Chen.⁸ In the research, it has been suggested to include personality traits and motivations as predictors to better understand the fan's behavior on social networking sites. A similar study was conducted by Kim et al.²² According to the results of the research, it was determined that the relationship between the differences in consumption behavior of sports social network sites and personality is more evident. Previous studies on sports fans and audiences have divided sports fan types into demographic,²¹ psychographic¹⁶ and behavioral¹⁵ sections. However, sports management in the academic field mostly focused on demographic variables. Over time, this understanding in the literature has changed and only the use of demographic factors has been criticized for inefficient predictability of future purchasing behavior.¹¹ This has enabled more complicated methods to be used by combining impulsive, demographic and behavioral data for a more effective segmentation basis. The mentioned developments in the literature reflect how important segmentation is in developing and maintaining relationships with heterogeneous sports consumer groups. Most personality studies in the field of sports are related to sports participation² and brand personality practice.³³ The most widely used personality scale in the literature is the Five-Factor Model or Big-Five.¹⁹ According to this model, human personality is evaluated under five basic dimensions: neuroticism, extraversion, open minded to experience, acceptability and conscientiousness.¹³ Mowen,²⁵ found that 62 percent of the variance in sports participation can be estimated by basic personality traits. Another way to be a consumer in sports is to participate in sports. In this respect, people whose profession is related to sports are also sports consumers. Vealey,³² emphasized that personality is important in achieving an effective sports performance, but many researchers argued that this relationship did not yield significant results. However, Vealey,³² contradicts with Allen et al.,² in a related analytical study on athlete personality profile, changes in personality and sports performance development, and personality differences between athletes and people who do not do organized sports.

MATERIALS AND METHODS

In this section, necessary information about the methodology of the study is given. Accordingly, information about the purpose of the research, information about the method and scope and the limitations of the research are given, respectively. The main purpose of this study is to examine the effect of personality traits on stadium marketing and customer satisfaction in stadiums. Within the scope of the study, a sub-purpose was determined for personality traits, stadium marketing and differentiation of customer satisfaction in stadiums according to the men and women who made the evaluation. Considering the studies in the

literature, no similar studies were found for this purpose. It is concluded that the study will guide future studies. As for the data collection technique applied in the research, the e-questionnaire method that prepared on the internet was used. Two scales were used in practice. The personality scale developed by Benet - Martinez and John³ and adapted into Turkish by Sumer and Sumer³⁰ was used. The scale is in five-point Likert type (1: strongly disagree, 5: strongly agree) with 44 items.³⁰ The second, stadium marketing and customer satisfaction survey⁶ consists of four dimensions. The first part of the stadium marketing and customer satisfaction survey includes 17 statements about the physical characteristics of the stadiums, the second part includes 14 statements regarding the services and facilities offered in stadiums, 13 statements regarding sociocultural activities in stadiums, and finally 19 statements regarding the information of the evaluator. High reliability was determined as, 675 for the personality scale used in the study and, 866 for the stadium marketing and customer satisfaction scale. Participants in the study were asked questions about 5-likert in the personality scale, 5-likert in the first and second parts in the stadium marketing and customer satisfaction scale, yes and no in the third part, and the information of the evaluator in the last part. The scope of the study was limited to university students. A total of 377 students, who continue their education and training in different departments, participated in the research. An ethics committee report was received from the relevant university. The analysis of the data obtained through the research was carried out with the SPSS 22 package program. The reliability and normality analyzes required in the analyzes applied in the study were made. Regression analysis and independent sample t-test, which are parametric due to the normal distribution were applied in the study.

RESULTS

Information on the demographic characteristics of the participants, which is the first of the results, is given in Table I.

Table I
Demographic information of the participants

	Variables	N	%
Gender	Male	147	39
	Female	230	61
Income status (Turkish Lira, TL)	500 TL - 1000 TL	286	75,9
	1001 TL - 1500 TL	36	9,5
	1501 TL - 2000 TL	23	6,1
	Above 2001 TL	32	8,5
Do you enjoy playing football?	Yes	178	47,2
	No	199	52,8
Do their preferences for going to stadiums change depending on where the match is held?	Yes	293	77,7
	No	84	22,3
Do the hours of the match affect the frequency of going to the match?	Yes	307	81,4
	No	70	18,6
Does the fact that the place where the match is held is natural grass affect the pleasure of watching?	Yes	237	62,9
	No	140	37,1
Does the stadium's seat heating affect the frequency of going to the match?	Yes	302	80,1
	No	75	19,9
Does having playgrounds where you can leave your children in stadiums affect the frequency of your spouse and child coming to the match?	Yes	312	82,8
	No	65	17,2
Should the stadium seats be all numbered?	Yes	336	89,1
	No	41	10,9
Does the fact that the stadiums are covered affect the frequency of coming to the match?	Yes	280	74,3
	No	97	25,7
Are football-related organizations promoted enough?	Yes	151	40,1
	No	226	59,9
Do you think your ticket is worth the money you paid?	Yes	202	53,4
	No	175	46,4
How many years have you watched football matches in stadiums?	0 – 5 years	329	87,3
	6 – 10 years	41	10,9
	11 – 15 years	0	0

	16 years over	7	1,9
How often do you watch football matches in stadiums?	Once a week	28	7,4
	Every two weeks	21	5,6
	Every three weeks	16	4,2
	Once a month and over	312	82,8
The name of the stadium where you watch football matches?	Konyaspor stadium	235	62,3
	Other	142	37,7
Which team do you support ?	Galatasaray	136	36,1
	Fenerbahçe	102	27,1
	Beşiktaş	65	17,2
	Trabzonspor	1	,3
	Konyaspor	39	10,3
	Other	34	9

Table 1 includes the demographic information of the participants who made the evaluation. Looking at the data in Table 1, individuals participating in the study are seen as 147 (39%) male and 230 (61%) female participants. When looking at the information about the income status, respectively, 75.9% is between 500 TL - 1000 TL, 9.5% is between 1001 TL - 1500 TL, 6.1% is between 1501 TL - 2000 TL and finally 8.5% has an income above 2001 TL. When Table 1 is examined, the responses of the participants to the questions posed by the scale used are 47.2% of the first question yes, 52.8% of them no, 77.2% of the second question yes 22.3% of them no. The 3rd question is 81.4% yes 18.6% no, 4th question 62.9% yes, 37.1% no, 5th question 80.1% yes 19.1% no While 82.8% of the 6th question answered yes, 17.2% answered no, while 89.1% of the 7th question answered yes, 10.9% answered no, while the rate of those who answered yes in the 8th question was 74.3%. Those who answered no are seen as 25.7%. Considering the data of the 9th question, 40.1% answered yes and 59.9% no, while 53.4% answered yes in the 10th question, and 46.4% answered no. Looking at the next questions, the 11th question is "How many years have you watched football games in stadiums?" 87.3% of those who watched for 0 - 5 years, 6 - 10 years were 10.9%, while those who watched for 16 years or more received 1.9%. In the twelfth question, "How often do you watch football matches in stadiums?" Considering the answers given to the question, 7.4% replied that they watch the matches once a week, 5.6% every two weeks, 4.2% once every three weeks, and finally 82.8% once a month or more. "13. Name of the stadium where you watch football matches?" 62.3% of the question was Konyaspor stadium, while the rate of other answer was 37.7%. Apart from the questions in the last scale used, "14th Which team do you support?" it is seen that the responses given respectively are 36.1% Galatasaray, 27.1% Fenerbahçe, 17.2% Beşiktaş, 3% Trabzonspor, 10.3% Konyaspor, while the other answer rate is 9%.

Table 2

Comparison of personality traits and stadium marketing and customer satisfaction according to the gender of the participants

Scales	Gender	N	X	SS	T	P
Personality	Male	147	3,2826	,25983	,269	,788
	Female	230	3,2753	,25689		
Stadium marketing and customer satisfaction	Male	147	2,6642	,28585	,510	,610
	Female	230	2,6490	,27828		

When Table 2 is examined, there is no significant difference between men and women in terms of personality traits in the scale for determining the personality traits of men and women (T .; 269, $p < 0.005$). At the same time, according to the scale that determines personality traits, it is seen that the answers given by men to the questions (X_{avg} 3,282) while the answers given by women (X_{avg} 3,275). Besides, there is no significant difference between men and women in the scale on stadium marketing and customer satisfaction (T .; 510, $p < 0.005$). At the same time, according to the stadium marketing and customer satisfaction scale, it is seen that the answers given by the men to the questions (X_{avg} 2,664), while the answers given by the women (X_{avg} 2,649).

Table 3

Regression Analysis results on the prediction of personality traits on stadium marketing and customer satisfaction

Model	Unstd.Coefficients		Std.Coefficients	t	Sig.
	B	Std.Error			
1	Constant	2,716	,185	14,674	,000

Pers. Chrstc.	-.019	.056	-.017	-.331	.741

$R = .017$; $R^2 = .000$; $F = .110$

Unstd. Coefficients: Unstandardized Coefficients; Std. Coefficients: Standardized Coefficients; Std. Error: Standard Error;

Pers. Chrstc.: Personality characteristics

When Table 3 is examined, there is a high level of positive relationship between personality traits and stadium marketing and customer satisfaction. However, this relationship is not statistically significant ($R = .017$, $R^2 = .000$, $p < 0.05$). According to Table 3, personality traits variable constitutes 0% of the total variance of the stadium marketing and customer satisfaction data of the subjects. According to the T-test results regarding the significance of the regression coefficient, it is seen that personality traits do not have a significant effect ($T = -.331$, $p < 0.05$). Looking at the regression analysis table in Table 3, it is possible to say that personality traits have a "-.019" effect on stadium marketing and customer satisfaction according to the data in the table. The regression equation to be created in line with these data;

Personality Traits = $-.019 \times \text{Stadium Marketing and Customer Satisfaction} + 2.716$.

DISCUSSION

According to the analysis results obtained in the study, there is a high level of positive relationship between personality traits and stadium marketing and customer satisfaction. However, this relationship is not statistically significant. According to the t-test results regarding the significance of the regression coefficient, it is seen that personality traits do not have a significant effect. According to the results of this analysis, it was revealed that the personality traits were not related to the situations people encountered in stadiums and the issues they experienced in terms of satisfaction. In other words, it is concluded that stadium marketing and customer satisfaction do not have a direct impact on the work to be done in line with the personality traits, therefore, improvements related to other parameters should be made in the arrangements and works in stadiums according to personality characteristics.³²⁻³³ Looking at some of the findings in the research, according to the answers given to some questions asked to the participants on stadium marketing and customer satisfaction, do the preferences of going to the stadiums change according to the place of the match? 77.7% yes answer to the question, Does the time the match is played affect your frequency of going to the match? The answer is 81.4% yes to the question, Does the fact that the stadium seats can be heated affect your arrival frequency? The answer is yes with a rate of 80.1%. Does the presence of playgrounds in the stadiums where you can leave your children affect the frequency of your spouse and child coming to the match? As for the question of 82.8% yes, should all stadium seats be numbered? The answer is yes as 89.1% to the question, Does the fact that the stadiums are covered affect your arrival frequency? 74.3% yes answer, Are football-related organizations well-promoted? 59.9% answered no to the question, How many years have you watched football matches in stadiums? How often do you watch football matches in stadiums, with a rate of 87.3% for 0-5 years? In the question, the rate of once a month and above was determined to be 82.8%. The interpretation to be made in line with these findings is that although the rate of going to stadiums between 0-5 years is likely to be high considering that the participants are university students, the personality traits are not effective in line with the data obtained in the research, but according to the answers received in line with the questions asked, the participants It is seen that the time, location, accessibility, physical properties of the stadiums are at an important point in increasing customer satisfaction.²⁻⁵ In addition, it has been determined that the sports organizations in the country in terms of promotion are seen as inadequate by the university students, the most important young segment, who do not make the necessary promotion.

CONCLUSION

Stadium marketing is a sub-title of sports marketing and its scope is narrow, causing some difficulties in terms of resources in the literature. Especially, this limitation was felt more in relation to personality traits. On the other hand, the study practice was designed for university students as they are both good sports spectators and active sports participants, and a university was chosen as a sample. Therefore, the result of the study connects university students involved in experimental design. In addition, diversification of demographic characteristics (age, educational status, occupation, etc.) will yield different results. Personality is an important factor in sports performance. For future research proposals, more research is needed to reveal important details of this relationship by relating it to other factors. In addition, although there are studies related to sports participation and personality traits,¹ states that critical studies are needed on this subject. According to Aidman, while personality affects long-term success, it is not related to short-term success. On the other hand, although studies are carried out on the common personality traits of athletes who have achieved important performances, this gap is still noticeable.¹⁴ Studies to eliminate this gap will support the literature. Finally, since there are very limited studies in which the personality traits of sports audiences are related, the future studies will contribute to the elimination of this constraint.

REFERENCES

1. Aidman, E. V., (2007). Attribute-based selection for success: The role of personality attributes in long term predictions of achievement in sport, in The Journal of the American Board of Sport Psychology, 3, 1-18.
2. Allen, M. S., & Laborde, S. (2014). The role of personality in sport and physical activity. Current Directions in Psychological Science, 23, 460-465.
3. Benet-Martinez, V. & John, O. P. (1998). "Los Cinco Grandes Across Cultures and Ethnic Groups: Multitrait Multimethod Analyses of the Big Five in Spanish and English." American Psychological Association, 75(3): 729-750.
4. Blann FW. (1998). Contemporary Sport Management. (Editörler: J.B. Parks, B.R.K Zanger and J. Quarterman) "Sport Marketing". Champaign: Human Kinetic.

5. Buhas, S. D. and Stance, L. (2017). The Relationship between Personality and Physical Activity, *GeoSport for Society*, 7(2), 72-77.
6. Bulgurcuoglu, A. N. (2014). Stadium marketing and customer happiness in stadiums. Unpublished doctoral thesis, Marmara University, Istanbul.
7. Butler, W.E. (1986). Personality, <http://www.hermetics.org/personality.html>, 27.06.2019.
8. Chen, X. (2016). The influences of personality and motivation on the sharing of misinformation on social media. *iConference 2016 Proceeding*. Retrieved from <https://www.ideals.illinois.edu/bitstream/handle/2142/89327/Chen145.pdf?sequence=1>
9. Cooper, G. (2005). "The Story of Victoria Ground". *The Oatcake*. <http://web.archive.org/web/20070508191208/http://stokecity.rivals.net/default.asp?sid=944&p=2&tid=8382833>. 03.06.2020
10. da Silva, E. C. and Las Casas, A. L. (2017). Sports Marketing Plan: An Alternative Framework for Sports Club, *International Journal of Marketing Studies*; 9(4), 15-28.
11. Day, G. (1990). *Market driven strategy: Processes for creating value*. New York, NY: Free Press.
12. Debord, G. (1996). *La Société du Spectacle*, [https://fr.wikipedia.org/wiki/La_Soci%C3%A9t%C3%A9_du_spectacle_\(livre\)](https://fr.wikipedia.org/wiki/La_Soci%C3%A9t%C3%A9_du_spectacle_(livre)) (03.06.2020)
13. Digman, J. M. (2002). Historical antecedents of the Five-Factor Model. In P. T. Costa & T. A. Widiger (Eds.), *Personality disorders and the Five-Factor Model of personality* (pp. 3–7). Washington, DC: American Psychological Association.
14. Dragos, P., (2015). Aspects regarding efficiency at work in certain Sport organisations, in *Geosport for Society*, 2 (1), 21-26.
15. Dwyer, B., & Drayer, J. (2010). Fantasy sport consumer segmentation: An investigation into the differing consumption modes of fantasy football participants, *Sport Marketing Quarterly*, 19, 207– 216.
16. Dwyer, B., & Kim, Y. (2011). For love or money: Exploring and developing a motivational scale for fantasy football participation. *Journal of Sport Management*, 25, 70–83.
17. Funk, D. C., Alexandris, K. and McDonald, H. (2016). *Sport Consumer Behaviour*, 1st edition, Routledge, London & New York.
18. Gurel, E. and Akkoc, U. (2011). Stadium: Similarities, parallelisms and projections, *The Journal of International Social Research*, 4(19), 346-370.
19. Hughes, D. J., Rowe, M., Batey, M., & Lee, A. (2012). A tale of two sites: Twitter vs. Facebook and the personality predictors of social media usage. *Computers in Human Behavior*, 28, 561–569.
20. <https://www.laliga.com/en-GB/news/el-clasico-poised-to-break-records-again-with-its-coverage-and-impact> (2020.05.15)
21. James, J. D., & Ridinger, L. L. (2002). Female and male sport fans: A comparison of sport Consumption motives. *Journal of Sport Behavior*, 25, 260–278.
22. Kim, Y., Kim, S. & Kim, Y.M. (2017). Big-Five Personality and Motivations Associated with Sport Team Social Networking Site Usage: A Cluster Analysis Approach, *Journal of Global Sport Management*, 2(4), 250-274, Doi: 10.1080/24704067.2017.1389249
23. Leeds, M. A., Allmen, P.V. & Matheson, V. A. (2018). *The economics of sports*, Taylor & Francis, 6. edition, New York, USA.
24. McCrae, R.R., Costa, P.T. (1989). "Reinterpreting the Myers-Briggs type indicator from the perspective of the five-factor model of personality", *Journal of Personality*, 57, 17-40.
25. Mowen, J. C. (2000). *The 3M model of motivation and personality: Theory and empirical applications to consumer behavior*. Norwell, MA: Kluwer Academic Press.
26. Quinn, K. Bursick, P., Borick, C. and Raethz L. (2003). Do new digs mean more wins? The relationship between a new venue and a Professional sports team's competitive success, *Journal of Sports Economics*, 4(3), 167-182.
27. Ryckman, R. M. (2008). *Theories of Personality* (9. Edition). California: Thomson Wadsworth.
28. Shank, M. D. and Lyberger, M.R. (2015). *Sports Marketing*, 5th. edition, Routledge, New York.
29. Smith, A.C.T. (2008). *Introduction to Sport Marketing*. Elsevier (Butterworth-Heinemann), Burlington, MA.
30. Sumer, N. and Sumer, H. C. (2005). Five factor personality traits scale (Unpublished work).
31. Taylor, P. (1989). *The hillsborough stadium disaster*, Interim Report, London.
32. Vealey, R. S., (2002). Personality and sport behavior, in T. S. Horn (Ed.), *Advances in sport psychology* (pp. 43-74). Champaign, Human Kinetics.
33. Walsh, P., Clavio, G., Lovell, M. D., & Blaszk, M. (2013). Differences in event brand personality between social media users and non-users. *Sport Marketing Quarterly*, 22, 214–223.

THE EFFECT OF AEROBIC EXERCISE ON SOME BLOOD PARAMETERS OF PARTICIPANT WITH AUTISM

Zeynep YILDIRIM

Bartın University Faculty of Sport Sciences, Bartın/TURKEY, <https://orcid.org/0000-0002-8924-3759>

Corresponding author: zeynep.erol1989@gmail.com

ABSTRACT

This study aimed to determine the effect of aerobic exercise applied to participant with autism spectrum disorder (ASD) on some blood parameters. Based on this aim, a 13-year-old male with diagnosed autism spectrum disorder and who had not participated in any exercise program before was applied a total of 40 hours of the exercise program for 5 days a week for 8 weeks, and after this program, the effects of some blood parameters were investigated. The single-subject case analysis method, one of the scientific research techniques, was used in the study, and the pre-test and post-test modelling of the individual participating in the exercise program was performed. In the research, it was found that a positive relationship was observed between liver enzymes and exercise as ALT; Pre-test: 10.2 U/L Post-test: 20 U/L, AST; Pre-test: 28 U/L, Post-test: 33 U/L. Sodium; Pre-test: 120 mmol/L Post-test: 140 mmol/L Urea; Pre-test: 38 mg/dL, Post-test: 27 mg/dL, Uric Acid; Pre-test: 4.7 mg/dL, Post-test: 4.9 mg/dL in this reference range where toxin values were examined, it was determined that exercise had beneficial effects. Moreover, it was found that exercise had a positive effect mostly on thyroid hormone values as T3; Pre-test: 5.82 pg/mL Post-test: 4.99 pg/mL, T4; Pre-test: 13.96 pg/mL, Post-test: 10.82 pg/mL TSH; Pre-test: 5.01 mU/L Post-test: 4.8 mU/L. As a result, an eight-week aerobic exercise program applied to a participant with autism spectrum disorder and had a positive effect on the thyroid values of the participant.

Keywords: Autism, Blood Parameters, Aerobic Exercise

INTRODUCTION

Pervasive developmental disorder (PDD) can be defined as a neurological disorder that causes a delay in the developmental stages of multiple basic functions such as communication and socialization, and through all types of PDD can be diagnosed up to the age of three, social, communication and interaction problems can observe in individuals. Generally, parents notice this situation with problems such as not being able to play games with their children's peers, inability to initiate communication and largely delay in language development. Pervasive Developmental Disorders (PDD) is a term that includes a disorder associated with difficulties in social interaction, emotional confusion, abstract and concrete communication, and symbolic game.¹⁵ The diagnoses of autistic disorder, Asperger syndrome, and common developmental disorder (PDD-NOS), which are among the pervasive developmental disorder group, describe conditions in which mild to severe disability and impairment are observed in three areas: social interaction, communication, and limited and repetitive behaviours.¹¹ The terms "Autism" and "Autistic" are derived from the Greek word "otos" that have meanings of "self, essence, self-like". The definition of autistic disorder was first made by the American child psychiatrist Leo Kanner in 1943. In this definition, the term "Autistic Disorder of Emotional Attachment" was used for the first time.¹⁵ Although it has been a long time since the concept of autism defined by Leo Kanner in 1943, it is still confronted with unknowns and many unidentified situations. Many studies and numerous researches have not been sufficient to fully describe the cause of autism. The fact that education programs applied to participant with autism reflect different results in each participant and this supports that autism is a complex phenomenon. Behavioural problems in autism can generally be divided into two types: externalized behaviours and internalized behaviours. Externalized behaviours are generally determined by the presence of one or more of the situations such as denial of duty, verbal aggression, physical aggression, aggression towards other persons or physical property, and self-harm. Externalized behaviours are defined as behaviours that can be clearly distinguished in the educational environment and are negatively evaluated by the society. Cognitive Rigidity (difficulty in changing mental expectations), obsessive thought patterns, problems with unmet expectations, and one or more of the problems related to changes in routines.⁴ Internalized behaviours may occur with developmental or behavioural problems such as anxiety disorder, attention deficit and hyperactivity, depression, learning disorders, mental disorder and obsessive behaviours in individuals with ASD. As the name suggests, internalized behaviours are internal to the person. In other words, those are situations where internal problems do not appear outside. Internalized behaviours can be a major obstacle for the individual who experiences them. As a result, internalized behaviours are often not recognized unless they exert negative effects by being reflected in them. However, waiting for the behaviours to reflect outside harms the child's self-esteem.⁵ In addition to the psychological and social problems in autism as developmental and behavioural, there are also physiological problems. Obesity problems are experienced especially due to sedentary life and thyroid disorder. Moreover, insulin resistance in individuals, hormone disorders, vitamin deficiencies, intestinal microbiota problems and problems in the kidneys are among the problems with toxic accumulation. It is necessary to evaluate the concept of exercise separately from physical activity and sports. Exercise, unlike physical activity, is accompanied by a regular program and aims at treatment, rehabilitation, physical and mental recovery. The difference from the concept of sports is that it does not include performance, without the need to struggle and to increase the power of success and there are no expectations such as increasing the power of success. Exercise types are basically divided into three groups as aerobic, muscle strengthening and stretching exercises. Aerobic exercise can be defined as rhythmic and dynamic movements in which large muscle groups' work. It can affect stamina and resistance in the body. Strengthening exercises are exercises that increase the strength and endurance of the muscle by applying resistance. Stretching exercises are applied with external and internal force to increase muscle flexibility or the rate of motion of the joint, increasing the mobility of the connective tissue and extending the muscle fibers.²

In addition to the sociological and psychological dimensions of exercise in autism, it is known that it helps to regulate the physical changes caused by the individual's sedentary life and the desire to overeat. In this study, the physiological importance of exercise in individuals with autism spectrum disorder will be emphasized.

METHOD

Research Method

The case analysis method, one of the scientific research techniques, was used in the study, and the pre-test and post-test modelling of the individual participating in the exercise program was performed.

Universe and sample

This study was carried out with a 13-year-old male with autism spectrum disorder, 1.53 cm in height and 55 kg body weight, living in Bartın, who was thought to represent the universe rather than the entire universe. He was diagnosed with autism spectrum disorder at the age of 2, and he was receiving special education support since the age of 3. However, he was never participated in an exercise program before. It was determined that he was obese and overweight due to his sedentary life. In terms of the validity and reliability of the research, the education he had except from the research and received research subjects during were evaluated separately. Besides, no participant nutrition program was applied and the participant continued his routine nutrition.

Data Collection

In the study, 8-week aerobic exercise was applied to the participant for data collection. The applied exercise program includes a total of 40 hours, 1 hour a day, 5 days a week. In Bartın State Hospital, the participant had ALT, AST, Sodium, Urea, Uric Acid, T3, T4, TSH, blood and urine value measurements were taken. The same measurements were taken again after the 8-week exercise program. While taking these values, it was paid attention that the participant did not take nutritional supplements for 12 hours.

8-week exercise program	Süre	Exercises
Start	15 min.	10 minutes of moderate speed running 5 minutes stretching of all body muscles
Treadmill Workout	20 min.	Low intensity running on the Diesel Fitness 500 treadmill
Activity	15 min.	Moving educational games
Finish	10 min.	5 minutes of low-speed walking 5 minutes of cool-down exercise

Analysis of Data

In the analysis of the data, pre-test and post-test comparison of blood measurements taken from the participant was made. Besides, while making this comparison, the age, gender and developmental status of the participant were taken into consideration, the required value ranges were determined and the pre-test post-test examination was made accordingly.

RESULTS

Pretest-Posttest Results of Blood Parameters and Urine Tests of the Participant

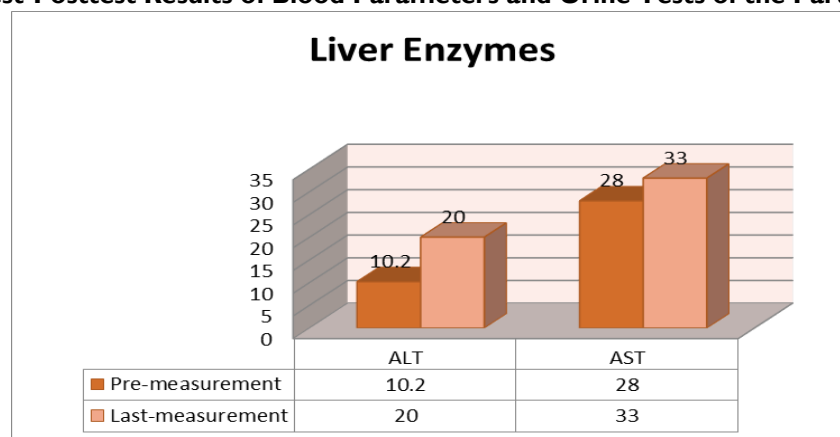


Fig. 1: ALT and AST blood values

Table 1 consisted of the pre-test and post-test results of the liver enzyme values Alanine transaminase (ALT) and aspartate transaminase (AST). The normal distribution rates of these values were determined based on the age and developmental characteristics of the participant, and the differences between the measurement results of these two values before and after exercise were examined according to these evaluation rates; ALT value was considered as a normal distribution ratio of 0-45 U/L. Before the exercise, the Alanine Transaminase value of the participant with autism determined as 10.2 U/L and after the eight-week exercise program blood result was determined as 20 U/L. With this result, it was determined that the participant was among the normal distribution rates before exercise, but this value increased a little more with the exercise. Normal distribution reference range of AST value was calculated as 15-60 U/L. Aspartate transaminase value was found to be 28 U/L according to the blood measurement results of the participant before the exercise, and it was determined that the AST value of the participant before exercise was within the normal range reference range. After the exercise, this value was reached 33 U/L and an increase in the AST value was found with the applied aerobic exercise program.

Although the pre-test value of this exercise program was within the normal reference range in the participant, it was determined that there was an increase in the post-test values and it provided a benefit in terms of liver enzyme values.

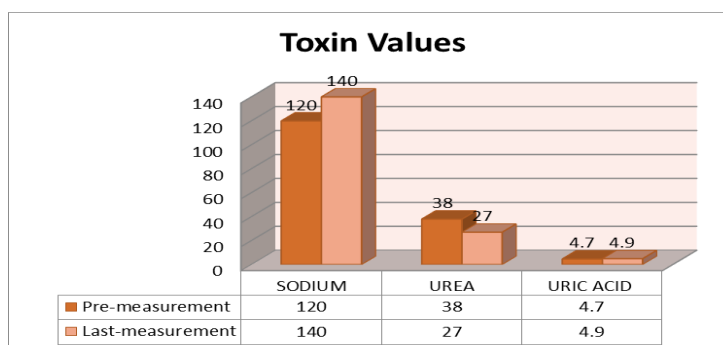


Fig. 2: Sodium, Urea, Uric Acid and Urine Values

Table 2 consisted of the pre-test values taken before exercise for Sodium, Urea and Uric Acid values, which provide the excretion of harmful substances accumulated in the body, and the post-test value results obtained after exercise. The participant with autism spectrum disorder was examined according to the reference range determined by considering the developmental characteristics and age, and the effects of exercise were examined. According to this examination; The reference range of sodium value, which regulated the water balance in the body and was important for the development of nerve and muscle functions, was determined as 138-145 mmol/L. According to this reference range, it was found that the value of the participant was 120 mmol/L and low before exercise. With the exercise with aerobic content, this value increased to 140 mmol/L and was within the reference range. In this context, there was a positive relationship between exercise and sodium value. The reference range of urea value, which supported the removal of harmful toxins accumulated in the body, was 15-35 mg/dL according to the age and developmental characteristics of the participant. According to this reference interval, it was determined that the urea value of the participant before exercise was quite high with 38 mg/dL. After the exercise, it was determined that this value decreased to 27 mg/dL and was within the reference range. In this case, it was determined that exercise can have a positive effect on urea value. When the uric acid value, which was responsible for waste destruction, was examined, it was determined that the reference range was 2-5.5 mg/dL. It was found that the pre-test value of the participant was 4.7 mg/dL and the post-test value was 4.9 mg/dL. It was determined that the uric acid value of the participant was in the reference range before and after the exercise and there was a change with aerobic exercise.

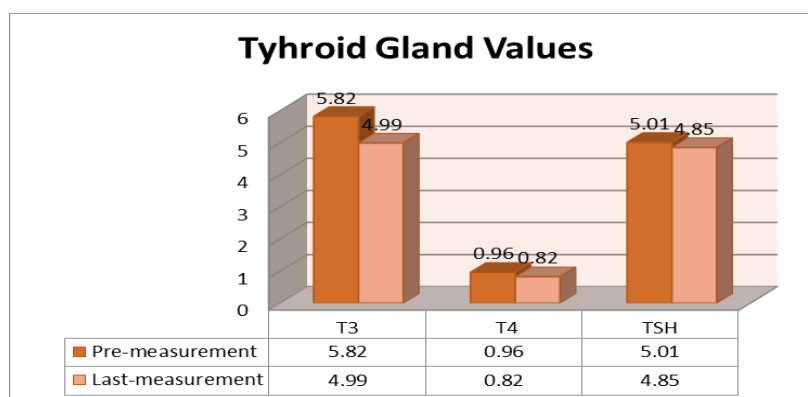


Fig. 3: T3, T4, TSH Blood Values

Table 3 consisted of the results of thyroid gland values from blood measurements taken before and after exercise of the participant. These results were evaluated according to the reference range that emerged by determining the age and developmental characteristics of the participant. The reference range of the Triiodothyronine Free T3 value was determined to be 3.35-4.8 pg/mL. When these reference values were taken into consideration, it was seen that the T3 value was quite higher than the value it should be (5.82 pg/mL) according to the blood results taken before the exercise. When the blood measurements after exercise were examined, it was found that this value decreased and was close to the reference range (4.99 pg / mL). In this case, it was concluded that aerobic exercise had a positive effect on free T3 value. The reference range for the Thyroxine Free T4 value was determined to be 6.1-11.2 pg/mL. In the study, it was determined that the pre-test value of the participant was higher than the average value range with 13.96 pg/mL. After the exercise program, this value was determined to be 10.82 pg/mL and a decrease was found. This showed that there was a positive correlation between exercise and free T4 value. When the Thyrotropin TSH value was examined, it was determined that the reference value range was 0.5-4.5 mU/L. According to the blood measurements taken before the exercise, it was determined that the participant was in the range of 5.01 mU/L, but this value should be higher than the reference weight, and after the exercise, this value decreased to 4.8 mU/L and reached a level close to the reference range. The applied aerobic exercise program had a maximum positive effect on thyroid values. It was determined that the overweight of the participant was due to insufficient secretion of thyroid hormone values and the decrease in thyroid values also caused weight reduction.

DISCUSSION

In the study, an 8-week exercise program with aerobic content was applied to a 13-year-old male participant with autism spectrum disorder, and some blood and urine parameters and bodyweight of the participant were examined. ALT, AST, Sodium, Urea, Uric Acid, T3, T4, TSH, blood and urine values were measured and taken before exercise. The same measurements were taken again after the 8-week exercise program. Moreover, pre-test and post-test measurements of the participant's body weight were taken with 0.1 precision scale. Enzymes known as liver function tests were aspartate transaminase (AST) and alanine transaminase (ALT). When the hepatocyte cell membrane was damaged, these enzymes entered the bloodstream. AST and ALT were also found in skeletal and cardiac muscle and maybe several times more than the normal in muscle damage, excessive exercise, polymyositis, and hypothyroidism.¹⁰⁻¹³ The pre-test and post-test measurement results of Alanine transaminase (ALT) and aspartate transaminase (AST) values, which were liver enzyme values, were examined with exercise. The normal distribution rates of these values were determined based on the age and developmental characteristics of the participant, and the differences between the measurement results of these two values before and after exercise were examined according to these distribution rates. ALT value was considered as a normal distribution ratio of 0-45 U/L. Before the exercise, the Alanine Transaminase value of the participant with autism increased to 20 U/L after the eight-week exercise program, whose blood result was determined as 10.2 U / L. With this result, it was determined that the participant was among the normal distribution rates before exercise, but this value increased a little more with exercise. Normal distribution reference range of AST value was calculated as 15-60 U/L. Normal distribution reference range of AST value was calculated as 15-60 U/L. Aspartate transaminase value was found to be 28 U/L according to the blood measurement results of the participant before the exercise, and it was determined that the AST value of the participant before exercise was within the normal range reference range. After the exercise, this value was reached 33 U/L and an increase in the AST value was found with the applied aerobic exercise program. Although the pre-test value of this exercise program was within the normal reference range in the participant, it was determined that there was an increase in the post-test values and it provided a benefit in terms of liver enzyme values. When the literature is examined, in the study conducted by Mashiko et al. In 2004, it was stated that there was a significant increase in ALT and AST levels after the training program applied to athletes during the 20-day camp period, and it was parallel to this study. In the study conducted by Su et al. in 2001, they found that there was a significant increase in ALT and AST values at the end of a 5-week training program applied to 16 male and 8 female judoists. In a study conducted by Saka in 2005, it was reported that there was a statistically significant increase in ALT and AST levels after acute exercise on 12 sedentary male subjects with a mean age of 25. In the study conducted by Wu et al. In 2004, it was reported that ultramarathon athletes observed a significant increase in ALT and AST values before and after the race. In the study conducted by Rosmarin et al. In 1993, it was reported that the increase in the intensity and duration of exercise generally increased ALT and AST levels. The pre-test values were taken before exercise for Sodium, Urea and Uric Acid values, which provide the excretion of harmful substances accumulated in the body, and the post-test value results obtained after exercise. According to this reference range, it was found that the value of the participant was 120 mmol/L and low before exercise. With the exercise with aerobic content, this value increased to 140 mmol/L and was within the reference range. In this context, there was a positive relationship between exercise and sodium value. The reference range of urea value, which supported the removal of harmful toxins accumulated in the body, was 15-35 mg/dL according to the age and developmental characteristics of the participant. According to this reference interval, it was determined that the urea value of the participant before exercise was quite high with 38 mg/dL. After the exercise, it was determined that this value decreased to 27 mg/dL and was within the reference range. In this case, it was determined that exercise can have a positive effect on urea value. When the uric acid value, which was responsible for waste destruction, was examined, it was determined that the reference range was 2-5.5 mg/dL. It was found that the pre-test value of the participant was 4.7 mg/dL and the post-test value was 4.9 mg/dL. It was determined that the uric acid value of the participant was in the reference range before and after the exercise and there was a change with aerobic exercise. In the study conducted by Su et al. In 2001, 16 male and 8 female judoists were applied for a 5-week training program and at the end showed an increase in Urea levels. In the study conducted by Mashiko et al. In 2004, they claimed that they recorded a significant increase in Urea values from blood samples taken before and after 20 days of camp 53 applied to Rugby players at the end of the study, they found that there was an increase in Urea levels. Ergün et al. (2006) formed 3 experimental groups of 10 people each and applied endurance training of different aerobic qualities for 12 weeks. At the end of the study, they found that there was an increase in Urea levels. The results of thyroid gland values from blood measurements taken and examined before and after exercise of the participant. These results were evaluated according to the reference range that emerged by determining the age and developmental characteristics of the participant. The reference range of the Triiodothyronine Free T3 value was determined to be 3.35-4.8 pg/mL. When these reference values were taken into consideration, it was seen that the T3 value was quite higher than the value it should be according to the blood results taken before the exercise. When the blood measurements after exercise were examined, it was found that this value decreased and was close to the reference range. In this case, it was concluded that aerobic exercise had a positive effect on free T3 value. The reference range for the Thyroxine Free T4 value was determined to be 6.1-11.2 pg/mL. In the study, it was determined that the pre-test value of the participant was higher than the average value range with 13.96 pg/mL. After the exercise program, this value was determined to be 10.82 pg/mL and a decrease was found. This showed that there was a positive correlation between exercise and free T4 value. When the Thyrotropin TSH value was examined, it was determined that the reference value range was 0.5-4.5 mU/L. According to the blood measurements taken before the exercise, it was determined that the participant was in the range of 5.01 mU/L, but this value should be higher than the reference weight, and after the exercise, this value decreased to 4.8 mU/L and reached a level close to the reference range. The applied aerobic exercise program had a maximum positive effect on thyroid values. It was determined that the overweight of the participant was due to insufficient secretion of thyroid hormone values and the decrease in thyroid values also caused weight reduction. The results of height and weight measurement determined by using precise measurement tools were examined. The mean height and weight of the participant was determined to be 157.7 cm/49.8 according to his age. According to these mean values, the mean height of the participant was considered normal, while the weight ratio was determined to be high before exercise. After the 8-week aerobic exercise program, an expected level of weight reduction was observed in the participant. It was determined that

there was a positive relationship between aerobic exercise applied to the participant with autism spectrum disorder and body weight. In the study conducted by Szmedra et al. in 1998, 7 women with an average age of 21.0 ± 0.8 years were applied treadmill exercise for 6 weeks. They stated that these results were statistically significant. This study gives similar results to our study. In the study conducted by Kerrie et al. in 2001, 24 women with hypertension, who were at the age of 55 and in the menopause period, applied 30 minutes of moderate-intensity walking exercise for 24 weeks. After 24 weeks of exercise, they recorded a 1.3 kg reduction in body weight. In the study conducted by Carol et al. In 1992, they investigated the effects of aerobic dance and jogging exercise on performance on 60 men and women aged between 24 and 48 years. They divided the subjects into two groups and applied the aerobic dance program to one group and the jogging exercise to the other group for 8 weeks. At the end of the study, they could not find a significant difference in body weight in the two groups. In the study performed by Mertens et al. in 1998, they applied a 12-month daily walking program to 8 obese men and 4 women who had myocardial infarction with an average age of 54 ± 9 years. At the end of the exercise, the bodyweight of the women increased from 70.7 kg to 65.6 kg, body fat percentage from 38.3 to 35.2, body mass index from 27.2 ± 1.3 kg/m² to 25.2 ± 1.7 kg/m². Total-K decreased from 5.89 mmol/L to 5.80 mmol/L, lean body weight increased from 41.6 kg to 42.2 kg. Triglyceride, HDL-C and LDL-C were not changed. In the study conducted by Amano et al. in 2001, obese men and women were applied 30 minutes of aerobic exercise for 3 days a week to 12 weeks. Body weights of the participants before exercise was 74.1 ± 2.6 kg, after exercise was 70.3 ± 2.9 kg, body mass indexes before exercise 27.3 ± 0.4 kg / m², after exercise 25.9 ± 0.5 kg / m². Body fat percentage before exercise was $29.6 \pm 1.3\%$ after exercise was $26.6 \pm 1.3\%$, fat mass before exercise was 21.7 ± 0.9 kg after exercise was 18.6 ± 1.0 kg. It was found that lean body weight was 52.4 ± 2.5 kg before exercise and 51.7 ± 2.6 kg after exercise and a significant decrease was found compared to pre-exercise.

CONCLUSION

As a result, an eight-week aerobic exercise program applied to a participant with autism spectrum disorder had a positive effect on the thyroid of the participant, as well as on the participant's endocrine system values, liver enzymes and vitamin values. It was suggested that there were no similar studies on individuals with autism in the literature, by increasing such studies in this field and contributing to the elimination of physiological problems experienced by disabled individuals due to their inactive lives.

REFERENCES

1. Amano, M., Kanda, T.H., & Maritani, T., (2001): Exercise Training and Autonomic Nervous System Activity in Obese Individuals, *Medicine Science In Sports Exercise*, 33(8):1287 –1291.
2. Ardiç F., (2014): Exercise Prescription, *The Turkish Journal of Physical Medicine and Rehabilitation*, 60(2).
3. Carol, E.G., Julie, S., McKinney, M.S., Richard, A., & Carleton, M.D., (1992): Is Aerobik Dance an Effective Alternative to Walk – Jog Exercise Trainnig, *The Journal of Sports Medicine and Physical Fitness*, 32(2):136 –141.
4. Coplan, J., (2010): Making sense of autistic spectrum disorders: Creating the brightest future for your child with ASD by finding the best treatment options (Chapter 12: Behavior management and psychopharmacology). New York: Bantam-Dell.
5. Cooper, S.A., Smiley, E., Jackson, A., Finlayson, J., Allan, L., & Mantry, D. (2009): Adults with intellectual disabilities: Prevalence, incidence and remission of aggressive behaviour and related factors. *Journal of Intellectual Disability Research*, 53(3), 217– 232
6. Ergün, M., Tengiz, I., Türk, U., Senisik, S., Alioglu, E., Yüksel, O., Ercan, E., & Islegen, C. (2006): The Effect Of Long Term Regular Exercise on Endothelial Functions, Inflammatory and Thrombotic Activity in Middle Aged, Healthy Men. *Journal Of Sports Science and Medicine*, 5: 266 – 275.
7. Kerrie, L., Edward, T., Howley-David, R., Bassett, J.R., & Dixie L., (2001): Increasing Daily Walking Lowers Blood Pressure in Postmenopausal Woman, *Medicine Science In Sports Exercise*, 33(11):1825 –1831.
8. Mashiko, T., Umeda, T., Nakaji, S., & Sugawara, K., (2004): Effects Of Exercise On The Physical Condition Ofcollege Rugby Players During Summer Training Camp Br J Sports Med.:38:186–190.
9. Mertens, D.J., Kavanagh, T., Campbell, R.B., & Shephard, R.J., (1998): Exercise Without Dietary Restriction as a Means to Long-Term Fat Loss in The Obese Cardiac Patient, *The Journal of Sports Medicine and Physical Fitness*, 38(4):310–316.
10. Nathwani, R.A., Pais, S., Reynolds, T.B., & Kaplowitz, N. (2005): Serum Alanine Aminotransferase İn Skeletal Muscle Diseases, *Hepatology*, 41(2)
11. Özkaya, B.T., (2013): Transition from Pervasive Developmental Disorders to Autism Spectrum Disorder: Proposed Changes for the Upcoming DSM-5, *Current Approaches in Psychiatry*, 5(2):127-139, doi:10.5455/cap.20130509.
12. Rosmarin, M., Beard, M.J., & Robbins, S.W. (1993): Serum Enzyme Activities İn Individuals With Different Levels Of Physical Fitness. *Journal Of Sports Medicine and Physical Fitness (J. Sports Med. Phys. Fitness)*, 33(3):252-257.
13. Saha, B., & Marti, C., (2002): Alteration Of Serum Enzymes in Primary Hypothyroidism, *Clinical Chemistry and Laboratory Medicine : Cclm / Fescc*, 40(6):609-611
14. Saka, T., (2005): Diz Ekstansör ve Dirsek Fleksör Kas Gruplarının Eksentrik Karakterli Egzersiz ile Oluşturulan Kas Hasarı Yanıtları, Uludağ Üniversitesi, Master thesis, Bursa.
15. Sherrill, C., (2007): The passion of Science : Research and creativity in adapted physical activity, *Sobama Journal*, 12(1), 1-5
16. Su, Y., Lin, C., Chen, K., Lee, S., Lin, J., Tsai, C., Chou, Y., & Lin, J., (2001): Effects Of Huangqi Jianzhong Tang on Hematological and Biochemical Parameters in Judo Athletes, *Acta Pharmacol Sin*, 22:1154-8.
17. Szmedra, L., Lemura, L.M., & Shearn, W.M., (1998): Exercise Tolerance, Body Composition and Blood Lipids in Obese African-American Woman Following Short-Term Training, *The Journal of Sports Medicine and Physical Fitness*, 38: –65.
18. Wu, H., Chen, K., Shee, B., Huang, Y., & Yang, R., (2004): Effects Of Ultra Marathon on Biochemical and Hematological Parameters, 10(18):2711

ACUTE EFFECTS OF YO-YO INTERMITTENT RECOVERY TEST LEVEL I (YO-YOIRI) PERFORMED IN THE MORNING AND EVENING ON BIOCHEMICAL PARAMETERS

Müşerref DORUK, Ayşegül YAPICI ÖKSÜZOĞLU*, Gülin FINDIKOĞLU ERGİN, Engin Güneş ATABAŞ

Pamukkale University, Faculty of Sports Sciences, Denizli, Turkey

<https://orcid.org/0000-0003-4243-5507>

Corresponding author: ayapici@msn.com

ABSTRACT

In the present study, we investigated possible alterations biochemical parameters in response to Yo-Yo intermittent recovery test level I (Yo-YoIRI) which is currently used to assess endurance performance, in soccer players. Thirteen soccer player volunteers from Tavasbirlik Spor soccer team who played in the Denizli Super Amateur league participated voluntarily. Yo-YoIRI test was applied to the athletes on two different days, morning and evening. Blood samples were collected before, during and immediately after test. During the test, the total distance was recorded. Lactate values were measured with blood from the earlobe. Glucose, triglyceride, VLDL, HDL, LDL, CK, AST, ACTH, Cortisol, T3, T4, TSH, GH, Total cholesterol, Insulin, C-Peptide measurements were made in biochemical measurements. As a result, a statistically significant difference was found between the morning and evening values biochemical parameters ($p < 0.05$). There was a statistically significant difference between the total distance and blood lactate values in the morning and evening measurements ($p < 0.05$). As a conclusion, it can be said that the endurance tests in soccer players are more effective in terms of performance in the evening hours.

Keywords: Yo-Yo intermittent recovery test level I (Yo-YoIRI), Biochemical parameters, Exercise

INTRODUCTION

Soccer is an aerobic-based anaerobic sport including submaximal running, walking, back running, dribbling, velocity, change of direction, jumping, shifting and tackling.¹⁻² Soccer is an intermittent sport characterized by continuous movement that often includes bursts of high intensity activity interspersed with regular recovery.²⁻³ Soccer players need high speed, agility, aerobic and anaerobic energy systems, high levels of muscle strength. Therefore, physical capacity evaluations of soccer players are very important. Many laboratory and field tests have been developed and applied to evaluate the physical capacities of soccer players.² The Yo-Yo Intermittent Recovery tests, level I (Yo-YoIRI) and level 2 (Yo-YoIR2), are among the most applied and studied field tests in soccer.⁴ Yo-Yo intermittent recovery test level I (Yo-YoIRI) shows aerobic energy decrease, whereas Yo-Yo IR level 2 (Yo-YoIR2) determines an individual's skill to recover from repeated exercise with a high addition from the anaerobic system.⁵⁻⁶ When studies on soccer players are examined, it is seen that daily intensive soccer training causes various physiological and biochemical changes depending on the characteristics such as the duration and intensity of the exercise.⁷⁻¹⁵ In addition to determining the exercise capacity of athletes, determining the changes in physiological variables such as blood parameters and heart rate is important for sports sciences. Blood flow in the muscles is closely related to the need for oxygen.⁸ Changes in blood parameters can affect the oxygen transfer to actively used tissues by affecting performance.⁹ Changes in blood parameters due to exercise depend on the duration, type and intensity of the exercise. Despite its diffusion, very few studies have been done on the biochemistry and hematology of soccer players. Biochemical properties and hematological parameters, which can be crucial to predicting and determining optimal performance, have been studied in elite football players in difficult seasons. Although previous studies have been about the differences between athletes' performance levels, there is no information in the literature regarding the biochemical responses of Yo-YoIRI, which is widely used to estimate the physical capacity of athletes at different times. Therefore, this study was designed to investigate the acute effects of Yo-YoIRI on biochemical parameters in morning and evening football players.

MATERIALS AND METHODS

Participants: 13 soccer player volunteers from Tavas Birlik Spor soccer team who played in the Denizli Super Amateur (DSAL) league participated voluntarily. Participants were taken on just if they met the following criteria: no known history of cardiovascular disease, non-smoker, body mass index (BMI) $> 30 \text{ kg/m}^2$, and did not have take any medication or condition known to affect inflammation. All the players were members of the same team and trained for two hours five days per week. The subjects were informed about the possible risks and advantages of the study and gave their informed permission to participate in this study, which was approved by the Clinical Research Ethical Committee of Pamukkale University (60116787-020/4297). This study was supported by Pamukkale University Scientific Research Projects Coordination Unit (project number is 2018SABE010).

The Yo-Yo intermittent recovery test Level I (Yo-YoIRI): The Yo-Yo intermittent recovery test consists of repeated 2 × 20 m runs trip movements between the start, turn and finish lines at a gradually increased speed controlled by sound from a recording device. After each 40 meters, the athletes rested in an area of 5 meters for 10 seconds in which they could active exercise rest.¹ When subjects failed to reach the finish line in time twice, the distance traveled was recorded as a test result. The test was applied to the same subject group on two different days, one morning and one evening. Blood Lactate measurements were taken with a lactate analyzer (Lactate Plus) by drawing blood from the earlobe 3 minutes after the test was completed.

Blood sampling: In order to determine the parameters, blood samples were taken from antecubital veins with EDTA tubes

before, after and 2 hours after the test. These samples were then used within 3 hours. In biochemical measurements, glucose, triglyceride, very low-density lipoproteins (VLDL), high-density lipoproteins (HDL), low-density lipoproteins (LDL), Total cholesterol, Creatine kinase (CK), aspartate aminotransferase (AST), ACTH, Cortisol, T3, T4, TSH, Growth hormone (GH), Total cholesterol, Insulin, C-Peptide measurements were made.

Test Procedure: The Yo-Yo intermittent recovery test was applied to the subjects in the same group on two different days, one morning and one evening. The tests were carried out in dry weather and synthetic turf. Each subject's height and body mass were recorded. On the first measurement day, Yo-YoIR1 was performed between 09.00-11.00. A total of 8 cc of blood was taken from all subjects before, after and 2 hours after the test from the elbow vein of the forearm. The distance traveled was recorded as a test result. Lactate values were measured 3 minutes after the end of the test with the blood taken from the earlobe. The athletes were rested for 1 week. On the second measurement day, Yo-YoIR1 was performed between 17:00 and 19:00. The same test protocol was repeated. During the 1 week rest period, the subjects were not allowed to do any physical activity.

Statistical Analysis: Statistical analyses were performed using the SPSS software, version 24.0 (Statistical Package for Social Sciences). Results were expressed as mean $\pm$ standard deviation, median (minimum-maximum values) and categorical variables as numbers and percentages. The Shapiro-Wilk Test was used to determine whether the data were normally distributed before the statistical procedures were examined. When the parametric test assumptions are provided, the difference between in-group test values was analyzed by t-test and analysis of variance in repeated measurements was used in dependent groups. In the non-parametric test assumptions are provided, the difference between in-group test values was tested by Wilcoxon paired sample test and Friedman test were used to compare dependent group differences. The statistical significance was set at $p < 0.05$.

RESULTS

All of the subjects completed the test protocols without any problems. At the beginning of the study there were no statistically significant differences biochemical parameters among the groups and physical characteristics of the subjects. The physical characteristic data of the subjects are demonstrated in Table 1.

Table 1. Physical characteristic data of the subjects

	Mean $\pm$ Sd	Med (min - max)
Age (years)	23.39 $\pm$ 2.5	23 (19 - 29)
Height (cm)	180.5 $\pm$ 0.05	179 (1.7 - 1.88)
Weight (kg)	74.72 $\pm$ 3.91	74.5 (70 - 83)
Body Mass Index (kg/m²)	23.14 $\pm$ 1.17	23.25 (19.8 - 24.9)

Table 2. Analysis of biochemical parameters in morning and evening measurements intra-intergroup of the subjects

	Morning Measurements		Evening Measurements		Between morning and evening p
	Mean $\pm$ Sd	Within the groups p	Mean $\pm$ Sd	Within the groups p	
Metabolism regulating hormones	Glucose (BT)	75.54 $\pm$ 12.81	90.69 $\pm$ 14.86		0,007*
	Glucose (AT)	97.23 $\pm$ 25.12	131.15 $\pm$ 38.13	0,0001*	0,006*
	Glucose (2HAT)	79.15 $\pm$ 7.32	83.77 $\pm$ 6.03	(1-2,2-3)	0,018*
	Insulin (BT)	14.76 $\pm$ 6.94	17.5 $\pm$ 16.49		0,599
	Insulin (AT)	14.95 $\pm$ 8.85	16.74 $\pm$ 7.12	0,0001*	0,434
	Insulin (2HAT)	5.89 $\pm$ 2.02	7.12 $\pm$ 2.42	(2-3)	0,158
	C-Peptide (BT)	2.73 $\pm$ 0.81	2.75 $\pm$ 1.35		0,958
	C-Peptide (AT)	2.57 $\pm$ 0.77	2.66 $\pm$ 0.71	0,012*	0,728
	C-Peptide (2HAT)	1.63 $\pm$ 0.3	1.81 $\pm$ 0.57	(2-3)	0,347
Lipids	LDL (BT)	82.46 $\pm$ 22.16	109.08 $\pm$ 89.43		0,506
	LDL (AT)	83.38 $\pm$ 23.31	138.69 $\pm$ 117.75	0,089	0,033*
	LDL(2HAT)	85.08 $\pm$ 21.25	92.31 $\pm$ 20.33		0,097
	HDL (BT)	47 $\pm$ 7.11	47.54 $\pm$ 7.46		0,521
	HDL (AT)	49.54 $\pm$ 8.29	52.46 $\pm$ 8.41	0,0001*	0,009*
	HDL (2HAT)	46.31 $\pm$ 6.98	49.69 $\pm$ 8.11	(1-2,2-3)	0,179

Sexual and Metabolic Hormones Metabolic Stress Hormones Muscle Damage	Cholesterol (BT)	152.62 ±28.43		161.92 ± 22.62		0,059
	Cholesterol (AT)	158.15 ±27.78	0,0001* (1-2,2-3)	176.92 ± 26.19	0,0001* (1-2,1-3)	0,003*
	Cholesterol (2HAT)	147.85 ±25.86		171 ± 27.11		0,001*
	Triglyceride (BT)	115.77 ±49.49		161.69 ± 109.6		0,028*
	Triglyceride (AT)	126.38 ± 38.8	0,0001* (1-3,2-3)	192.46 ± 119.43	0,003* (1-2,2-3)	0,013*
	Triglyceride (2HAT)	82.69 ± 20.13		145.08 ± 82.47		0,005*
	VLDL (BT)	23.15 ± 9.99		56.85 ± 104.41		0,028*
	VLDL (AT)	25.23 ± 7.81	0,0001* (1-3,2-3)	86.15 ± 139.41	0,012* (2-3)	0,009*
	VLDL (2HAT)	16.46 ± 4.1		29 ± 16.38		0,005*
	T3 (BT)	3.31 ± 0.27		3.16 ± 0.25		0,1
	T3 (AT)	3.31 ± 0.27	0,077	3.04 ± 0.24	0,0001* (1-3,2-3)	0,005*
	T3 (2HAT)	3.4 ± 0.24		3.33 ± 0.21		0,326
	T4 (BT)	1.38 ± 0.14		1.4 ± 0.18		0,516
	T4 (AT)	1.37 ± 0.12	0,551	1.39 ± 0.19	0,775	0,814
	T4 (2HAT)	1.38 ± 0.14		1.39 ± 0.21		0,734
	TSH (BT)	2.31 ± 1.36		2.18 ± 0.91		0,481
	TSH (AT)	2.75 ± 1.67	0,002* (1-2,2-3)	2.76 ± 1.25	0,0001* (1-2,2-3)	0,933
	TSH (2HAT)	2.2 ± 1.03		1.81 ± 0.66		0,051
	Cortisol (BT)	15.8 ± 3.81		13.84 ± 3.57		0,124
	Cortisol (AT)	17.02 ± 5.25	0,0001* (1-3,2-3)	16.54 ± 3.89	0,0001* (2-3)	0,616
	Cortisol (2HAT)	11.32 ± 2.72		10.95 ± 2.75		0,642
	ACTH (BT)	40.55 ± 27.06		28.52 ± 11.13		0,196
	ACTH (AT)	93.55 ± 57.53	0,02* (2-3)	160.95 ± 97.94	0,0001* (1-2,2-3)	0,012*
	ACTH (2HAT)	36.81 ± 49.56		11.64 ± 2.94		0,005
	GH (BT)	0.55 ± 1.48		0.58 ± 1.04		0,533
	GH (AT)	6.01 ± 8.67	0,0001* (1-2,2-3)	13.98 ± 10.72	0,0001* (1-2,2-3)	0,029*
	GH(2HAT)	0.21 ± 0.28		0.44 ± 0.42		0,033*
	AST (BT)	23.08 ± 5.31		21.85 ± 6.61		0,407
	AST(AT)	25.38 ± 5.88	0,0001* (1-2,2-3)	24.62 ± 7.54	0,0001* (1-2,2-3)	0,633
	AST (2HAT)	23.38 ± 5.66		21.46 ± 7.59		0,229
	CK (BT)	322.54 ± 156.86		223.77 ± 123.62		0,018*
	CK (AT)	353.38 ± 167.71	0,0001* (1-2,2-3)	240.62 ± 137.21	0,0001* (1-2)	0,015*
	CK(2HAT)	339.62 ± 161.14		230.23 ± 128.16		0,007*

BT / 1: before test; AT / 2: after test; 2HAT / 3: 2 hours after the test; *p<0.05

Comparisons of the metabolism regulating hormones;

In comparison of glucose hormone in the group; there is a significant difference between the 1st and 2nd measurements in the morning, the 1st and 2nd measurements in the evening measurements and the 2nd and 3rd measurements (p<0.05). There was a significant difference between the 1st and 3rd measurements of the insulin hormone in the morning and only the 2nd and 3rd measurements of the evening measurements (p<0.05). While C-peptide hormone has a significant difference between the 1st and 3rd measurements in the morning, the 2nd and 3rd measurements, there is only a significant difference between the 2nd and 3rd measurements in the evening measurements (p<0.05). In comparison between groups; there is a significant difference between 3 measurements in comparison of morning and evening measurements in glucose values (p<0.05). There is no significant difference between insulin and C-peptide hormones morning and evening measurements (p>0.05).

Comparisons of the lipids;

There is no statistically significant difference in morning and evening intra-group measurements of LDL hormone ($p>0.05$). There is a significant difference between the 1st and 2nd measurements of the HDL hormone in the morning and evening, the 2nd and 3rd measurement ($p<0.05$). There is a significant difference between cholesterol hormone in the morning between 1st and 2nd measurement, 2nd and 3rd measurement, evening measurement between 1st and 2nd measurement, 1st and 3rd measurement ($p<0.05$). There is a significant difference between triglyceride hormone between 1st and 3rd measurements in the morning, 2nd and 3rd measurements, between 1st and 2nd measurements in the evening and 2nd and 3rd measurements ($p<0.05$). There is a significant difference between the 1st and 3rd measurements of the VLDL hormone in the morning between the 2nd and 3rd measurement, and in the evening between the 2nd and 3rd measurement ($p<0.05$). In comparison between groups; there is a significant difference only in the 2nd measurements of LDL and HDL hormones ($p<0.05$). There is a significant difference between cholesterol hormone in the 2nd and 3rd measurement between morning and evening ($p<0.05$). In the morning and evening measurements of triglyceride and VLDL hormones, there was a significant difference in all 3 measurements ($p<0.05$).

Comparisons of the metabolic and sexual hormones;

There is no significant difference in morning measurements of hormones T3 and T4 ($p>0.05$). While there is no significant difference in T4 evening measurements ($p>0.05$), there is a significant difference in T3 hormone between evening 1st and 3rd measurements, 2nd and 3rd measurements ($p<0.05$). There is a significant difference between the 1st and 2nd, 2nd and 3rd measurements of TSH hormone in the morning and evening ($p<0.05$). There is a significant difference between the 1st and 3rd, 2nd and 3rd measurements of the cortisol hormone between the 2nd and 3rd measurements of the evening measurements ($p<0.05$). There is a significant difference between ACTH hormone between the 2nd and 3rd measurements in the morning and between the 1st and 2nd, 2nd and 3rd measurements in the evening ($p<0.05$). There is a significant difference between the 1st and 2nd, 2nd and 3rd measurements of GH hormone in the morning and evening ($p<0.05$). In comparison between groups; when the morning and evening measurements of the hormone T3 are compared, there is only a significant difference in the second measurement ($p<0.05$). There is no significant difference in the comparison of T4 and TSH hormones in the morning and evening ($p>0.05$). There is no significant difference in the comparison of cortisol morning and evening ($p>0.05$).

Comparisons of the muscle damage;

There is a significant difference between the 1st and 2nd measurements of morning and evening of AST hormone, between the 2nd and 3rd measurements ($p<0.05$). There is a significant difference between the 1st and 2nd measurements of CK hormone in the morning and the 2nd and 3rd measurement. There is only a significant difference between the 1st and 2nd measurements in the evening measurements of CK ($p<0.05$).

Table 3. Blood lactate values and total distance covered after the test of the subjects

	Morning Measurements		Evening Measurements		p
	Mean $\pm$ Sd	Med (min- max)	Mean $\pm$ Sd	Med (min- max)	
Lactate (mMol)	6,39 $\pm$ 2,38	6,6 (2,8-11,1)	8,4 $\pm$ 1,7	8,6 (5,9-12,1)	0,04*
Total distance (m)	1363,07 $\pm$ 399,15	1440 (520-1880)	1655,38 $\pm$ 264,59	1560 (1280-2120)	0,04*

* $p<0.05$

There was a statistically significant difference between total distance covered and the blood lactate values in the morning and evening measurements ($p<0.05$).

DISCUSSION

The Yo-YoIR test, which is a simple and valid way to examine a person's repeated intensive training and performance changes, has been determined to be a more sensitive measure of maximum oxygen intake, especially for interval training. The results of the current study, which is to our knowledge the first one in the literature investigating the effects of Yo-Yo intermittent recovery test level I (Yo-YoIRI) on biochemical parameters in soccer players indicate that, a statistically significant difference was found between the morning and evening values. Physical demands and activity profile of many sports involving intermittent exercise, such as basketball, volleyball and soccer, have been studied extensively. Many of these sports are characterized with high aerobic load throughout the competition and extensive anaerobic energy decrease during periods of competition.¹⁷⁻¹¹ Knowing the athlete's anaerobic and aerobic capacity is important in determining the outcome of the competition. For this reason, it is very important to evaluate the abilities of the athlete. Field tests are generally more applicable for coaches as dozens of athletes can be tested at the same time. As a result, more recently coaches have used field tests for monitoring players. The Yo-Yo IR tests have quickly become some of the most extensively studied fitness tests in sports science. Due to their applicability and specificity, these tests have also been widely applied in many team sports to assess players' abilities to over and over perform high-intensity exercise.⁴ When the studies on soccer players are examined, it is seen that daily intense soccer training positively affect various physiological systems such as nervous, immune, musculoskeletal and metabolic systems. One of the most practical ways to examine these effects is to investigate the biochemical and blood parameters of players.¹²⁻¹³ In literature, it was stated that biochemical and hematological parameters are affected by the environment, age and nutritional habits of the person, as well as the intensity, type, time, frequency and of physical activity and exercise.¹⁴ In our study, there is a statistically significant difference was found between the morning and evening values biochemical parameters ($p<0.05$). Metabolism and biochemical parameters create differences in their effects according to the energy systems used in competitions and training and the intensity of the exercise. In our study, there was a statistically significant difference in glucose, insulin and c-peptide hormone values in the morning and evening in the group comparisons and in the morning and evening comparisons between the groups. Regarding lipids, there is a statistically significant difference in morning and evening within group comparisons and

morning and evening comparisons between groups in all parameters except LDL. Hammouda et al (2012) found that athletes had significantly higher glucose levels following exercise. They found that this increase in glucose levels was consistent with previous results during training of similar intensity.¹⁶ and soccer competitions.¹⁷ However, this increase is not after a Yo-YoIR1. Findings show that the glucose released is high enough to compensate for the use of blood glucose during a game.¹⁸ Considering the effects of Yo-YoIR1 on lipid profile, the findings showed that exercise was sufficient to achieve a significant increase in LDL, HDL, TG and TC levels. As a result, the measurements showed that the aerobic energy reached the highest values in this test. This may explain TG mobilization after training. The authors know that there are no studies of the acute effect of exercise on these biomarkers. When sexual and metabolic hormones are examined in the study, between testosterone and TSH in the morning; evening between T3, testosterone and TSH; In the morning and evening, there is a statistically significant difference between T3 and testosterone between groups. When stress and metabolic hormones are examined, there is a statistically significant difference between the groups in the morning and evening ACTH and GH hormones. There is a statistically significant difference in muscle damage hormones only in the CK in the morning and evening in the whole group comparisons and in the morning-evening between the groups. The CK hormone level increased significantly after the Yo-YoIR1 test. This marker is essentially indicative of muscle damage.¹⁹ Increased muscle damage markers increase higher anaerobic solicitation. The extent of muscle damage is correlated with both the time and intensity of training.¹⁵ Recent studies show that muscle damage increases in soccer players after a competition.¹⁵⁻²¹ Aloui et al., (2017) illustrate that CK (36.37% at 07:00 h vs. 30.53% at 17:00 h) and LDH (37.17% at 07:00 h vs. 20.7% at 17:00 h) levels induced by the YYIRT are significantly higher in the morning compared with the evening. These results are indicative of micro-lesions of actively working muscles.²³⁻²⁴ and muscle damage resulting in reduced performance in the morning.²⁶⁻¹⁹ Thus, the increase in CK hormone levels indicates that the athlete is more vulnerable to injury and muscle damage caused by intense training. For this reason, it can be said that it would be better to do the exercises done by the athletes in the evenings. Aloui et al., (2017) in their study, they are committed to checking the effect of time-of-day on the selected muscle damage markers (i.e., lactate dehydrogenase, creatine kinase and lactate), blood marker of oxidative stress, lipid profile (i.e., total cholesterol, high-density lipoprotein, low density lipoprotein and triglycerides), cardiovascular parameters (i.e., systolic blood pressure and diastolic blood pressure), biochemical markers and glucose and hormonal parameters (testosterone and cortisol) following the YYIRT. Therefore, they assumed that evening training was the best time to practice intermittent exercise, which is associated with hormonal, cardiovascular, and oxidative responses as well as biochemical responses. There was a statistically significant difference between blood lactate values in the morning and evening measurement results ($p < 0.05$). This type of protocol makes it possible to examine the relationship between physiological responses to submaximal interval exercise and Yo-Yo performance.⁴ Numerous studies have investigated the physiological responses of Yo-YoIR1 and Yo-YoIR2.⁶⁻¹⁰⁻²⁷ Yo-YoIR1 produces lower blood lactate concentration, higher levels of creatine phosphate, and higher muscle pH⁴ suggesting a higher anaerobic effect of Yo-YoIR2. The results show that the blood lactate level increased significantly after Yo-YoIR1. Previous research has reported similar results and suggested that increased blood lactate concentrations after training caused the change associated with red blood cell deformation.²⁸ Fernandes et al. (2014) showed that blood lactate levels are not affected by the hour during the day. However, Racinais et al. (2010) and Hammouda et al. (2012) showed that blood lactate levels were higher in the evening after training; Therefore, athletes appear to be more prone to free radical damage when they train. The physiological response to a standard high intensity interval exercise test (specifically blood Lactate) was closely related to both Yo-Yo performances. Consequently, the ability to maintain acid-base balance during submaximal interval exercise was also important for performance in the Yo-YoIR1 test. These results support the studies of previous researchers who reported a significant relationship between the level of blood Lactate accumulation and performance during the continuation of Yo-Yo tests.¹ There is a statistically significant difference between the total distance values in the morning and evening measurements ($p < 0.05$). In our study, the distance in the Yo-YoIR1 evening was higher than in the morning hours. The Yo-Yo intermittent recovery test (Yo-YoIR1) has been developed recently to evaluate the intermittent endurance abilities of soccer players in field conditions.⁶ The validity of the Yo-Yo IRI test as a measure of physical performance has been demonstrated by studies showing a significant correlation between Yo-Yo IRI and distance covered at high density.⁵ Also, the improvement in Yo-Yo IRI performance as a result of high-intensity interval training was associated with changes in the amount of high-intensity activity performed during the competition.³² As a result, it can be said that endurance tests applied to soccer players are more effective in terms of performance in the evening. This research focuses on the biochemical responses of various metabolic markers after Yo-YoIR1 in soccer players.

CONCLUSION

The physiological response to the training stimulus serves as a guide for trainers and athletes regarding the appropriateness of training volume and intensity. Future studies should focus on longer follow-up and sampling after training to examine the daily variation of hormonal and cardiovascular parameters and oxidative stress during the athlete's recovery period. Additionally, to learn more about which field test is more useful from a biochemical perspective, other field tests such as the 12-minute running test, the 20m shuttle running test, Leger shuttle-run test may have implications for players from different types of sports.

REFERENCES

1. Mohr, M., Krstrup P. & Bangsbo, J. (2003): Match performance of high-standard soccer players with special reference to development of fatigue. *J Sports Sci.*, 21, 519-528.
2. Chuman, K., Hoshikawa, Y., Iida, T. and Nishijima, T. (2011): Relationships between Yo-Yo intermittent recovery tests and development of aerobic and anaerobic fitness in U-13 and U-17 soccer players. *Int. J. Sport Health Sci.*, 9: 91-97.
3. Reilly, T, Bangsbo, J, and Franks, A. (2000): Anthropometric and physiological predispositions for elite soccer. *J Sport Sci.*, 18: 669-683.
4. Bangsbo, J., Iida, F.M. & P. Krstrup. (2008): The Yo-Yo intermittent recovery test: A useful tool for evaluation of physical performance in intermittent sports, *Sports Med.*, 38: 37-51. Review.

5. Krstrup, P., & Bangsbo, J. (2001): Physiological demands of top class soccer refereeing in relation to physical capacity: effect of intense intermittent exercise training. *J Sports Sci.* 19: 881-91.
6. Castagna, C., Impellizzeri, F.M., Chamari, K., et al. (2006): Aerobic fitness and Yo-Yo continuous and intermittent tests performances in soccer players: a correlation study. *J Strength Cond Res.* 20 (2): 320-5.
7. Chtourou, H., Driss, T., Souissi, S., et al. (2012): The effect of strength training at the same time of the day on the diurnal fluctuations of muscular anaerobic performances. *J Strength Cond Res.* 26:217-25.
8. Saltin, B., Radegran, G., Koskolou, M.D. & Roach, R.C. (1998): Skeletal muscle blood flow in humans and its regulation during exercise, *Acta Physiol Scand.* 162; 421-436.
9. Chien, S. (1987): Red cell deformability and its relevance to blood flow, *Annu Rev Physiol.* 49: (1987), 177-192.
10. Krstrup, P., Mohr, M., Amstrup, T., Rysgaard, J., Johansen, A. (2003): Steensberg, P.K. Pedersen and J. Bangsbo, The Yo-Yo intermittent recovery test: Physiological response, reliability, and validity, *Med Sci Sports Exerc.* 35: 697-705.
11. Krstrup, P., Mohr, M., Steensberg, A., Bencke, J., Kjaer, M. & Bangsbo, J. (2006): Muscle and blood metabolites during a soccer game: Implications for sprint performance, *Med Sci Sports Exerc.* 38: 1165-1174.
12. Reilly, T., Ekblom, B. (2005): The use of recovery methods post-exercise. *J Sports Sci.* 6: 619-27. <https://doi.org/10.1080/02640410400021302>.
13. Anđelković, M., Baralić, I., Đorđević, B., Stevuljević, J.K., Radivojević, N., Dikić, N., et al. (2015): Hematological And Biochemical Parameters In Elite Soccer Players During A Competitive Half Season. *J Med Biochem.* 34: 460-466. <https://doi.org/10.2478/jomb-2014-0057>.
14. Astrand, P.O. & Rodahl, K. (1986): **Textbook of Work Physiology Physiological Bases of Exercise.** New York: McGraw Hi ll Book Company.
15. Hammouda, O., Chtourou, H., Chahed, H., et al. (2012): High Intensity Exercise Affects Diurnal Variation of Some Biological Markers in Trained Subjects. *Int J Sports Med.* 33: 886-91.
16. Marliss, E.B., Kreisman, S.H., Manzoni, A., et al. (2000): Gender differences in glucoregulatory responses to intense exercise. *J Appl Physiol.* 88: 457-66.
17. Bangsbo, J., Graham, T., Kiens, B., et al. (1992): Elevated muscle glycogen and anaerobic energy production during exhaustive exercise in man. *J Physiol.* 451:205-27.
18. Bangsbo, J., Marcello, I.F., Krstrup, P. (2007): Metabolic Response and Fatigue in Soccer. *Int J Sports Physiol Perform.* 2: 111-27.
19. Brancaccio, P., Lippi, G., Maffulli, N. (2010): Biochemical markers of muscular damage. *Clin Chem Lab Med.* 48:757-67.
20. Hammouda, O., Chtourou, H., Chahed, H., et al. (2011): Diurnal Variations of Plasma Homocysteine, Total Antioxidant Status, and Biological Markers of Muscle Injury During Repeated Sprint: Effect on Performance and Muscle Fatigue-A Pilot Study. *Chronobiol Int.* 28:958-67.
21. Ascensao, A., Rebelo, A., Oliveira, E., et al. (2008): Biochemical impact of a soccer match-analysis of oxidative stress and muscle damage markers throughout recovery. *Clin Biochem.* 41:841-51.
22. Aloui, K., Abdelmalek, S., Chtourou, H., Wong, D.P., Boussetta, N., Souissi, N. (2017): Effects of time-of-day on oxidative stress, cardiovascular parameters, biochemical markers, and hormonal response following level-I Yo-Yo intermittent recovery test. *Physiol Int.* 104 (1), 77-90. DOI: 10.1556/2060.104.2017.1.6
23. Baird, M.F., Graham, S.M., Baker, J.S., Bickerstaff, G.F. (2012): Creatine-kinase- and exercise-related muscle damage implications for muscle performance and recovery. *J. Nutr. Metab.* 2012, 9: 60-67.
24. Ceci, R., Valls, M.R.B., Duranti, G., Dimauro, I., Quaranta, F., Pittaluga, M., Sabatini, S., Caserotti, P., Parisi, P., Parisi, A., Caporossi, D. (2014): Oxidative stress responses to a graded maximal exercise test in older adults following explosivetype resistance training. *Redox Biol.* 2, 65-72.
25. Brancaccio, P., Lippi, G., Maffulli, N. (2010): Biochemical markers of muscular damage. *Clin. Chem. Lab. Med.* 48(6),757-767.
26. Mohebbi, H., Azizi, M. (2011): Maximal fat oxidation at the different exercise intensity in obese and normal weight men in the morning and evening. *J Human Sport Exerc.* 6(1), 49-58.
27. Thomas, A., Dawson, B., Goodman, C. (2006): The Yo-Yo test: reliability and association with a 20-m shuttle run and VO2max. *Int J Sports Physiol Perform.* 1:137-149.
28. Fernandes, A.L., Lopes-Silva, J.P., Bertuzzi, R., Casarini, D.E., Arita, D.Y., Bishop, D.J., Lima-Silva, A.E. (2014): Effect of time of day on performance, hormonal and metabolic response during a 1000-M cycling time trial. *PLoS One.* 9(10), e109954.
29. Racinais, S., Perrey, S., Denis, R., Bishop, D. (2010): Maximal power, but not fatigability, is greater during repeated sprints performed in the afternoon. *Chronobiol. Int.* 27(4), 855-864.
30. Krstrup, P. & Bangsbo, J. (2001): Physiological demands of top-class soccer refereeing in relation to physical capacity: Effect of intense intermittent exercise training. *J Sport Sci.* 19: 881-891.
31. Krstrup, P., Mohr, M., Amstrup, T., Rysgaard, T., Johansen, J., Steensberg, A., Pedersen, P.K., and Bangsbo, J. (2003): The Yo-Yo Intermittent Recovery Test: Physiological response, reliability, and validity. *Med Sci Sport Exerc.* 35: 697-705.
32. Krstrup, P., Mohr, M., Ellingsgaard, H., & Bangsbo, J. (2005): Physical demands during an elite female soccer game: Importance of training status. *Med Sci Sports Exerc.* 37: 1242-1248.

ANALYSIS OF AGGRESSION AND PERSONALITY TRAITS IN VOLLEYBALL PLAYERS**Mehmet Şirin GÜLER*¹, Muharrem Alparslan KURUDİREK²**1. Sarıkamış School of Physical Education and Sport, Kafkas University, Kars
[Http://orcid.org/0000-0001-6014-0636](http://orcid.org/0000-0001-6014-0636)2. Sport Science Faculty, Atatürk University, Erzurum
[Http://orcid.org/0000-0001-5549-6902](http://orcid.org/0000-0001-5549-6902)**Corresponding author:** mehmet0910@hotmail.com**ABSTRACT**

This study was conducted in order to evaluate personality traits and aggression of volleyball players in the second league, and to measure how a contact-free sports might cause change in personality subscales and to measure the level of aggression. The study universe contains second league volleyball players playing in Intercollegiate Group Championship in 2019-2020 season. The research sample was formed by using random sampling method. The sample of the study is composed of 120 volleyball players in total, 59 being male, and 61 being female. A questionnaire form consisting of three sections was used in the data collection of the present study. Items developed by the researcher regarding the demographic characteristics were used in the first section while "the aggression questionnaire" developed by Buss and Perry and translated into Turkish by Demirtaş 2012 as well as conducting a reliability study was used in the second section. In the third section, "the personality scale" developed by Costa and McRae and adapted into Turkish by Gülgöz (2005) by conducting a reliability study was used. The questionnaire was applied as a 5-point Likert scale. It was observed in the study that total mean scores of verbal aggression, anger, hostility, and aggression in participants were medium, that mean scores of physical aggression were low-level whereas mean scores of neuroticism, extroversion, agreeableness, openness to experience, and conscientiousness were high. Moreover, it was seen that there was a statistically significant, negative, low-level correlation relationship between anger and agreeableness subscales, which were aggression and personality subscales.

Keywords: Volleyball, Aggression, Personality.**INTRODUCTION**

Volleyball, attracting great attention in the international arena, is a branch of sports that have millions of fans and practitioners in the world. This interest in volleyball has carried the sports to schools and clubs in developed countries and in Turkey; thereby making it a part of life. Since it is among contact-free, enjoyable sports developing group dynamics, volleyball has become one of the most favorite sports in young people with its psychological, social, physical and pedagogical values. Volleyball contains complex structures based on especially anaerobic and aerobic transitions as the energy system used in terms of game characteristics.¹⁸ Therefore, the structure of volleyball performance is complex. It is composed of many closely interconnected components and factors, either being individual or collective. In addition, individual differences significantly affect psychological commitment.¹⁰ These are general strength, speed, durability, coordination and flexibility. Hence, these components or factors need to be worked and developed in an interconnected manner as well as requiring personality maturity. Therefore, the present study is of the utmost importance in measuring levels of personality and aggression in those playing volleyball, a contact-free sports providing both physical and mental maturity. Aggression is defined as "offending and disturbing behaviour towards another living or object".¹⁵ Psychologically, it is defined as the effort of the individual to impose his or her own thoughts and behaviour on others by force against external resistance (TDK, 2005). Aggression is also defined as 'the effort of the individual to impose his or her own thoughts or behaviour on others by force against external resistance' in psychology dictionary. In other sources, aggression is described as 'any kind of behaviour that offends and harms others psychologically and physically', 'any kind of behaviour with the intention of offending others' or 'angry behaviour'. Personality, on the other hand, is a mental integrity that is unique to the individual, collecting individual characteristics one by one. This integrity contains body structure, general physical appearance, intelligence, skills, excitement, reactions, emotions, interests and general culture of the individual. All these elements leave some impression on individuals based on the environment that they live in and characteristics of the environment and the individual.¹⁴ As a result, sports activities, whether amateur or professional, is a tool contributing immensely to personality development as well as controlling the individual in many aspects, filling the gaps and providing environment for the individual to remove excess. This study was conducted in order to evaluate personality traits and aggression of volleyball players in the second league, and to measure how a contact-free sports might cause change in personality subscales and to measure the level of aggression.

MATERIAL AND METHOD**Research Model**

This study was carried out with survey model. Survey model is a research approach aiming to describe the situation existing in the past or now.¹¹

Universe and Sample

The study universe included second league volleyball players playing in Intercollegiate Group Championship in 2019-2020 season. The research sample was formed by using random sampling method. The sample of the study is composed of 120 volleyball players in total, 59 being male, and 61 being female.

Data Collection Tools

A questionnaire form consisting of three sections was used in the data collection of the present study. Items developed by the researcher regarding the demographic characteristics were used in the first section while "the aggression questionnaire" developed by Buss and Perry and translated into Turkish by Demirtaş 2012 as well as conducting a reliability study was used in the second section. The questionnaire is a 5-point Likert type scale: "It does not fit my character at all", "Hardly fit", "A little bit fit", "Very fit" and "Completely fit". It aims to measure subscales of four different types of aggression: physical aggression, verbal aggression, anger and hostility. The physical aggression subscale is described using 9 questions (items 13,8,2,11,25,16,29,22 and 5) measuring physical harm against others. The verbal aggression subscale has 5 questions (items 27, 27, 21, 14 and 4) correlating and measuring verbal abuse against others. The anger subscale is described using 7 questions (items 19, 28, 1, 18, 9, 23 and 12) aiming to measure the emotional aspect of aggression. The hostility subscale contains 8 questions (items 20,24,3,26,10,15,7 and 17) aiming to the cognitive aspect of aggression. In the third section, "the personality scale" developed by Costa and McRae and adapted into Turkish by Gülgöz (2005) by conducting a reliability study was used. The questionnaire was applied as a 5-point Likert scale. Turkish version of the questionnaire is a 5-point Likert-type scale consisting of 60 items in total. It aims to measure five different personality scales: extroversion, openness to experience, neuroticism, agreeableness and conscientiousness. Each subscale (extroversion, openness to experience, neuroticism, agreeableness and conscientiousness) contains 12 questions.

Statistical Analysis

Data obtained from participants were put online by using SPSS 20.0 for Windows software, descriptive statistical and non-parametric statistical analyses were conducted.

FINDINGS

When the information on demographic variables of participants is considered, it is clear that 59 participants are male, 61 participants are female. 18 people have associate degree, 74 people have bachelor's degree and 18 participants have postgraduate level. Their age range is as such: 25 people are 18 years old and below; 32 people are 19 years old; 36 people are 20 years old and lastly 27 participants are 21 years old and above. Among participants, 63 people earn 0-999 Turkish liras; 35 people get 1000-1999 TL; 18 people earn 2000-2999 TL and 4 participants earn 3000+ TL. Considering their starting age of sports, it is obvious that 3 people begin 1-3 years old; 12 people (4-6 years old); 54 people (7-9 years old); 38 people (10-12 years old) and 13 participants (13+). It is seen that the majority of the participants are women, having bachelor's degree, and those whose income is below 1000□. Most of the participants start the sports in 7-9 age group. When the mean values of aggression and subscale of participants are taken into consideration; the minimum value is 1 and the maximum value is 4.40 for verbal aggression and the mean value is 2.74. For anger, the minimum value is 1.14 and the maximum value is 4.57 and the mean value is 2.78. For physical aggression, the minimum value is 1 and the maximum value is 4.67 and the mean value is 2.45. For hostility, the minimum value is 1 and the maximum value is 4.38 and the mean value is 2.75. The minimum value of aggression total score is 1.07 and the maximum value is 4.24 and the mean value is 2.66. It is understood that total mean scores of participants in verbal aggression, anger, hostility and aggression are medium-level while aggression mean scores are low-level. Considering mean values of personality subscale of participants, the minimum value is 1.42 and the maximum value is 4.17 and the mean value is 3.90 for neuroticism. For extroversion, the minimum value is 1.42 and the maximum value is 4.83 and the mean value is 3.67. The minimum value is 1.08 and the maximum value is 4.50 and the mean value is 3.47 for openness to experience. The minimum value is 1.33 and the maximum value is 4.67 and the mean value is 3.86 for agreeableness. For conscientiousness, the minimum value is 1.33 and the maximum value is 4.67 and the mean value is 3.60. It is understood that mean scores of participants in neuroticism, extroversion, agreeableness, openness to experience and conscientiousness are high. When the aggression and personality scale means are analyzed considering gender variable, it is clear that there is not any statistically significant difference between groups in verbal aggression, anger, hostility, extroversion, openness to experience, and agreeableness subscales while there are statistically significant differences between groups in physical aggression, neuroticism and conscientiousness subscales. According to this, it is observed that males have higher mean scores in neuroticism and conscientiousness subscales compared to females. Furthermore, when the aggression and personality scale means of participants are analyzed considering age variable, it is understood that there is not any statistically significant difference between groups in anger, physical aggression, hostility, neuroticism, openness to experience, agreeableness and conscientiousness by the age variable of participants whereas there are statistically significant differences between groups in verbal aggression and extroversion subscales. Accordingly, it is seen that participants in the 20 age group have lower mean rank compared to participants in the 21 and older age group in the verbal aggression subscale while participants in the 18 and below age group has lower mean rank compared to participants in the 19-21 and 21 and older age groups in the extroversion subscale.

Table 1. Comparing Aggression and Personality Scale Means of Participants by Income Variable (Kruskal-Wallis H Test)

Factor		Variable (Income)	N	Mean Rank	sd	X ²	p	Difference
Aggression	Verbal Aggression	0-999	63	58.71				
		1000-1999	35	58.00				
		2000-2999	18	64.94				
		3000+	4	90.63				

Personality	Anger	0-999	63	57.21	3	1.844	.605	-
		1000-1999	35	63.36				
		2000-2999	18	62.64				
		3000+	4	77.63				
	Physical Aggression	0-999	63	56.51	3	2.460	.483	-
		1000-1999	35	61.87				
		2000-2999	18	70.17				
		3000+	4	67.88				
	Hostility	0-999	63	62.66	3	.852	.837	-
		1000-1999	35	60.17				
		2000-2999	18	54.33				
		3000+	4	57.13				
	Neuroticism	0-999	63	57.66	3	6.569	.087	-
		1000-1999	35	69.44				
		2000-2999	18	48.22				
		3000+	4	82.25				
	Extroversion	0-999	63	57.60	3	7.794	.050	-
		1000-1999	35	68.81				
		2000-2999	18	47.83				
		3000+	4	90.38				
	Openness to Experience	0-999	63	59.89	3	7.415	.060	-
		1000-1999	35	66.06				
		2000-2999	18	45.17				
		3000+	4	90.50				
	Agreeableness	0-999	63	56.52	3	11.615	.009	4>3 4>1
		1000-1999	35	67.89				
		2000-2999	18	49.58				
		3000+	4	107.75				
	Conscientiousness	0-999	63	56.29	3	7.394	.060	-
		1000-1999	35	67.14				
		2000-2999	18	54.08				
		3000+	4	97.63				

When the table is analyzed, it is seen that there is not any statistically significant difference between groups in verbal aggression, anger, physical aggression, hostility, neuroticism, openness to experience and conscientiousness subscales by the income variable of participants while there is a statistically significant difference between groups in the agreeableness subscales. Accordingly, it is seen that participants whose income are 3000□ and above have higher mean rank compared to participants whose income are between 0-999 and 2000-2999□.

Table 2. Comparing Aggression and Personality Scale Means of Participants by Education Variable (Kruskal-Wallis H Test)

	Factor	Variable (Education)	N	Mean Rank	sd	X ²	p	Difference
P Aggression	Verbal Aggression	Associate Degree	18	69.42	2	2.063	.357	-
		Bachelor's Degree	84	57.64				
		Postgraduate Degree	18	64.94				
	Anger	Associate Degree	18	62.86	2	.155	.925	-
		Bachelor's Degree	84	60.46				
		Postgraduate Degree	18	58.31				
	Physical Aggression	Associate Degree	18	66.11	2	.688	.709	-
		Bachelor's Degree	84	58.92				
		Postgraduate Degree	18	62.25				
	Hostility	Associate Degree	18	73.81	2	4.919	.085	-
		Bachelor's Degree	84	56.01				
		Postgraduate Degree	18	68.14				
	Neuroticism	Associate	18	50.47	2	6.069	.048	3>1

	Degree	84	58.97					
	Bachelor's	18	77.67					
	Degree							
	Postgraduate							
Extroversion	Associate			2	.418	.811	-	
	Degree	18	56.19					
	Bachelor's	84	61.74					
	Degree	18	59.00					
	Postgraduate							
	Associate							
	Degree	18	55.56					
	Bachelor's	84	59.98					
Openness to Experience	Degree	18	67.86	2	1.193	.551	-	
	Postgraduate							
	Associate							
	Degree	18	56.97					
Agreeableness	Bachelor's	84	58.62	2	2.697	.260	-	
	Degree	18	72.81					
	Postgraduate							
	Associate							
	Degree	18	51.36	2	2.299	.317	-	
	Bachelor's	84	60.66					
	Degree	18	68.89					
	Postgraduate							

When the table is analyzed, it is seen that there is not any statistically significant difference between groups in verbal aggression, anger, physical aggression, hostility, extroversion, openness to experience, agreeableness and conscientiousness subscales by the education variable of participants while there is a statistically significant difference between groups in neuroticism subscale. Accordingly, it is seen that the participants having postgraduate degrees have higher mean rank compared to participants having associate degrees.

Table 3. Comparing Aggression and Personality Scale Means of Participants by the Age of Starting the Sports Variable (Kruskal-Wallis H Test)

	Factor	Variable (Age of the Starting Sports)	N	Mean Rank	sd	X ²	p	Difference
Aggression	Verbal Aggression	1-3	3	82.50	4	3.021	.554	-
		4-6	12	60.67				
		7-9	54	64.22				
		10-12	38	55.42				
		13+	13	54.65				
	Anger	1-3	3	51.50	4	1.784	.775	-
		4-6	12	52.00				
		7-9	54	62.12				
		10-12	38	59.29				
		13+	13	79.50				
	Physical Aggression	1-3	3	66.50	4	1.141	.888	-
		4-6	12	55.75				
		7-9	54	62.07				
		10-12	38	61.95				
		13+	13	52.73				
Personality	Hostility	1-3	3	69.67	4	.775	.942	-
		4-6	12	60.08				
		7-9	54	61.97				
		10-12	38	60.05				
		13+	13	53.96				
	Neuroticism	1-3	3	66.83	4	.902	.924	-
		4-6	12	56.08				
		7-9	54	59.63				
		10-12	38	60.14				
		13+	13	67.77				
	Extroversion	1-3	3	67.67	4	.678	.954	-
		4-6	12	61.17				
		7-9	54	60.93				
		10-12	38	57.47				

Openness Experience	to	13+	13	65.31	4	1.576	.812	-
		1-3	3	68.33				
		4-6	12	60.46				
		7-9	54	59.90				
		10-12	38	57.32				
Agreeableness		13+	13	70.54	4	2.516	.642	-
		1-3	3	70.83				
		4-6	12	49.92				
		7-9	54	63.12				
		10-12	38	57.08				
Conscientiousness		13+	13	67.00	4	1.884	.757	-
		1-3	3	51.50				
		4-6	12	63.33				
		7-9	54	61.86				
		10-12	38	55.54				
		13+	13	68.81				

When the table is analyzed, it is seen that there is not any statistically significant difference between groups in aggression and personality subscales by the age of starting the sports variable.

When the correlation relationship between aggression and personality scales according to Spearman Correlation test, it is seen that there is a statistically significant, negative and low-level correlation relationship between anger and agreeableness subscales, which are aggression and personality subscales.

DISCUSSION

In the present study in which aggression and personality traits of university students playing volleyball was discussed, following conclusions were obtained and discussed in the light of the literature. It is observed that total mean scores of participants in verbal aggression, anger, hostility and aggression are medium-level while physical aggression mean scores are low-level. The fact that aggression attitudes are low in volleyball, which does not have physical contact can be considered as an expected result. On the other hand, the relatively high mean scores in anger suggests that athletes have deficiencies in terms of discharging. When analyzed, the literature demonstrates that sports in which there is contact with the opponent leads to an increase in physical aggression.²⁰ On the other hand, it is known that those playing team sports have a lower tendency of aggression than those playing individual sports.⁷⁻²⁻¹⁶ It is observed that mean scores of participants in neuroticism, extroversion, agreeableness, openness to experience and conscientiousness are high. The positive effects of playing sports on personality are known facts. Studies show that those who play sports differ from those who do not in terms of personality traits.²³ The reason behind this is that there are studies in the literature demonstrating that those playing sports have more positive personality traits. It is observed that there is not any statistically significant difference between groups in verbal aggression, anger, hostility, extroversion, openness to experience and agreeableness subscales by the gender variable of participants while there are statistically significant differences between groups in physical aggression, neuroticism and conscientiousness subscales. According to this, it is observed that males have higher mean scores in neuroticism and conscientiousness subscales compared to females. When analyzed, the literature demonstrates that there are studies suggesting males have a higher tendency of physical aggression compared to females.¹⁻⁴⁻¹²⁻¹⁹⁻²¹⁻²⁴ Considering the perception suggesting that aggressive attitude is a behavior suitable to masculine character, it may be thought that the result obtained in this study is not surprising. In their study, Campbell et al. stated that men regard aggressive behavior as a tool increasing their self-confidence and evaluates it in a positive manner while women regard aggression as loss of control.³ On the other hand, when the literature on neuroticism and conscientiousness is analyzed, it has been observed that there are different studies in which males and females each have had higher scores (Saygılı et. al, Öztürk et. al, 2015). Pinpointing sharp difference across genders on the concept of personality is becoming more and more difficult each day in today's world. In today's world, male and female roles are much closer to each other than they were in the past. Practices on gender equality and differences across genders are rapidly decreasing. It is observed that there is not any statistically significant difference between groups in anger, physical aggression, hostility, neuroticism, openness to experience, agreeableness and conscientiousness by the age variable of participants whereas there are statistically significant differences between groups in verbal aggression and extroversion subscales. Accordingly, it is seen that participants in the 20 age group have lower mean rank compared to participants in the 21 and older age group in the verbal aggression subscale while participants in the 18 and below age group has lower mean rank compared to participants in the 19-21 and 21 and older age groups in the extroversion subscale. Studies show that extroversion increases with age and reaches its peak in young adulthood.⁸ Therefore, findings obtained in this study are in parallel with the literature. It has been concluded that there is not any statistically significant difference between groups in verbal aggression, anger, physical aggression, hostility, neuroticism, extroversion, openness to experience, and conscientiousness subscales by the income variable of participants while there is a statistically significant difference between groups in the agreeableness subscale. Accordingly, it is seen that participants whose income are 3000□ and above have higher mean rank compared to participants whose income are between 0-999 and 2000-2999□. The increase in income may be observed in a way that people are distancing away from financial concerns; thereby not having any stress. In this respect, it is possible to consider increasing income as an important reason for people to display suitable behavior. It has been concluded that there is not any statistically significant difference between groups in verbal aggression, anger, physical aggression, hostility, extroversion, openness to experience, agreeableness, and conscientiousness subscales by the education variable of participants while there is statistically significant difference between groups in the neuroticism subscale. Accordingly, it is seen that the participants having postgraduate degrees have higher mean rank compared

to participants having associate degrees. When analyzed, results demonstrate that it is possible to say that the age variable is related to the topic rather than the education variable. The reason behind this is that neuroticism mean scores increase with age in the age variable.

CONCLUSION

Considering the answers given by participants to questionnaire and as a result of correlation analysis conducted between aggression and personality subscales, it is observed that there is a statistically significant, negative, low-level correlation relationship between anger and agreeableness subscales. Accordingly, increase in anger reduces agreeableness. The positive effects of sports on personality development are undeniable. Moreover, personality traits that could avert aggression may be improved through sports. From this perspective, the integration of the concept of sports into individual life should be evaluated as a social issue, and studies should be conducted in this direction.

REFERENCES

1. Arıca, Osman Tolga. "Üniversite Öğrencilerinde Saldırganlık, Benlik Saygısı ve Denetim Odağı İlişkisi." Yayımlanmamış Yüksek Lisans Tezi. İstanbul: Marmara Üniversitesi Sosyal Bilimler Enstitüsü, 1995.
2. Baron RA. Richardson DR. Human aggression (2nd Ed.), Plenum Pres, New York, 1994.
3. Campbell, A., Muncer, S., & Coyle, E. (1992). Social representation of aggression as an explanation of gender differences. *Aggressive Behavior*, 18, 95–108.
4. Demirhan, Mine. "Kendini Açma Düzeyleri Farklı Genel Lise Öğrencilerinin Bazı Değişkenler Açısından Saldırganlık Düzeylerinin İncelenmesi." Yayımlanmamış Yüksek Lisans Tezi. Eskişehir: Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü, 2002.
5. Demirtaş, AM. (2012). Saldırganlık ölçeğinin Türkçe formunun geçerlilik ve güvenirlik çalışması. *Türk Psikiyatri Dergisi*, 23:1-5.
6. Enç M. Ruh Bilim Terimleri Sözlüğü. Ankara, TDK Yayın, 1980: 158.
7. Erşan EE. Doğan O. Doğan S. Beden Eğitimi ve Spor Yüksekokulu Öğrencilerinin Saldırganlık Düzeylerinin Sosyo-demografik Açısından Değerlendirilmesi, *Cumhuriyet Tıp Dergisi*. 2009;31: 231–238
8. Eryılmaz A, Ercan L. Öznel İyi Oluşun Cinsiyet, Yaş Grupları ve Kişilik Özellikleri Açısından İncelenmesi *Türk Psikolojik Danışma ve Rehberlik Dergisi* 2011, 4 (36), 139-151.
9. Gülgöz, S. (2002). Five-factor model and NEO-PI-R in Turkey. A. J. Marsella (Series Ed.), R. R. McCrae ve J. Allik (Eds.), *The Five-Factor Model Across Cultures*, 1-23.
10. Karabey C.N., Kayapalı S.Y. (2016). Bireysel Farklılıklar İle Psikolojik Sözleşme İhlali Arasındaki İlişkide Üstün Desteğinin Aracılık Rolü, *İşletme Araştırmaları Dergisi*, 8/1, 140-160.
11. Karasar, N. (2012). Bilimsel Araştırma Yöntemi. 23. Basım. Nobel Akademik Yayıncılık. Ankara.
12. Kurtulmaz Y. Öğretmen Adaylarının Saldırganlık Düzeyleri ile Akademik Başarıları, İletişim ve Problem Çözme Becerileri Arasındaki İlişkiler: (Anadolu Üniversitesi ve Osmangazi Üniversitesi Öğrencileri Üzerinde Bir Araştırma), 2005.
13. Kurudirek Mİ. Lise düzeyindeki elit buz hokeyi oyuncularının saldırganlık düzeylerinin incelenmesi Gazi Üniversitesi Sağlık Bilimleri Enstitüsü Beden Eğitimi ve Spor Anabilim Dalı Spor ve Sağlık Bilimleri Bilim Dalı Yüksek Lisans Tezi, 2014.
14. Mumcu HE. Açık ve Kapalı Beceri Gerektiren Sporları İcra Eden Sporcuların Kişilik Tiplerinin Güdülenmeleri Üzerine Etkisi. Sağlık Bilimleri Enstitüsü, Beden Eğitimi ve Spor Anabilim Dalı. Yüksek Lisans tezi, Ankara: Gazi Üniversitesi, 2011.
15. Paul B, Marie S. An exploration of aggressive and prosocial behavior subtypes in adolescence. *Journal of Youth and Adolescence*, 2005, 31:99-199.
16. Ramazanoğlu F. Canikli A. Saygın Ö. Futbolcular ile Taekwondocuların Saldırganlık Düzeylerinin Karşılaştırılması, *Atatürk Üniversitesi BESYO, Beden Eğitimi ve Spor Bilimleri Dergisi*. Erzurum, 2002;4 (2) :37–39
17. Saygılı G. Atay E. Eraslan M. Hekim M. Düzenli Olarak Spor Yapan ve Yapmayan Öğrencilerin Kişilik Özellikleri ile Akademik Başarıları Arasındaki İlişkinin İncelenmesi, *Kastamonu Eğitim Dergisi*
18. Şahin Kafkas, A., Çoksevim, B. (2014). İzokinetik Egzersiz Programlarının Sporcuların Üst ve Alt Ekstremitelerinde Kas Grupları Üzerine Etkisi. İnönü Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 1(3):10-21.
19. Tok, Yaprak. "Cinsiyet Rollerine İlişkin Farklı Yargılara Sahip Üniversite Öğrencilerinin Saldırganlık Düzeyleri." Yayımlanmamış Yüksek Lisans Tezi. Ankara: Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü, 2001.
20. Tutkun E. Güner BÇ. Ağaoğlu SA. Soslu R. Takım Sporları ve Bireysel Sporlar Yapan Sporcuların Saldırganlık Düzeylerinin Değerlendirilmesi, *Spor ve Performans Araştırmaları Dergisi*, 2010; 1(1) 23-29.
21. Tuzgöl, Meliha. "Ana-Baba Tutumları Farklı Lise Öğrencilerinin Saldırganlık Düzeylerinin Çeşitli Değişkenler Açısından İncelenmesi." Yayımlanmamış Yüksek Lisans Tezi. Ankara: Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü, 1998.
22. Türk Dil Kurumu Türkçe Sözlük, Ankara, TDK Yayını, 1982: 884.
23. Weinberg SR. Gould D. Foundation of Sport and Exercise Psychology, Champaign, IL: Human Kinetics Publishers. 2007; s40.
24. Zeichner, Amos, Dominic J. Parrott, ve F. Charles Frey. "Gender Differences in Laboratory Aggression under Response Choice Conditions", *Aggressive Behavior*. 29: 95-106, 2003.

INVESTIGATION OF THE EFFECT OF 8-WEEK PILATES AND STRETCHING EXERCISES ON SPINAL CORD DEFORMATION IN CERABREL PALCY PATIENTS (CASE STUDY)

Zeynep YILDIRIM¹, Taner BOZKUŞ¹, Ayşegül YAPICI ÖKSÜZOĞLU²

1. Bartin University Faculty of Sport Sciences, Bartin/TURKEY, <https://orcid.org/0000-0002-8924-3759>

1. Bartin University Faculty of Sport Sciences

Corresponding author: zeyneperol.1989@gmail.com

Bartın/TURKEY, <https://orcid.org/0000-0002-4096-773X>

2. Pamukkale University Faculty of Sport Sciences, Denizli/TURKEY, <https://orcid.org/0000-0003-4243-5507>

Corresponding author: zerol@bartin.edu.tr

ABSTRACT

The purpose of this study is; The effect of pilates and stretching exercises on cerebral palsy, Static Encephalopathy, Non Progressive, Neuromuscular Encephalopathy, Brain Felci patients on Cobb bevel in Scoliosis, Lordosis, and kyphosis posture disorders. As a result of this purpose, 7-year-old autistic child who had shortening of the right leg muscle and spinal deformity due to Brain Felcine resulted in a total of 32 hours of pilates and stretching exercises with a condition of 4 days a week for 8 weeks. Single subject research method was used in the study and comparison of cobb bevel level before exercise and cobb angle level after exercise were compared. In the results obtained from the study, the cobb bevel level of the individual in the pre-test was Scoliosis; 13 °, Lordosis; 12 °, Kyphosis; 6 °. Cobb bevel in the measurement results obtained after the exercises applied Scoliosis; 8 °, Lordosis; 6 ° Kyphosis; 6 °. As a result, it was found that there was no change in the kyphosis Cobb bevel when the applied pilates and stretching exercises had a positive effect on the rate of scoliosis which was found to have the most positive effect on Lordosis level in living spinal cord deformation due to SP. **Conclusion:** These results indicate that pilates and stretching exercises have not improved especially in adolescence and thus have not improved in angle of view.

INTRODUCTION

Cerebral Palsy (CP) is a clinical syndrome of the brain that has not fully developed defined by symptoms such as dysfunctional, movement and posture disorders, mental insufficiency, hemiplegia, and dysarthria.⁹⁻¹⁸ It was first described by Little in 1861 and perinatal asphyxia (Lack of oxygen in the brain for a long time during birth) was accepted as the only cause of Cerebral Palsy for a long time.⁹ However, despite the advances in neonatal care and the increase in the frequency of cesarean section, the absence of a decrease in Cerebral Palsy disease has led to the discussion whether perinatal asphyxia plays a role in the diagnosis of Cerebral Palsy or not.⁷ Cerebral palsy (CP) is divided into five types: spastic, athetoid, ataxic, flask (hypotonic), and mix. The most common is the spastic type and usually affects 70% to 80% of cerebral palsy patients.¹⁴ Spastic CP is defined by increased muscle tone, the persistence of primitive reflexes, and hyperreflexia.¹³ Difficulty in starting and ending of the movement is observed in children with spastic CP due to the lack of harmony between agonist and antagonist muscle activity. In addition, increased suprasegmental reflexes (harmonizing vowels and consonants in speech) prevent the protective extensor required for lifelong postural control and ambulation, balance, and the protective reaction.¹² In these children, spasticity mostly affects the shoulder extensors, adductors, internal rotators, elbow flexors, pronators, and wrist flexors in the upper extremities. In addition, hip flexors, adductors, internal rotators, knee flexors, and ankle flexors are much more affected in the lower extremities. The most common problems in children with spastic CP are generally spasticity in the extremities, decreased muscle tone in the trunk, stereotypical movement pattern, slow motion, associated reactions, joint deformities due to muscle weakness, posture and gait disorders.¹¹ Cerebral palsy is a quite common static encephalopathy that can occur with multiple musculoskeletal problems. The increase in peripheral muscle tone, causing a decrease in the joint and muscle flexibility, reduces the patient's range of motion. Scoliosis, lordosis, and kyphosis risk increases as the severity of musculoskeletal involvement increases. Scoliosis, lordosis, and kyphosis negatively affect the functional capacity, daily care and nutrition of the patients.¹⁶ Scoliosis is the three-dimensional bending injury of the spine of 10 degrees or more and it is one of the most common types of damage to the spine. Scoliosis is derived from the Greek word for "curvature, skew".¹⁸ In a healthy human spine, the vertebrae lie from top to bottom, in a straight line in the neck, back and waist regions, while in scoliosis patients the vertebrae shift to the right or left and also rotate around their own axis.¹⁶ Scoliosis is one of the most important issues of orthopedic surgery, with advances in diagnosis and treatment, but still involving many problems that need to be resolved despite its medical history dating back many years. Scoliosis can cause back pain, decrease in functional capacity due to movement difficulties, aesthetic concerns and related psychological distress, and even cardio-pulmonary functional loss in advanced degrees of curvature.⁵ Lordosis is a condition in which there is an excessive curvature of the spine in the waist. The spine naturally curves in the neck, back and waist to support the weight of the head and absorb shock. Lordosis occurs when the natural curve in the waist, that is the lumbar region, is above normal. This situation causes excessive pressure in the spine and causes pain. People with lordosis usually have a visible curve in the waist. When viewed from the side, the waist makes a certain C shape. Also, people with lordosis appear to be pushing their stomach and hips outward.⁶ Kyphosis is defined as the anterior tilting of the vertebral column, mostly in the thoracic region, as a result of increased convexity from the back. In kyphosis, there is a shortening in the anterior column of the vertebral column while there is an increase in its posterior column.⁸ There is a normal kyphosis angulation in the thoracic and sacral regions in the sagittal plane in a healthy person. Pathological conditions usually occur in the thoracic region since the sacral region is more stable. It is of primary importance to decide whether the developing kyphosis is pathological or not. Patients generally apply to clinics complaining about their physical appearance. Pain and neurological problems are also

among the complaints of patients.⁴The general objectives of rehabilitation in children with cerebral palsy can be summarized as minimizing the impact of physical disorders, gaining independence in society, and improving the quality of life of children and families who play a major role in this process. Rehabilitation in children with cerebral palsy varies according to the type and degree of the disease, additional disorders, the age of the children, and socioeconomic factors. In addition, visual, auditory, and cognitive disorders, seizures, learning difficulties, and emotional problems are factors that affect the treatment outcomes.¹⁷

METHOD

Research Group

In this study, the single-subject case analysis method was used, and it was carried out with a 7-year-old male who was diagnosed with autism and spastic cerebral palsy living in Bartın Province. It has been determined that the individual has a shortening of the right leg muscle as a result of the decrease in muscle flexibility due to Spastic CP and a spinal deformity accordingly.

Data Collection Tool In the study, 32 hours of reformer Pilates and stretching exercises were applied for the aim of data collection within 8 weeks (4 days in a week, 1 hour in a day). Spinal cord (MR) pre-test measurements of the individual participating in the research were taken at Bülent Ecevit University Faculty of Medicine and the same measurements were taken again after the 8-week exercise program.

8-week exercise program	Duration	Exercises Performed
Start	10 min	5 min walking at a moderate pace 5 min stretching of all body muscles
Reformer	25 min	Half Hundred Obliques Hip Rolls Shoulder Bridge Implementation of the exercises as 3 sets of 8 repetitions
Stretches	15 min	Stretching the hamstring muscle Stretching the hip flexor muscles Flexion and extension application to the Lumbar Spine area Abdominal Stretches Scapula Stretches
Finish	10 min	5 min walking at a slow pace 5 min cool down exercise

Data Analysis

The analysis of the data was performed by examining the pre-test and post-test measurement results and by comparing the x-ray results of the individual's kyphosis, scoliosis, and lordosis Cobb angles. Evaluation and analysis of the results were carried out in the presence of an x-ray specialist.

RESULTS

Cobb angle values, taken before the exercise, of the individual diagnosed with Spastic Cerebral Palsy and autism, were Scoliosis; 13°, Lordosis; 12° and Kyphosis; 6° respectively. When these values were examined, it was determined that the indicated Cobb angles were higher than they should be considering the physical figures of the individual as a result of the decrease in muscle flexibility due to Spastic CP and he had a borderline Cobb angle according to the degree of diagnosis of spinal cord injury. During the 8-week exercise period, reformer exercises were first applied in Pilates exercises, and then stretching exercises were applied to gain muscle flexibility. These exercises were prepared and applied considering the diagnosis of autism and CP and other developmental characteristics of the individual. The applied exercise program was carried out in his home environment where the individual lived, with the thought that the child would feel comfortable and adapt more easily to exercise since the child was also diagnosed with autism. Angle measurements were taken again after the applied exercise program and the values of the Cobb angles were respectively found as Scoliosis; 8°, Lordosis; 6°, Kyphosis; 6°. When the pre-test and post-test Cobb angles of the participant were examined, it was determined that there was a 5° decrease in Scoliosis measurements (Pre T.; 13°, Post T.; 8°), and it was determined that Pilates and stretching exercises positively affect the diagnosis of Scoliosis. When the pre-test and post-test Cobb angles of the participant were examined, it was found that there was no change in Kyphosis measurements (Pre T.; 6°, Post T.; 6°). When the pre-test and post-test Cobb angles of the participant were examined, it was found that there was a 6° decrease in the lordosis measurements (Pre T.; 12°, Post T.; 6°) and the exercise applied had a positive effect on the lordosis value. It is thought that the most positive change occurred in the Lordosis Cobb angle due to the fact that the type of exercise performed was in the supine position.

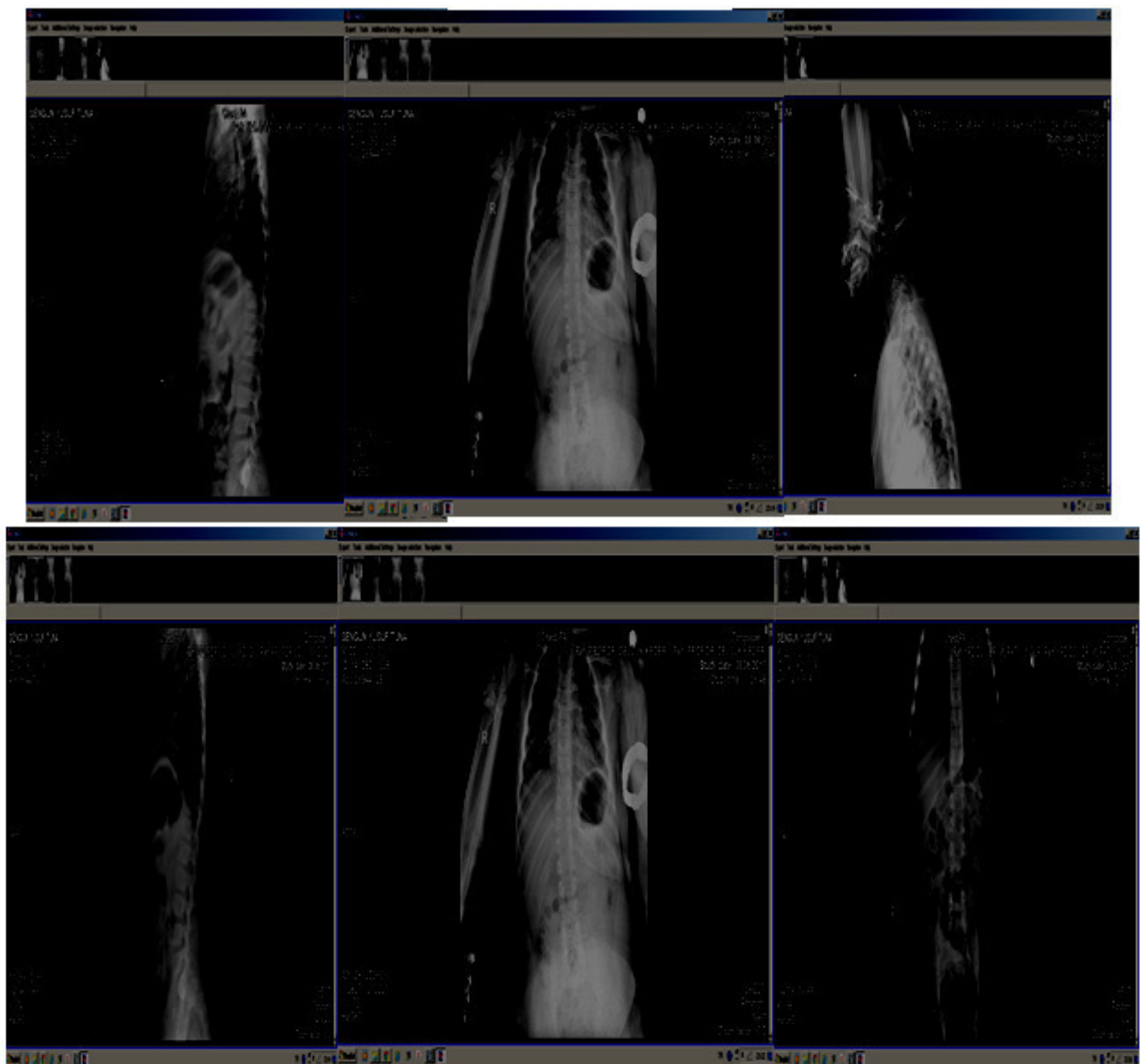


Figure 1: Lordosis, Scoliosis and Kyphosis Pre-test and Post-test Measurement Results of the Individual Participating in the Study

DISCUSSION

It is known that CP syndrome, which is defined as cerebral palsy, causes damage to the conduction system of the brain and muscles. It has been determined that it is commonly observed that the muscles lose their flexibility over time as a result of the reduction of the conduction in the muscles, and accordingly, posture disorders. In the study, it was aimed to correct the existing disorder and regain the flexibility of the muscles of the individual with posture disorder due to CP with Pilates and flexibility exercises and it was observed that the individual has Cobb angle values of Scoliosis; 13°, Lordosis; 12° and Kyphosis; 6° according to the X-ray results in the pre-test measurements. When these values were examined, it was determined that the angle of lordosis in the individual was quite high and the exercise program was applied considering these angle values. After the exercise program, a result was reached in line with the goals determined at the beginning of the study and the final test values were found as Scoliosis; 8°, Lordosis; 6° Kyphosis; 6°. When the literature is reviewed, a similar study in which Pilates exercise is applied to individuals with CP and autism to regain muscle flexibility or to regulate existing posture disorders has not been found. However, Bahadır, in his modified Pilates study conducted in 2011, concluded that Pilates contributed positively to spinal cord disorders and this result was determined to support our study.³ Aydın (2007) emphasized the importance of exercise in children with cerebral palsy in his study titled Therapeutic exercises in 2007. Emphasizing that one of the exercise programs applied is Pilates, he stated that this type of exercise has a positive effect on gaining muscle flexibility, and this explanation, which is in line with our study, supports our research.² Polat et al's emphasis on the effectiveness of exercise in regaining muscle flexibility and eliminating physical deprivations in children with Cerebral Palsy as a result of spinal cord injury in their research, titled as swimming and water therapy as treatment methods in cerebral palsy in 2018, supports our study.¹⁵ In their study, Thorpe and Reilly applied a program including walking in the water, lower extremity resistance exercises for 10 weeks (1 day in a week) for a 31-year-old individual with CP, and emphasized that there was an improvement in lower extremity gross motor function score, walking speed, muscle strength, and self-perception parameters. The result in this study, that the exercise affects the physical development of individuals with CP, supports our study.¹⁹ Kelly and Darrah, in their study, pointed out that the underwater exercise programs applied to children with CP had positive effects on gross motor function, walking, muscle strength, respiratory function and flexibility. This research also supports our study.¹⁰

CONCLUSION

In conclusion, it is thought that Pilates and stretching exercises have the ability to rehabilitate patients with lordosis and scoliosis, who are especially diagnosed at an early age, and it is possible to treat these individuals without surgical intervention by ensuring the continuity of the exercises. It is suggested that conducting similar studies, that will contribute to the literature, will be important both for these individuals to have a healthy life and to be a resource in the literature.

REFERENCES

1. Allington N.J, Bowen J.R. (1996). Adolescent idiopathic scoliosis: Treatment with the Wilmington brace. A comparison of full time and part time use, *Journal Bone Joint Surgery*, 78 : 1056 –1062.
2. Aydın, R. (2007). Terapötik Egzersizler, *Türkiye Klinikleri J Pediatr Sci.*, 3(5):59-64.
3. Bahadır, Z. (2011). Neden Modifiye Pilates, *Journal of Exercise Therapy and Rehabilitation*, 1(1):17-25
4. Bernhardt M. (1997). Normal spinal anatomy: Normal sagittal plane alignment. In: Bridwell KH, DeWald RL (eds). *The textbook of spinal surgery*. 2nd ed. Philadelphia, Lippincott-Raven, 185-91.
5. Bradford D.S, Lonstein J.E, Moe J.H. (1987). *Moe's Textbook of Scoliosis and other Spinal Deformities*. 2. ed., 41-58.
6. Cecchinato R, Redaelli A, Martini C, Morselli C, Villafane J.H, Lamartina C, Berjano P. (2007). Long fusions to S1 with or without pelvic fixation can induce relevant acute variations in pelvic incidence: a retrospective cohort study of adult spine deformity surgery.
7. Flodmark O (2003). Brain imaging studies of individuals with cerebral palsy. In *Rivista di Neuroradiologia*. pp: 183-184, 2003.
8. Gokce A, Ozturkmen Y, Mutlu S, Caniklioğlu M. (2008). Spinal osteotomy: correcting sagittal balance in tuberculous spondylitis. *J Spinal Disord Tech*, 21 (7): 484- 488.
9. Hill A, Volpe J.J. (1999). Hypoxic-ischemic Cerebral Injury in the Newborn. In Swaiman KF, Ashwal S (eds): *Pediatric Neurology*. Third ed. St Louis: Mosby, 191-204.
10. Kelly M, Darrah J. (2005). Aquatic exercise for children with cerebral palsy. *Dev Med Child Neurol*. 47:838-42.
11. Levitt S. (2010). *Cerebral Palsy and Motor Delay*. 5 th. ed. Wiley- Blackwell: London.
12. Livanelioğlu A, Günel MK. (2009). *Serebral Palside Fizyoterapi*. Ankara
13. Ozkan Y. (2018). Child's quality of life and mother's burden in spastic cerebral palsy: a topographical classification perspective. *J Int Med Res*, 46(8):3131-3137.
14. Qin Y, Li Y, Sun B, et al. (2018). Functional Connectivity Alterations in Children with Spastic and Dyskinetic Cerebral Palsy. *Neural Plast*.
15. Polat, S. Kabakcı, A.G. İnce, G. Yücel, A. H. (2018). Serebral Palsi'de Tedavi Yöntemleri Olarak Yüzme ve Su İçeri Terapi, *Arşiv Kaynak Tarama Dergisi*, 27(3):274-286.
16. Sanger TD, Chen D, Fehlings DL, et al. (2011). Definition and Classification of Hyperkinetic. *Mov Disorder*, 25(11):1538-1549
17. Styer-Acevedo J. (1999). Physical therapy for the child with cerebral palsy. In: Tecklin JS, editor. *Pediatric physical therapy*. 3rd ed. Philadelphia: Lippincott Williams & Wilkins, 179-230.
18. Swaiman K.F. (1999). Cerebral Palsy. In Swaiman KF, Ashwal S (eds): *Pediatric Neurology*. Third ed. St Louis. Mosby. Pp: 312-324.
19. Thorpe DE, Relly MA. (2008). The effect of an aquatic resistive exercise program on lower extremity strength, energy expenditure, functional mobility balance and self-perception in an adult with cerebral palsy: a retrospective case report. *Journal of Aquatic Physical Therapy*. 8:18–24.

INVESTIGATION OF THE PSYCHOLOGICAL LEVELS OF SPORTS-EDUCATED UNIVERSITY STUDENTS

Bilal Okudan*¹, Feyzullah Koca²

1. Dr. Academician Okudan Bilal, Adnan Menderes University, Faculty of Sport Sciences, Aydın, Turkey, ORCID ID: 0000-0003-4290-0421

2. Accosicate Professor Koca Feyzullah, Erciyes University, Faculty of Sport Sciences, Kayseri, Turkey, ORCID ID: 0000-0002-0332-2334

Corresponding author: bilalokudan@gmail.com

ABSTRACT

The aim of this study is to investigate the psychological levels of sports-educated university students according to their gender, their grade level, their department and the type of sports they do. Independent t test and one-way ANOVA were used for statistical analysis. Students' sub-dimensions of coping with difficulty, being open to learning, concentration, confidence and achievement, goal setting, being able to perform well under pressure and getting rid of anxiety and total scale scores did not show a statistically significant difference according to gender, class level and type of sport ($p > 0.05$). The scale total scores showed a statistically significant difference between the sub-dimensions of being open to learning, trust and achievement, goal setting and getting rid of anxiety according to the department they studied ($p < 0.05$ and $p < 0.001$). **Conclusion:** It has been determined that the psychological levels of sports-educated university students do not change according to gender and grade level, and differ according to the department they study. In addition, the psychological skill levels of the students, who are all team sports, did not change according to the type of sports they do. It is recommended to conduct this study with a larger group, considering team and individual sports.

Keywords: Sport, Student, Psychology, Success

INTRODUCTION

It is accepted that psychological characteristics as well as physical characteristics are effective in the success of athletes. Psychological skills are factors that increase motivation in humans and cause the emergence of existing abilities and ultimately increase the success of the athlete. Among these factors, goal setting, imagination, self-talk, motivating speech, changing the direction of thought, autogenic training and gradual relaxation techniques, besides factors such as fear and stress, these factors should be envisioned. The factors that maximize performance and provide motivation are seen as psychological skills.¹¹ In addition to the skills that will increase the performance of the athlete, the fact that the athlete places the inadequate movements in the subconscious by studying and using them when necessary is called sportive skill.⁵⁻²⁶ Mental training and skills, which are a systematic and programmed process that enable the learning and development of psychological abilities such as motivation, concentration, focusing attention, self-confidence, positive thinking and affect, goal setting, control, and similar, are considered indispensable to achieve high performance in sports activities (Neff, 2010). Concentration is the ability to maintain your ability to focus on what you are doing against internal and external stimuli that constantly affect you.³ The high concentration levels of athletes before training and competition indicates that their attention levels are also high (Weinberg 2011, Williams 2006). A high level of attention decreases the share of erroneous movements to be made in training and competition. Keeping the concentration level at a high level increases the efficiency of mental and physical training. For a good concentration level, the athlete should focus directly on the level of attention and set specific goals.⁵⁻³ Durand-Bush et al. (2001) highlighted commitment, goal setting and self-confidence skills in the mental skills category. Mental factors in sports activities can be revealed by improving the skills and skill movements of athletes.¹⁹ The importance of self-confidence skill to reach elite performance level in sports has been revealed by some scientific studies. Self-confidence, which means being aware of the skills and characteristics of the individual about belief in successful future performance, is considered among the determinants of high-level performance.⁷ Trust and Success Motivation Self-confidence skill leads to positive emotions to come to the fore. It also helps to increase concentration, facilitate goal setting, devote one's effort to the branch, and lastly, the continuity of the mental processes that the person needs to develop in the game.⁸ Goal Setting and Mental Preparation: Measures whether an athlete sets specific performance goals and works in this direction. Goal Setting is the determination of goals and objectives that provide motivation and direction.⁴ Goals are the facts that direct the results that inspire the success of the individual. As motivational factors, the positive effects of short-term and long-term goals on successful performance have been determined by many studies (Yıldız and et al., 2010; Locke and Latham, 2002). Ability to Cope with Difficulties: Measures whether an athlete can be positive, enthusiastic, calm, in control and quickly overcome his mistakes, even when the situation gets worse.⁵⁻²⁶ Being Open to Learning: It measures whether the athlete is open to learning and accepts constructive criticisms without personal perception and without worry.⁵⁻²⁶ Concentration can be expressed as the ability to direct and maintain a person's attention in accordance with their purpose.¹⁵ Getting Rid of Worries: It can be expressed as reducing the psychological worries, tension and anxiety level of the person.²⁰⁻²³ The aim of this study is to investigate the psychological levels of sports-educated university students according to their gender, their grade level, their department and the type of sport they do.

METHODS

Participants. 225 male and 120 female students studying at the sports faculty participated in this study. They completed the psychological skills assessment scale on a voluntary basis.

Measuring tool

Scale for Assessing Psychological Skills of Athletes (ACSI-28): The scale (APPENDIX II.) Is a self-assessment tool developed by Smith and et al. (1995) to evaluate the psychological skills of athletes. Turkish validity and reliability study was conducted by Erhan et al. (2015). This tool developed for athletes consists of 28 items, 7 sub-dimensions, and each sub-dimension consists of 4 items. The scale, which consists of 28 items in total, is a 4-point Likert type scale. The scoring was scored between 0 and 3 according to the expressions 'Almost never', 'Sometimes', 'Often' and 'Almost always'. The questions numbered 3,7,10,12,19 and 23 of the scale are negative and they should be numbered reverse. Scoring for sub-dimensions ranges from 0 to 12, and an increase in the score obtained from the scale indicates that the athlete's psychological skills are good.

Statistical analysis

SPSS 23.0 package program was used for data analysis. Independent t test and one-way ANOVA were used in the statistical analysis of the data.

RESULTS

Table 1. Psychological skills assessment according to gender

	Gender	N	Average	St.deviation	t-test
Coping with difficulties	Male	225	6,53	1,84	-0,26
	Female	120	6,58	1,89	
Open to learning	Male	225	6,45	1,61	-0,18
	Female	120	6,45	1,74	
Concentration	Male	225	6,77	2,28	0,42
	Female	120	6,67	1,76	
Trust and success	Male	225	7,17	2,07	-0,32
	Female	120	7,24	1,85	
Targeting	Male	225	6,71	1,98	-0,02
	Female	120	6,72	1,91	
Ability to perform well under pressure	Male	225	6,70	1,69	0,65
	Female	120	6,57	1,92	
Dealing with anxiety	Male	225	5,65	1,76	0,35
	Female	120	5,58	1,79	
Total Score	Male	225	45,98	8,13	0,20
	Female	120	45,81	7,47	

Table 2. Psychological skills assessment of the students according to their department

	Department	N	Average	St.deviation	F/LSD
Coping with difficulties	Teacher (1)	95	6,69	1,48	1,19
	Coaching (2)	123	6,33	1,61	
	Sports Management (3)	100	6,73	2,39	
	Recreation (4)	27	6,33	1,75	
	Total	345	6,55	1,85	
Open to learning	Teacher (1)	95	6,17	1,20	7,46** 3>1,2,4
	Coaching (2)	123	6,17	1,35	
	Sports Management (3)	100	7,09	2,21	
	Recreation (4)	27	6,37	1,33	
	Total	345	6,45	1,66	
Concentration	Teacher (1)	95	6,91	1,49	0,34
	Coaching (2)	123	6,63	2,38	
	Sports Management (3)	100	6,68	2,45	
	Recreation (4)	27	6,81	1,27	
	Total	345	6,73	2,12	
Trust and Success	Teacher (1)	95	7,31	1,37	3,04* 3>1,2,4 1>4
	Coaching (2)	123	7,01	1,96	
	Sports Management (3)	100	7,54	2,52	
	Recreation (4)	27	6,37	1,55	
	Total	345	7,19	1,99	
Targeting	Teacher (1)	95	7,04	1,47	2,94*

		Coaching (2)	123	6,42	1,73	1>2,4
		Sports Management (3)	100	6,91	2,51	
		Recreation (4)	27	6,15	1,83	
		Total	345	6,71	1,95	
Ability to perform well under pressure	with	Teacher (1)	95	6,93	1,30	1,41
		Coaching (2)	123	6,67	1,67	
		Sports Management (3)	100	6,42	2,28	
		Recreation (4)	27	6,48	1,48	
		Total	345	6,65	1,78	
Dealing with anxiety	with	Teacher (1)	95	5,13	1,43	4,94* 1<2,3
		Coaching (2)	123	5,63	1,51	
		Sports Management (3)	100	6,08	2,24	
		Recreation (4)	27	5,74	1,56	
		Total	345	5,63	1,77	
Total Score		Teacher (1)	95	46,17	4,47	2,96* 2<3
		Coaching (2)	123	44,85	6,39	
		Sports Management (3)	100	47,45	11,58	
		Recreation (4)	27	44,26	5,74	
		Total	345	45,92	7,90	

*p<0.05 and **p<0.001

Table 3. Sports Psychological evaluation skills of students according to their branches

Sport branches		N	Average	St. deviation	F
Coping with difficulties	Football	131	6,53	1,71	0,06
	Basketball	92	6,48	1,66	
	Volleyball	76	6,65	1,35	
	Handball	46	6,57	2,11	
	Total	345	6,55	1,85	
Open learning	Football	131	6,38	1,76	1,31
	Basketball	92	6,10	1,36	
	Volleyball	76	6,38	2,47	
	Handball	46	6,63	1,45	
	Total	345	6,45	1,66	
Concentration	Football	131	6,50	1,75	1,30
	Basketball	92	6,64	1,12	
	Volleyball	76	7,23	1,53	
	Handball	46	6,88	2,65	
	Total	345	6,73	2,12	
Trust and Success	Football	131	7,08	1,88	0,25
	Basketball	92	7,26	1,78	
	Volleyball	76	7,19	1,60	
	Handball	46	7,28	2,21	
	Total	345	7,19	1,99	
Targeting	Football	131	6,47	1,78	1,88
	Basketball	92	6,55	1,66	
	Volleyball	76	7,31	1,49	
	Handball	46	6,87	2,22	
	Total	345	6,71	1,95	
Ability to perform well under pressure	Football	131	6,58	1,56	0,77
	Basketball	92	6,52	1,60	
	Volleyball	76	6,35	2,04	
	Handball	46	6,81	1,95	
	Total	345	6,65	1,78	
Dealing with anxiety	Football	131	5,61	1,69	1,79
	Basketball	92	5,29	1,85	
	Volleyball	76	5,15	1,59	
	Handball	46	5,83	1,82	
	Total	345	5,63	1,77	

Total Score	Football	131	45,15	7,92	1,41
	Basketball	92	44,83	4,51	
	Volleyball	76	46,27	6,64	
	Handball	46	46,87	8,74	
	Total	345	45,92	7,90	

DISCUSSION

Micoogulları and et al., (2020) in one study, no significant difference was found between athletes in terms of self-confidence, goal setting and determination skills according to gender and type of sports branch. Yucel (2003), stated in his study that the gender of the athletes did not affect the state anxiety and trait anxiety. Yıldız and et al. (2019) in their studies, they found no significant differences in the scores of the psychological skills assessment scale according to the gender variable. In the study conducted by Guler (2015), it was determined that the average scores of male athletes participating in the study regarding the level of psychological skills use were statistically significantly higher than the average scores of female athletes (except for the openness to learning sub-dimension of the study). Ayrancı and et al. (2019) in this study, it was observed that there was no significant difference in terms of being open to learning, trust and success motivation, getting rid of worries and total score of the athletes according to their gender. On the other hand, it was seen that there was a significant difference in favor of women in the sub-dimensions of coping with difficulties, concentration, goal setting and mental readiness, and in favor of men in the sub-dimension of being able to perform well under pressure. In this study, the sub-dimensions of coping with difficulty, being open to learning, concentration, confidence and achievement, goal setting, being able to perform well under pressure and getting rid of anxiety and total scale scores did not show a statistically significant difference according to gender ($p>0,05$). In this study, the scores that men and women got from the sub-dimensions are similar. This situation may also have an effect on their education. In this study, according to the department they read the student be open to learning, confidence and success, goal setting and scale total score and subscales get rid of the concern showed a statistically significant difference ($p<0.05$ and $p<0.001$). The difference between the scores of the students' coping with difficulties, performing well under pressure and concentration sub-dimension scores according to the department they read is statistically insignificant. ($p>0.05$). In the sub-dimensions of being open to learning and trust and success, the scores of the sports management students are higher than the students of the teaching, coaching and recreation departments. In setting goals, the scores of the teaching departments are higher than the students of the coaching and recreation departments. Students of teaching department got the lowest score in the subscale of getting rid of anxiety. The thought of whether they can be appointed as teachers or not may be effective. Vanek and Cratty (1970) He stated that team athletes were less anxious than individual athletes and had higher self-confidence. Yıldız and et al., (2019) found a statistically significant difference between the average scores of athletes who are interested in individual and team sports in their level of using their psychological skills. Ayrancı and et al. (2019) in their study, it was found that there was no significant difference in the sub-dimensions of goal setting and mental preparation, good performance under pressure and getting rid of worries, according to the sports branch in which the athletes were engaged, while being able to cope with difficulties, being open to learning, concentration, confidence and motivation of success and total score were significant in favor of team athletes. It was determined that there was a difference. In this study, there was no statistically significant difference between the sub-dimensions of coping with difficulty, being open to learning, concentration, confidence and achievement, goal setting, good performance under pressure and getting rid of anxiety, and total scale scores according to the type of sport ($p> 0.05$). The different results of the two studies can be attributed to the difference of the subjects and the fact that all types of sports in this study are team sports.

CONCLUSION

It has been determined that the psychological levels of sports-educated university students do not change according to gender and class level, and differ according to the department they study. In addition, the psychological skill levels of the students who are all team sports did not change according to the type of sports they do. It is recommended to conduct this study with a larger group, considering team and individual sports.

REFERENCES

1. Ayrancı M.,Çamurcuoğlu Y.,Çallı M.,Duran R.,Kaya A. (2019). Spor Bilimleri Fakültesinde Öğrenim Gören Sporcuların Psikolojik Becerilerinin İncelenmesi, 11. Uluslararası Spor
2. Camiası Sempozyumu Tam Metinleri,(Editörler: Faruk Yamaner-Sami Baskın),Rize,sh: 214224
3. Beşiktaş Y. (2012). Sporda Zihinde Canlandırmak, 1. Baskı, İstanbul: Beyaz Yayınları
4. Burton D. (1993). GoalSetting İn Sport. In R.N. Singer, M. Murphey, &L.K.Tennant (Eds), Handbook of Researc On Sport (Pp. 467 -491). New York: Macmillan
5. Erhan E., S , Bedir, D , Güler, M , Ağduman, F . (2019). Sporcuların Psikolojik Becerilerini
6. Değerlendirme Ölçeğinin Türkçe Geçerlilik Güvenirlik Çalışması, Beden Eğitimi ve Spor Bilimleri Dergisi, 17 (1) , 59-71.
7. Hartl P. Hartlova H. (2000). Psychology dictionary. Praha: Portal.
8. Harwood C., Cumming J., Fletcher D. (2004). Motivational profiles and psychological skills use within elite youth sport. Journal of Applied Sport Psychology. 16, 318–332. Hays K., Maynard I., Thomas O., Bawden M. (2007). Sources and types of confidence identified by world class sport performers. Journal of Applied Sport Psychology. 19, 434– 456.
9. Holgado F., Navas L., López-Núñez M. (2010). Goal orientations in sport: a causal model. European Journal of Education and Psychology. 3, 19-32.

10. Locke EA., Latham GP. (2002). Building a practically useful theory of goal setting and task motivation. *American Psychologist*. 57(9), 705-717.
11. Malina R.M., Ribeiro B., Aroso J., Cumming S.P., 'Characteristics of youth Soccer Players Aged 13-15 Years Classified By Skill Level', *Br J Sports Med*, 2007; 41:290-295.
12. Miçooğulları BO., Ekmekçi R., Dağışan Y. (2020). Üniversite Sporcu Öğrencilerinde Kendine Güven Hedef Belirleme ve Kararlılık. *Beden Eğitimi ve Spor Bilimleri Dergisi*. 14(2), 133-144.
13. Neff R. (2010). *Mental Training For Athletes and Other Performers 2006*, www.Mentaltraininginc.Com
14. Nideffer, R.M., & Sagal, M. (1998). "Concentration and Attention Control". In J.M. Williams (Ed), *Applied Sport Psychology: Personal Growth To Peak Performance* (3rd Ed.,Pp.296 -315). Mountainview, CA: Mayfield Murphy & Jowdy,1992)
15. Porter K. (2003). The mental athlete: Inner training for peak performance in all sports. Canada. Human Kinetics.
16. Ryba T., Stambulova N., Wrisberg C. (2005). The Russian origins of sport psychology: A translation of an early work of A. C. Puni. *Journal of Applied Sport Psychology*. 17, 156-169.
17. Smith R and Christensen D (1995) *Journal of Sport&ExercisePsychology*, 1995.17.399415 1995 Human Kinetics Publishers, Inc.
18. Weinberg RS., Gould D. (2011). *Foundations of sport and exercise psychology*. 52. Baskı. Champaign, IL. Human Kinetics.
19. Williams J. (Ed), (2006). *Applied Sport Psychology Personal Growth to Peak Performance*. 5th. Ed, New York: Mcgraw - Hill.
20. Williams. J.M, & Harris, D.V. (1998). "Relaxation and Energizing Techniques For Regulation of Arousal". In J.M. Williams (Ed), *Applied Sport Psychology: Personal Growth To Peak Performance* (3rd Ed.,Pp.219 -236). Mountainview, CA: Mayfield
21. Vaněk, M., & Cratty, B. J. (1970). *Psychology and the superior athlete*. Macmillan.
22. Yıldız, M. E., & Erhan, S. E. (2019). Kış sporu ile uğraşan sporcuların psikolojik becerilerinin incelenmesi. *IntJourExerPsc*, 1(1):24-32.
23. Yücel, Ebru O. (2003). Taekwondocuların Durumluk ve Sürekli Kaygı Düzeyleri ve Müsabakalardaki Başarılarına Etkisi, Yüksek Lisans Tezi, Gazi Üniversitesi Sağlık Bilimleri Enstitüsü Beden Eğitimi ve Spor Anabilim Dalı, Ankara.

THE EFFECTS OF OMEGA-3 SUPPLEMENTS COMBINED WITH ENDURANCE EXERCISES ON ALBUMIN, BILIRUBIN AND THYROID METABOLISM

Zarife PANCAR

Gaziantep University, Sports Science Faculty, Gaziantep/Turkey

Corresponding author: z_panca@hotmail.com

(Orcid:0000-0002-1659-2157)

ABSTRACT

The aim of this study is to examine the effects of Omega-3 supplements given to young handball players for six weeks in addition to endurance exercises on the levels of albumin, bilirubin, thyroid stimulating hormone (TSH), triiodothyronine (T3) and thyroxine (T4). For this purpose, 28 volunteer male athletes, who are registered athletes in a sports club, participated in the study. The athletes participating in the study were randomly divided into four groups as control (n: 7), omega-3 supplement group (n: 7), exercise group (n: 7), and exercise + reinforcement group. No application was applied to the control group. Six weeks, three days a week, 60 minutes of endurance exercise programs were applied to the exercise group in addition to handball training. Omega-3 fish oil (1000 mg / oral) chewable herbal capsule was given to the supplement group in adult dose at the same time every day for six weeks, accompanied by a nutritionist. Blood samples were taken from all individuals included in the study between 09:00 and 10:00 in the morning before the experiment and one day after the application. Albumin (g / dL), bilirubin (mg / dL), TSH (mIU / L), T3 (pg / ml) and T4 (ng / dl) values were analyzed in the blood samples taken. SPSS 22.0 (Inc., Chicago, IL, USA) program was used for statistical analysis of the data obtained. In the statistical analysis of the data obtained, a statistical significance at the level of 0.05 was determined in favor of the post-test in the TSH values in the reinforcement, exercise, and reinforcement + exercise groups. Again, unlike the control group, TSH values were found to be significant in favor of the reinforcement group, exercise group, and reinforcement + exercise group ($p < 0.05$). No significance was found between the groups in terms of albumin, bilirubin, T3 and T4 hormone levels ($p > 0.05$). As a result, it can be said that endurance exercises and additional Omega-3 supplements given for six weeks affect the levels of thyroid stimulating hormone, which has a regulating effect on biochemical events in the development of thyroid gland cells and in the release of hormones.

Keywords: Fatty acids, exercise, metabolism, supplementation

INTRODUCTION

Omega-3 (ω -3), fatty acids are essential fatty acids that participate in the structure of the cell membrane and are necessary for the cell to maintain its normal functions. The fluidity and flexibility of the cell membrane depends on the amount of essential fatty acids in the membrane.^{1,2} Omega-3 fatty acids, which are effective on gene expression and intracellular communication, also provide the cell's energy need and help maintain body temperature (3). It is recommended that an adult take 1-1.5 grams of omega-3 fatty acids daily under normal conditions. Approximately 3 grams or more of omega-3 can be used in the treatment of some specific diseases.⁴ Exercise not only causes anthropometric changes in the human body, but also causes physiological changes such as hypertrophy, strength-strength gain, hormonal changes.^{5,6,7} and some performance variables such as endurance and strength that can be seen as a result of these changes are factors affecting the sportive success.^{8,9,10} These changes seen during or after exercise bring along some enzymatic and hormonal adaptations.^{11,12} The diversity of hormones, their effective role in providing homeostasis, exercise, stress and so on, hormones for reasons such as changes in situations, it has become one of the topics that sports scientists have been working on for years and is constantly up-to-date.^{13,9} It is known that regular physical exercise provides protection against mortality with its protective and therapeutic effect against diseases such as cardiovascular diseases, ischemic heart disease, heart failure, chronic obstructive pulmonary disease and type 2 diabetes.^{14,15} Physical activity has an effect on improving aerobic performance, cardiovascular endurance, muscle strength and flexibility, body composition, as well as reducing anxiety, increasing self-confidence and self-esteem.¹⁶ Based on this information, the effects of both exercise and supplementation of omega3 fatty acids on the metabolism of albumin, bilirubin and thyroid have been the subject of research. The aim of this study is to examine the effects of Omega-3 supplementation given to young handball players for six weeks in addition to endurance exercises on the levels of albumin, bilirubin, thyroid stimulating hormone (TSH), triiodothyronine (T3) and thyroxine (T4).

METHODS

Experimental design

This study is an experimental study with a randomized control group. Randomized controlled studies are studies with high evidence value that directly affect clinical decisions and investigate the effectiveness of different treatment trials. It is one of the most suitable methods to make reliable and valid comparisons (17). Inclusion criteria were determined as the individuals participating in the study, being healthy, having no chronic disease, not smoking and regularly doing sports. Six-week endurance training was applied at the same time, three days a week. Apart from that, they were told to avoid strenuous physical activities. All subjects were informed about the study and their descriptive information was recorded.

Subjects

Athletes between the ages of 19-22 who were enrolled in the study for a sports club, who continued their handball training, were selected to work on a voluntary basis. Volunteer participation certificate was obtained from athletes and trainers.

Nutritionist opinion and support was obtained on the diet and supplements of the athletes. Measurements of all participants were taken before starting the study and one day after.

Procedures

Exercise Protocol

Apart from handball training, the athletes participating in the study were subject to six weeks of endurance exercises. In the exercise procedure, a twenty-minute active warm-up period, sixty minutes of handball and endurance exercises, and ten minutes of cool-down exercises were performed after the end of the training. Training intensity of the first three weeks of training was adjusted to a maximum of 55-60% according to the condition levels of the athletes. In the last three weeks of the training, the training intensity was calculated by using the Karvonen method and increased to 65-75% maximum (18).

Determination of Biochemical Analysis

Blood samples were taken from the participants in the resting condition twice before and after 24 hours the study. Venous blood samples were collected from the right arm of the participants into 5ml at the central laboratory of Gaziantep University Faculty of Medicine between the hours of 09:00 and 10:00 in the morning. Blood samples were collected by a gel biochemistry tube by expert. Blood samples were centrifuged at 4000 rpm for 10 minutes. Albumin, Bilirubin, TSH, T3 and T4 levels were determined in blood samples using auto analyzer.

Statistical analysis

SPSS 22.0 (SPSS Inc., Chicago, IL, USA) program was used for statistical analysis. Values were represented as mean and standard deviation, and significance was set at 0.05. Kolmogorov-Smirnov test was performed to assess normality, and 2x4 mixed-factor analysis of variance and least significant difference tests were performed to analyze intra- and intergroup differences.

RESULTS

Statistical information of the data obtained from the study is shown in Table 1. No significance was found in the values of the control group in thyroid stimulating hormone levels ($p > 0.05$). Statistical significance was found in the post-test values of the omega 3 supplement group (1.40 ± 0.44), the exercise group (1.53 ± 0.68), and the omega-3 + exercise group (1.60 ± 1.23) ($p < 0.05$). In the intergroup analysis of TSH values, a difference was found in favor of all groups compared to the control group ($p < 0.05$). There was no statistically significant difference in T3, T4, Albumin and Bilirubin values in the control group, supplement group, exercise group and reinforcement + exercise group ($p > 0.05$).

Table 1. Analysis of pre-test and post-test values of all groups

		CG. Mean±SD	O3G Mean±SD	EG. Mean±SD	O3+EG Mean±SD
TSH (mIU/L)	Pre-test	2.19±0.74	1.88±0.68	1.92±0.60	2.00±1.28
	Post-test	2.22±0.94	1.40±0.44 ^A	1.53±0.68 ^A	1.60±1.23 ^A
	Difference	0.03±0.65	-0.47±0.39 ^B	-0.39±0.60 ^B	-0.40±0.63 ^B
T3 (pg/ml)	Pre-test	3.78±0.35	3.65±0.36	3.63±0.42	3.62±0.37
	Post-test	3.94±0.32	3.77±0.54	3.60±0.35	3.70±0.39
	Difference	0.16±0.24	0.12±0.50	-0.03±0.42	0.07±0.37
T4 (ng/dl)	Pre-test	1.37±0.15	1.30±0.12	1.42±0.19	1.32±0.12
	Post-test	1.28±0.21	1.26±0.21	1.36±0.15	1.23±0.13
	Difference	-0.09±0.15	-0.05±0.23	-0.06±0.25	-0.10±0.09
Albumin (g/dL)	Pre-test	51.37±3.49	52.75±2.31	50.70±4.21	50.44±1.30
	Post-test	50.49±1.68	49.83±4.11	50.84±2.31	49.64±1.87
	Difference	-0.89±4.75	-2.92±5.11	0.14±4.96	-0.80±2.94
Bilirubin (mg/dL)	Pre-test	0.79±0.48	0.81±0.19	0.56±0.18	0.57±0.16
	Post-test	0.74±0.24	0.90±0.42	0.66±0.25	0.42±0.07
	Difference	-0.05±0.27	0.09±0.54	0.10±0.28	-0.15±0.14

CG: control group, **O3G:** Omega 3 supplemented group, **EG:** exercise group, **O3 + EG:** Omega3 supplemented group, **SD:** standard deviation, **A:** significant difference between pre- and post-tests, **B:** significant difference from CG

DISCUSSION

The aim of this study is to examine the effects of Omega-3 fatty acid supplementation on albumin, bilirubin, thyroid stimulating hormone (TSH), triiodothyronine (T3) and thyroxine (T4) hormone levels in young handball players who received Omega-3 fatty acid supplements for six weeks of endurance exercise. Two major findings were identified in this study. The first is that the group supplemented with omega-3 fatty acids affected TSH levels, and the second finding is that exercise also affected TSH levels.

The endocrine system functions functionally in almost all tissues of the body. It helps maintain the normal function of the body, prepares the body for exercise and various stressful environments, and plays an important role in various adaptations of the body. Thanks to these functions, the endocrine system; It helps to maintain performance during exercise, to ensure chronic adaptation to training in the human body, and consequently to improve exercise and sports performance (19). It is known that thyroid hormones increase the basal metabolic rate, protein synthesis and the effect of catecholamines. The responses of thyroid hormones to different types of exercise are not clear. While there are studies showing that aerobic exercise increases T3 and T4 intensity (20), there are studies showing that it does not increase acutely during exercise (21). In our study, it was determined that six weeks of endurance exercises affect TSH levels. No change was observed in albumin, bilirubin T3 and T4 values. Especially in acute and chronic exercises, thyroid hormone (TSH, T3, T4) release increases. Thyroid hormones, along with exercise, improve the endurance of the organism by affecting protein carbohydrates, fat, metabolism, and adaptation of the organism to physiological and metabolic changes that will occur as a result of exercises.^{22,23} Teixeira and friends.²⁴ found in their study that there was no major change in thyroid hormones of the ten-week exercise program. Masaki and friends.²⁵ found that acute exercise had changes in TSH and T3 levels, and there was no change in T4 level. Cinar and friends (2017) determined that a six-week exercise program and zinc supplement affected the participants' thyroid hormone metabolism positively. In their study, Mwafy and friends (26) observed that the six-month exercise program had a significant increase in TSH level and a decrease in T3 and T4 levels. In our study, a significant change was found in the TSH levels of the omega 3 supplement group. No change was observed in T3, T4, albumin and bilirubin values. The same change was observed in the group exercised with supplementation. Omega 3 fatty acids are necessary for organelles such as the cell membrane, endoplasmic reticulum and mitochondria for normal functioning of cellular functions. Omega-3 fatty acids, which are effective on gene expression and intracellular communication, also provide the energy need of the cell and help maintain body temperature (3). Omega-3 fatty acids are polyunsaturated long-chain fatty acids^{18, 22} carbon lengths) and the first of many double bonds is located at the third carbon atom starting from the methyl end of the molecule. Two of the important omega-3 fatty acids are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).^{27, 28} It has very important positive effects on our health. For example, it is effective in the treatment of hypertension, Crohn's disease, rheumatoid arthritis and asthma. It reduces the risk of coronary artery disease and serum triglyceride levels.^{29,30} Omega-3 fatty acids lower LDL-cholesterol levels. Mortality due to sudden infarctions can be significantly reduced by consuming 35 grams or more of fish per day. It has been shown that the risk of cardiovascular disease can be reduced significantly by eating at least one meal of fish per week.^{31,32} The effect of omega-3 fatty acids in lowering blood pressure and plasma lipids, reducing platelet aggregation and inflammatory response is well known. There is also control of the cellular immune response.^{28,33} Numerous scientific research findings examining the effects of omega-3 fatty acids on human health have shown that these fatty acids have important positive effects in the prevention and treatment of many diseases from cardiovascular diseases to hypertension, Alzheimer's to depression, rheumatic diseases to asthma, immune system diseases to osteoporosis show that they have. Moreover, these fatty acids achieve their positive effects naturally, that is, with nutrition, without any serious side effects.³⁴

CONCLUSION

As a result, it can be said that with six weeks of endurance exercise, omega 3 supplements do not change the levels of albumin and bilirubin. It can be said that the TSH change in thyroid metabolism is affected by exercise and omega 3 supplementation.

REFERENCES

1. Nordoy A. Is there a rational use for n-3 fatty acids (fish oils) in clinical medicine? *Drugs*. 42(3):331-42.
2. Bourre JM, Bonnel M, Chaudiere J, Clement M, Dumont O, Durand G. (1992). Structural and functional importance of dietary polyunsaturated fatty acids in the nervous system. *Adv Exp Med Biol*. 318(1):211-29.
3. Masters C. (1996). Omega-3 fatty acids and the peroxisome. *Mol Cell Biochem* 1996;165(2):83-93.
4. Wills E D. (1985). The role of Dietary Components in Oxidative Stress in Tissues. Sies H (Ed.). Academic Press. Orlando.
5. Fary, C. and Kraemer, W.J. (1997). Resistance Exercise Overtraining and Overreaching. *Sports Medicine*. 23(2):106-129.
6. Cinar, V., Akbulut, T., & Sarıkaya, M. (2017). Effect of zinc supplement and weight lifting exercise on thyroid hormone levels. *Indian Journal of Physiology and Pharmacology*, 61(3), 232-236.
7. Sarıkaya M. Çınar V. Selçuk M. (2016). Examination on the effect of the training program implemented during preparation period on the physical characteristics of tennis players. *International Journal of Sport Studies*. 6(10):607-611.
8. Çınar V. Pancar Z. Özdal M. Sarıkaya M. (2018). Effect of physical program on iron and iron-binding capacity in obese children. *Scholar Journal of Art, Humanites and Sciences*. 6(6): 1299-1303.
9. İnce, İ. (2020). Metabolik Bozukluklara Karşı Egzersiz ile İlişkili Yeni Bir Miyokin: İrisin. *Türk Spor Bilimleri Dergisi*, 3(1):44-50.
10. Ozan, M. Buzdağlı, Y. Şıktar, E. et al., (2020). The Effect of Protein and Carbohydrate Consumption during 10-Week Strength Training on Maximal Strength and Body Composition. 06/23:2322-3537.
11. Hackney, A.C. and Dobridge, J.D. (2009). Thyroid Hormones and the Interrelationship of Cortisol and Prolactin: Influence of Prolonged, Exhaustive Exercise. *Endokrynologia Polska*, 60(4):252-257.
12. Ehrman, J.K. Kerrigan, D. and Keteyian, S. (2018). *Advanced Exercise Physiology: Essential Concepts and Applications: Human Kinetics*.
13. Ozbay, S. Ulupinar, S. Şebin, E. et al. (2020). Acute and Chronic Effects of Aerobic Exercise on Serum Irisin, Adropin, and Cholesterol Levels in the Winter Season: Indoor Training Versus Outdoor Training. *Chinese Journal of Physiology*, 63(1):21.
14. Jolliffe, JA. Rees, K. Taylor, RS. Thompson, D. Oldridge, N. Ebrahim, S. (2001). Exercise-based rehabilitation for coronary heart disease. *Cochrane Database of Systematic Reviews*. 1(1): 1-65.
15. Boulé, NG. Haddad, E. Kenny, G.P. Wells, GA. Sigal, RJ. (2001). Effects of exercise on glycemic control and body mass in type 2 diabetes mellitus: a meta-analysis of controlled clinical trials. *Jama*. 286(10): 1218-27.

16. Aşçı, H. (2014). Does Physical activity/Exercise make women good? International Gender and Sport Symposium, Abstract Book, Ankara.
17. Xiao L, Lavori PW, Wilson SR, Ma J.(2011). Comparison of dynamic block randomization and minimization in randomized trials: A simulation study. Clin Trials 2011;8:59-69. doi:10.1177/1740774510391683
18. Erdoğan R. Effects of Endurance Workouts on thyroid hormone metabolism and biochemical markers in athletes. Brain. Broad research in artificial intelligence and Neuroscience. 2020. 11(3): 136-146.
19. Ratamess, N.A., (2012). ACSM's Foundations of Strength Training and Conditioning, pp:516: Wolters Kluwer Health/Lippincott Williams & Wilkins.
20. Ciloglu, F., Peker, I., Pehlivan, A., et al., (2005). Exercise Intensity and Its Effects on Thyroid Hormones. Neuroendocrinology Letters, 26(6):830-834.
21. Premachandra, B., Winder, W., Hickson, R., et al., (1981). Circulating Reverse Triiodothyronine in Humans During Exercise. European Journal of Applied Physiology and Occupational Physiology, 47(3):281-288.
22. Elliott-Sale, K. J., Tenforde, A. S., Parziale, A. L., Holtzman, B., & Ackerman, K. E. (2018). Endocrine effects of relative energy deficiency in sport. International Journal of Sport Nutrition and Exercise Metabolism, 28(4), 335-349.
23. Louzada, R. A., & Carvalho, D. P. (2018). Similarities and differences in the peripheral actions of thyroid hormones and their metabolites. Frontiers in endocrinology, 9, 394.
24. Teixeira, R. B., Zimmer, A., de Castro, A. L., de Lima-Seolin, B. G., Türck, P., Siqueira, R., Belló-Kleina, A., Singal, P. K., Sander, A. & da Rosa Araujo, A. S. (2017). Long-term T3 and T4 treatment as an alternative to aerobic exercise training in improving cardiac function post-myocardial infarction. Biomedicine & Pharmacotherapy, 95, 965-973.
25. Masaki, M., Koide, K., Goda, A., Miyazaki, A., Masuyama, T., & Koshiha, M. (2019). Effect of acute aerobic exercise on arterial stiffness and thyroid-stimulating hormone in subclinical hypothyroidism. Heart and vessels, 34, 1309–1316.
26. Mwafy, S., Yassin, M., & Mousa, R. (2018). Thyroid hormones, lipid profile and anthropometric changes after programmed weight loss in Palestinian obese adult females. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 12(3), 269-273.
27. Hasler CM. (2002). Functional foods: benefits, concerns and challenges a position paper from the American Council on Science and Health. J Nutr. 132: 3772- 3781.
28. Din JN, Newby DE, Flapan AD. (2004). Omega 3 fatty acids and cardiovascular disease fishing for a natural treatment. Br Med J. 328: 30-35.
29. Wylie-Rosett J, Mossavar-Rahmani Y, Gans K. (2002). Recent dietary guidelines to prevent and treat cardiovascular disease, diabetes, and obesity. Heart Disease. 4: 220-230.
30. Rennie KL, Hughes J, Lang R, Jebb SA. (2003). Nutritional management of rheumatoid arthritis: a review of the evidence. J Hum Nutr Diet. 16: 97-109.
31. Krauss RM, Eckel RH, Howard B, et al. (2002). AHA Dietary Guidelines: revision 2000: a statement for healthcare professionals from the Nutrition Committee of the American Heart Association. Circulation. 102: 2284-2299.
32. Lee KW, Lip GY. (2003). The role of omega-3 fatty acids in the secondary prevention of cardiovascular disease. QJM. 96: 465-480.
33. Kehn P, Fernandes G. (2001). The importance of omega-3 fatty acids in the attenuation of immune-mediated diseases. J Clin Immunol. 21: 99-101.
34. Çelebi Ş, Kaya H, Kaya A. (2017). Omega-3 yağ asitlerinin insan sağlığı üzerine etkileri. Alinteri, Review. Volume: 32, Issue:2: 105 – 112.

RELATION BETWEEN BODY MASS INDEX AND PHYSICAL FITNESS IN ELDERLY MEN

Mehmet Şirin GÜLER¹, Selami YÜKSEK², Tamer CİVİL³

1. Sarıkamış School of Physical Education and Sport, Kafkas University, Kars
[Http://orcid.org/0000-0001-6014-0636](http://orcid.org/0000-0001-6014-0636)

2. Trabzon University, Faculty of Sport Sciences, Trabzon
[Http://orcid.org/0000-0001-6014-0636](http://orcid.org/0000-0001-6014-0636)

3. Karadeniz Technical University, Faculty of Sport Sciences, Trabzon
[Http://orcid.org/0000-0003-0104-0007](http://orcid.org/0000-0003-0104-0007)

Corresponding author: mehmet0910@hotmail.com

ABSTRACT

This work has been performed to analyse the effect of 60-75 years old male body mass indexes (BMI) on physical fitness levels. 738 elderly men, who do not have chronic health problems and who could maintain their daily life activities independently, included on a voluntary basis to the research. Those whose BMI values are less than 18.50 kg / m² are weak, those between 18.50 and 24.99 kg / m² are normal, those between 25.00 and 29.99 kg / m² are overweight and those who are 30 kg / m² and more are classified as obese. BMI categories have been divided into 3 groups: Normal (226 cases), Overweight (391 cases) and Obese (121 cases). Senior Fitness Test (SFT) protocol created by Rikli and Jones (2001) was used to determine the physical fitness levels of the participants. SPSS 22 statistics program and the Kolmogorov Smirnov test were used in order to analyse the data obtained from the measurements. The data were presented as arithmetic mean, standard deviation and differences between averages. The analysis of the test scores with the BMI classification of the participants was done with the One Way Anova-Shaffe test. The relation between body weights and test scores according to the BMI Categories was analyzed with pearson correlation test. Statistical significance was examined at the level of 0.05 and 0.01. According to the findings of the study, the difference between the physical fitness test scores of the participants in the Normal and Overweight BMI category was not found to be significant. As a consequence, it is necessary to create exercise programs in order to develop physical fitness levels which are thought to decrease together in old age and which are found to be significantly low in obese elderly people. Particularly, it is considered important for elderly people who are inactive and living in cities to participate in such exercise programs in order to be able to do their daily life activities independently.

Keywords: Weight, Fitness, Sports

INTRODUCTION

Aging is a physiological process that occurs in every living creature and causes a decrease in all functions. It is also explained as all of the structural and functional changes that occur at the level of the molecule, cell, tissue, organ and system. General signs of aging are diminishment in various functions and capacities of the body, decreased adaptation to changes in the internal and external environment, and decreased resistance to potentially harmful effects on the body. With aging, changes in cell structure, diminishment of cell number and regeneration ability of the body can be observed.¹⁴ The definition of "old adult" varies depending on different perspectives and goals. Researchers divides elderly people into three subgroups: Young 'old people' between 65-74 ages; middle aged 'old people' between 75-84 ages and elderly people aged 85 and over.¹ Physiological regression and an increase in disease curvature are observed with aging. Although both conditions affect each other in this process, physiological regression triggers disease formation more effectively. Many physiological functions of healthy older adults are preserved in basal rest, but regression can be observed in organ systems and static mechanisms.¹⁶ Along with the aging, there is also diminishment both functional and physical inactivity.¹⁵ It can be observed impairments in the functional health of sedentary old people due to their activity-related strength, endurance and flexibility problems; and these individuals make more efforts to perform normal activities. Physical fitness plays a vital role in health and independence in older individuals. It is generally accepted that a decrease in daily physical activity contributes to increased obesity worldwide.¹¹⁻¹³ Problems such as sarcopenia that occur with old age cause a diminish in mobility and scope of the activity.⁵ The loss in physiological capacities due to old age supports the formation of obesity with physical losses. Therefore; it is necessary to protect the body mass index with exercise and healthy nutrition via encouraging the individual to an active life. "Physical fitness" is defined as the ability to do

daily work vigorously and carefully without excessive fatigue, and to allocate enough energy for leisure and unexpected emergencies.²³ Low physical fitness is an important risk factor for cardiovascular disorders, osteoporosis, decreased muscle mass and risk of falling.¹⁶ The development of components such as muscle strength, endurance and flexibility enables the maintenance of functional movement in older people and a more active lifestyle and also increases the quality of life.¹⁰ Meanwhile, adequate and balanced nutrition with a regular exercise affects the performance of the elderly people as positive and reduces the risk of future health problems.⁷ Body mass index (BMI) is calculated by dividing body weight by the square of the height.⁶ Body mass index is associated with all causes of mortality and increased morbidity caused by diseases such as cardiovascular diseases hypertension, diabetes and BMI is often used to describe overweight and obesity, as they are well correlated with other measurements that measure body fat, and are mostly derived from available data.⁶ In individuals above 65 ages, the BMI is desired to be between 24-29. Body mass index below 25 may cause weakness and high mortality in the elderly.⁴ In the conducted researches, it is clear that an active lifestyle and movement delay the biological age in the elderly and protect the individual in various diseases. Developing technology is moving people away from the active lifestyle today, as well as negatively affecting the eating habits of people along with this passive life. The risk of obesity and disease increases when some negative conditions such as inactivity and nutritional changes come together. Researches present that passive lifestyle increases the frequency of overweight and obesity in our country, as in the world and it also shows us that obesity is effective in the elderly people. In this context, it is thought that this study will contribute to the literature of this study of field in order to analyse the effect of Body Mass Indexes (BMI) on physical fitness levels of 60-75-year-old male patients.

MATERIALS and METHOD

The study was carried out with the voluntary participation of 738 male patients aged 60-75 years, who could maintain their daily life activities independently and having no serious health problems. Volunteers wishing to participate in the study were asked demographic information and the status of orthopedic or mental disability, which could prevent or restrict the application of test protocol. Those with neurological or advanced cardiovascular chronic disease were excluded from the study. In the application of the tests, clothes such as jackets and coats that could prevent or restrict the movements of the participants were removed. An experienced assistant was assigned to each station to make the stations run smoothly. Participants who did not complete any of the stations containing the test protocol were excluded from the evaluation. In the study, the armless, straight back chair with a sitting height of 43.18 cm, a custom-made dumbbell weighing 3.63 kg, a distance of 2.44 meters, a cone, a 50 cm long wooden ruler, a 1.5x1.5 mat, stopwatch, scales and tensiometer were used.²¹ Each participant completed the two-minute step test with a bare foot on a 1.5 x 1.5 size mat. The same devices were used for the physical and physiological measurements of all cases. The BMI values of 738 patients who met the criteria and completed the tests were calculated by dividing the body weight by the length of the body in square meters and recorded in kg / m². The cases smaller than 18.50 kg / m² are considered as Weak (0 Case), those between 18.50-24.99 kg / m² are Normal Weight (226 cases), those between 25.00- 29.99 kg / m² are Overweight (391 cases) and those with a body mass index greater than 30 kg / m² are regarded as obese (121 cases) by taking the BMI norm values determined by WHO into consideration.

Applied Tests

The Senior Fitness Test (SFT) protocol including six phases which was developed by Rikli and Jones in order to determine the physical fitness levels of the elderly aged 60-94 years, was used.²¹ Each phase of the test protocol was explained one by one before the participants were taken to the test. 4-5 minutes of warm-up (walking, jogging, stretching exercises) were demonstrated to the participants. Test protocol includes 6 tests: Chair Stand Test (30CST), The Biceps Curl Test (ARCLT), Two Minutes Step Test - (2MST), Up and Go Test- 8 Footstep (8FUAGT), Chair Sit and Reach Test (CSRT), Back Scratch Test - (BST).

Statistical Analysis

Analysis of the data obtained as a result of measurements were done by using SPSS 22.0 for Windows package program. As a result of the Kolmogorov Smirnov test, it is understood that all groups showed normal distribution. The comparison of the test scores of the participants regarding their body mass index values was made with One Way Anova - Scheffe Test. The relation between body mass index and test scores was evaluated by Pearson Correlation. The statistical significance levels of the in-group and intergroup variables and parameters were analysed in the range of $p < 0.05$ and $p < 0.01$.

RESULTS

While 97 participants did not receive any education, 84 of them are only literate. 390 participants graduated from primary school; 61 of them got secondary school education level. Lastly, 64 participants graduated from high school, 42 of them had university graduation. Considering the participants' level of income, we can say that 50 of them had low, 452 of them has medium, 219 participants had high and 17 had very high level of income. The profession of participants consists of various jobs: 117 officer, 185 employees, 21 teachers, 10 police-watcher, 172 farmers, 4 lawyer-prosecutor-judge, 1 doctor/healthcare personnel and 10 no-profession.

Table 1. Age, Height, BMI and Body weight values regarding categories of BMI.

Parameters	BMI Category	Min	Max	X	Sd.
Age _{year}	Normal Weight	60,00	75,00	67,55	4,56
	Overweight	60,00	75,00	67,10	4,52
	Obese	60,00	75,00	66,51	4,34
Height _{cm}	Normal Height	153,00	197,0	170,03	6,66
	Overweight	150,00	190,00	169,50	6,32
	Obese	154,00	182,00	168,51	5,55
Body Weight _{kg}	Normal Weight	47,00	89,00	66,89	6,99
	Overweight	60,00	98,00	78,47	7,24
	Obese	75,00	139,00	90,74	2,49
BMI _{kg/m²}	Normal Weight	17,26	24,96	23,03	1,71
	Overweight	25,00	29,95	27,27	1,35
	Obese	30,00	47,54	31,94	2,49

When Table 1 is analysed; the averages of age and height are close to each other in terms of normal, overweight and obese categories While the averages of body weight are such: 66.89 for normal, 78.47 for overweight, 90.74 for obese. BMI averages are as such: 23.03 for normal, 27.27 for overweight and 31.94 for obese. When their smoking status was considered, 91 normal weight, 104 overweight and 24 obese participants smoke. 70 normal weight, 162 overweight and 45 obese participants did not smoke. Moreover, 65 normal weight, 125 overweight and 52 obese participants quitted smoking. Status of doing exercises regarding categories of BMI was taken into consideration, 34 normal weight, 79 overweight and 22 obese participants exercise while 192 normal weight, 312 overweight and 121 obese participants did not exercise.

Table 2. The differences between statistical analysis of test scores and groups belonging some variables of groups according to BMI categories.

Parameters	Category	Min	Max	X	Sd.	p	Differences
30 CST The Chair Stand Test (reps/30sec)	Normal Weight	7,00	24,00	15,45	3,28	0,000	N-O** K-O**
	Overweight	6,00	24,00	14,96	2,93		
	Obese	7,00	21,00	13,47	2,84		
ARCLT The Biceps Curl Test (reps /30sec)	Normal Weight	7,00	24,00	16,42	2,95	0,395	-
	Overweight	8,00	25,00	16,75	2,85		
	Obese	7,00	23,00	16,62	2,89		
2MST 2 Minutes Step Test (step /2mins)	Normal Weight	39,00	125,00	71,53	16,02	0,000	N-O** K-O*
	Overweight	29,00	118,00	69,27	15,46		
	Obese	30,00	105,00	65,25	14,59		
CSRT The Chair Sit and Reach Test (cm)	Normal Weight	-27,00	11,00	-4,18	8,54	0,946	-
	Overweight	-36,00	14,00	-4,13	8,80		

BST The Back Scratch Test (cm)	Obese	-28,00	12,00	-4,42	8,11	0,000	N-O** K-O**
	Normal Weight	-31,00	9,50	-8,02	8,90		
	Overweight	-39,00	10,50	-8,45	9,79		
8FUAGT Up and Go Test-8 Footstep (sec)	Obese	-38,00	4,00	-12,87	9,12	0,000	N-O** K-O**
	Normal Weight	3,17	9,61	5,25	1,13		
	Overweight	3,44	11,26	5,40	1,11		
	Obese	4,09	11,23	6,05	1,50		

N: Normal Group, K: Overweight Group, O: Obese Group, X: Average, SD: Standard Deviation, p: The Level of Significant Differences between Groups, ** p<0.01, *p<0.05.

Table 3. Relation between Test Scores and Body Weights of Participants considering BMI Categories

BMI GROUPS		30 CST Chair Test (reps/30sec)	ARCLT Stand Biceps Test (reps /30sec)	2MST Curl Step Test in 2 minutes (step/2mins)	CSRT Chair Reach (cm)	BST Sit and Back Scratch Test (cm)	8FUAGT 8 Footstep Up and Go Test (sec)	
NORMAL	Body Weight	r	0,050	0,123	0,191**	-0,005	0,159*	-0,097
		p	0,455	0,065	,004	,943	0,017	0,147
		n	226	226	226	226	226	226
Overweight	Body Weight	r	0,000	0,135**	0,082	-0,081	0,087	-0,064
		p	0,986	0,008	0,106	0,109	0,086	0,209
		n	391	391	391	391	391	391
OBESE	Body Weight	r	-0,234**	-0,143	-0,248**	-0,124	-0,238**	0,460**
		p	0,010	0,118	0,006	0,176	0,009	0,000
		n	121	121	121	121	121	121

There is a positive significant relation between the scores of 2 minutes Step Test and Back Scratch Test as a result of correlation analysis between the body weights of the participants in the normal category and the test scores. On the other hand, there is only a positive significant relation between the scores of body weight and biceps curl test as a result of positive correlation between the body weight and test scores of participants in the overweight category. Lastly, in the category of obese participants, there is negative significant relation between the scores of body weight and Chair Stand Test, 2 minutes Step Test and Back Scratch Test in consequence of correlation analysis between the body weights and test scores. There is a positive significant relation between the scores of body weight and 8 Footstep Up and Go Test.

DISCUSSION

The age and height averages are close to each other in terms of normal, overweight and obese categories. It is seen that the BMI categories formed regarding these perspectives have similar characteristics. In a study on cross-sectional study with individuals aged 60 and over by Barbosa et al. (2005); it was reported that there was a diminishment in the scores of performance tests with aging. In our study, it is thought that close age averages between the categories is an advantage in terms of analysing the test scores. The average of body weight (kg), which is one of the important conditions in establishing the categorical approach of our study, was found to be 66.89 in normal weight, 78.47 in overweight and 90.74 in obese. The BMI (kg / m²) averages are 23.03 in normal, 27.27 in overweight and 31.94 in obese. The BMI average of all participants in the study is 27.41. When the literature is analysed, we see that the elderly people have similar BMI values. Valentine et al. (2009) reported in their field study on relation between BMI and physical function in 134 elderly

people that BMI average is 28.35 kg / m². In another study by Syddall et al., 3225 elderly people have been evaluated and the average BMI value was 27.35 kg / m². When the smoking habits of the patients were assessed, the rate of smokers was found as 29.6%. In terms of the ratios among the BMI categories, the proportion of smokers' is 41.6% in normal weight, the ratio of overweight is 47.5% and the rate of obese is 10.9%. The fact that this rate is lower in obese can be explained by the lower number of these cases, and it is thought that smoking problems may not occur in addition to health problems caused by excessive body weight in obese patients. It is identified that very few cases (18.3%) do exercises. In terms of the ratio between BMI categories, the rate of exercising is 25.2% in normal weight, the ratio of overweight is 58.5% and the rate of obese is 16.3%. It is determined that the majority of the cases (81.7%) do not exercise. It has been found that those who do not exercise are similar in terms of the BMI categories. The high rate of overweight participants among those who exercise makes us think that exercise awareness of overweight people is higher than that of other categories. In their study, Goggin and Morrow (2001) reported that 69% of the participants aged 60 and over say that exercise is beneficial for health, but 69% do not participate in sufficient exercise. The findings of this study support our study. In a study on 2558 elderly people by Asp et al. (2017), it has been stated that while 13% of physically active individuals face obesity, the rate of physically inactive individuals facing obesity is 22%. In their study with 107 obese old participants, Villareal et al. (2011) revealed that weight loss and exercise should be planned and implemented together in order to provide the best improvement in physical functions. Brach JS et al. (2004) reported that overweight and obese women have similar levels of physical activity and physical fitness, while normal women are more active. From this point of these studies, it is obvious that exercise in old age is very important. As a result of the statistical evaluation, when 30 CST, 2 MST, BST and 8 FUAGT scores were analysed, the differences between the scores of the normal and overweight and the obese participants are significant ($p < 0.01$). When the 2 MST scores are considered, the difference between normals and obese ($p < 0.01$) and overweight and obese ($p < 0.05$) are significant, but the differences between the categories are not significant when the ARCLT and CSRT scores are regarded. Similar findings have been found in a study on older women by Güler et al. (2020). In another study including 3605 participants aged 65 and over, the majority of obese participants had low physical functions.¹⁹ In many studies, it was proven that obesity negatively affects physical mobility as well as various health problems and exercise should be effective to avoid obesity.¹⁷⁻²⁰ When these results are evaluated together, it is thought that decreasing BMI values may improve the physical fitness parameters in terms of health in the elderly. As a result of the correlation analysis between the body weights and test scores of the cases in the normal weight category; it was determined that there is a positive relationship between the body weight and the 2 MST and BST scores, and not with any other test scores. An increase in body weight in overweight reveals that it increases arm forces. In the overweight category, no change due to weight gain was detected in other tests except ARCLT. As a result of the correlation analysis between the body weights and test scores of the participants in the obese category, a significant negative relation was found between body weight and 30 CST, 2 MST, and BST scores. As the body weight of the obese increases, the test scores decrease. Nevertheless, there is a positively significant relation between the scores of body weight and 8 FUAGT in obese participants. Depending on the weight gain, the movement skills decrease more in obese individuals than in the other category.

CONCLUSION

While the BMI value is at the optimal level in elderly individuals causes the physical functions to be high, the high BMI value causes the physical functions to be low.³ Having obese BMI values appears to be a serious problem that restricts strength, muscular endurance, flexibility, and cardiorespiratory features. Decreasing physical movement and increasing body weight with old age makes it difficult to perform daily life activities independently. Weight gain and obesity in the elderly people lead up to development of many acute and chronic diseases by negatively affecting movement, respiratory, circulatory, hormonal and many other systems based on our study findings and literature. It is known that the most effective methods for preventing these conditions are regular exercise and balanced nutrition. These can help them do their daily life activities independently in the following years and to have the strength to resist health problems that may develop in the following years.

REFERENCES

1. Abeles N, Cooley S, Deitch IM, Harper MS ve ark. What practitioners should know about working with older adults. *Prof Psychol Res Pr* 1998; 29: 413-427.
2. Asp, M., Simonsson, B., Larm, P., & Molarius, A. (2017). Physical mobility, physical activity, and obesity among elderly: findings from a large population-based Swedish survey. *Public Health*, 147, 84–91. <https://doi.org/10.1016/j.puhe.2017.01.032>
3. Apovian C. M. Frey C.M. Wood G. C. Rogers J. Z. Still C.D. Body Mass Index and Physical Function in Older Women: Obesity Research, 2002; Vol.10: 740 –747.

4. Babiarczyk B, Turbiarz A Washburn RA. Body Mass Index in elderly people - do the reference ranges matter? *Prog Health Sci* 2012; 2: 58-67.
5. Barbosa AR, SouzaJMP, Lebrão MLL, Laurenti R, Marucci MFN. Functional limitations of Brazilian elderly by age and gender differences: data from SABE Survey. *Cad Saude Publica*.2005, 21(4):1177-85.
6. Bedogni G. Body mass index: from quetelet to evidence-based medicine. In: Ferrera LA.
7. Bilici M.F. (2019). Adolesan Dönemde Fiziksel Aktivite, Spor ve Beslenmenin Sportif Performans ve Fiziksel Gelişime Etkisi. Birinci Baskı Güven Plus Grup Danışmanlık. İstanbul. 165.
8. Body mass index, New Research. New York: Nova Science Publishers; 2005. p. 1-14.
9. Brach JS, VanSwearingen JM, FitzGerald SJ, Storti KL ve ark. The relationship among physical activity, obesity, and physical function in community-dwelling older women. *Prev Med* 2004; 39: 74–80.
10. Brill PA. Functional fitness in older adults. USA: Human Kinetics; 2004; 3-8.
11. French, S. A., Jeffery, R. W., Forster, J. L., McGovern, P. G., Kelder, S. H., & Baxter, J. E. (1994). Predictors of weight change over two years among a population of working adults: The Healthy Worker Project. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity*, 18(3), 145–154.
12. Goggin NL, Morrow JR. Physical activity behaviours of older adults. *Journal of Aging and Physical Activity* 2001; 9:58-66.
13. Grundy, S. M., Blackburn, G., Higgins, M., Lauer, R., Perri, M. G., & Ryan, D. (1999). Physical activity in the prevention and treatment of obesity and its comorbidities. *Medicine and Science in Sports and Exercise*, 31(11 SUPPL.).
14. Güler MŞ, Yüksek S, Göksu Ö. Investigation of the Relationship between Body Mass Index and Physical Fitness in Older Women. *International Journal of Sport Culture and Science*. March 2020; 8(1).
15. Hessert MJ, Gugliucci MR, Pierce HR. Functional fitness: maintaining and improving function for elders with cronic diseases. *Fam Med* 2005; 37: 472-6.
16. Hilgenkamp TIM, Wijck RV, Evenhuis HM. Low physical fitness levels in older adults with ID: results of the HA-ID study. *Res Dev Disabil* 2012; 33: 1048–58.
17. Lang, I. A., Llewellyn, D. J., Alexander, K., & Melzer, D. (2008). Obesity, physical function, and mortality in older adults. *Journal of the American Geriatrics Society*, 56(8), 1474–1478. <https://doi.org/10.1111/j.1532-5415.2008.01813.x>
18. Lauretani, F., Russo, C. R., Bandinelli, S., Bartali, B., Cavazzini, C., Di Iorio, A., ... Ferrucci, L. (2003). Age-associated changes in skeletal muscles and their effect on mobility: An operational diagnosis of sarcopenia. *Journal of Applied Physiology*, 95(5), 1851–1860. <https://doi.org/10.1152/jappphysiol.00246.2003>.
19. López-García E, Banegas JR, Gutiérrez-Fisac JL, Pérez-Regadera AG, Gañán LD, Rodríguez-Artalejo F. Relation between body weight and health-related quality of life among the elderly in Spain. *Int J Obes Relat Metab Disord*. 2003; 27: 701-9.
20. Riebe, D., Blissmer, B. J., Greaney, M. L., Ewing Garber, C., Lees, F. D., & Clark, P. G. (2009). The relationship between obesity, physical activity, and physical function in older adults. *Journal of Aging and Health*, 21(8), 1159–1178. <https://doi.org/10.1177/0898264309350076>
21. Rikli, RE, Jones, JC. (2001). Senior fitness test manual. Human Kinetics, Champaign, Illinois.
22. Syddall H, Evandrou M, Cooper C, Sayer AA. Social inequalities in grip strength, physical function, and falls among community dwelling older men and women. *J Aging Health*. 2009;21(6):913-39.
23. Tuna H. Yaslılarda yas ve fiziksel aktivite düzeyinin fonksiyonel uygunluga etkisi. İzmir, Dokuz Eylül Üniversitesi Sağlık Bilimleri Enstitüsü, Doktora Tezi, 2010.
24. Valentine RJ, Misis MM, Rosengren KS, Woods JA ve ark. Sex impacts the relation between body composition and physical function in older adults. *Menopause*. 2009;16(3):518-23.
25. Villareal, D. T., Chode, S., Parimi, N., Sinacore, D. R., Hilton, T., Armamento-Villareal, R., ... Shah, K. (2011). Weight loss, exercise, or both and physical function in obese older adults. *New England Journal of Medicine*, 364(13), 1218–1229. <https://doi.org/10.1056/NEJMoa1008234>

SP-50

WHAT ARE THE PHYSIOLOGICAL RESPONSES OF STEP - AEROBIC EXERCISES IN SEDANTER WOMEN?

Mine TURĞUT^{1*}, Taner BOZKUŞ²

1. Bartın University, Faculty of Sports Sciences, Bartın, Turkey

<https://orcid.org/0000-0002-8556-3114>

2. Bartın University, Faculty of Sports Sciences, Bartın, Turkey

<https://orcid.org/0000-0002-4096-773X>

Corresponding author: minetrgt@gmail.com

ABSTRACT

This study was aimed to investigate the effect of a 12-week step-aerobic exercise program applied to sedentary women on some physical and physiological parameters. Sixteen voluntary sedentary women with a mean age of 20.2 ± 1.3 years were included in the study. In the study, height, body weight and BMI were measured by the researchers, and before and after the exercise program of the participants' blood samples were taken with an empty stomach in the morning by experts in an appropriate laboratory environment in the health institution. The data obtained in the research were analysed using the SPSS 22.0 package program. Nonparametric tests Wilcoxon Signed Ranks Test was used to reveal the difference between the pre-test and post-test values of the research group. According to the results obtained, it was determined that there was a significant difference between the blood lipids such as Triglyceride, HDL, LDL and total cholesterol levels before and after the step-aerobic exercise program ($p < 0.05$). As a result of the applied step-aerobic exercise program; it was seen that there was a significant improvement in physiologically sedentary women. Step-aerobic exercises can be an exercise program that can be preferred both to lead a healthy life and to reach the desired body mass index. Besides, it was thought that it might have a protective effect from metabolic disorders that may occur.

Keywords: Step Aerobics, Exercise, Blood Fats

INTRODUCTION

Although technological developments that have gained momentum all over the world in today's conditions make peoples' life easier, unfortunately, these facilities have brought an inactive life to them. Today, almost all people do the work with machines which they can do with physical force. This situation has increased the possibility of some diseases (diabetes, cardiovascular diseases, etc.) seen in older ages in the past at an early age. For this reason, it is necessary to emphasize the importance of physical activity, which is quite effective in preventing such diseases, especially in the current period. Physical activity (PA) can be used to prevent and treat illness. In Sweden, licensed healthcare professionals have prescribed PA programs to assist patients in increasing their physical activity level.¹ Physical activity programs were prepared by the Physical Activity Professional Associations and approved by the Swedish Medical Association in 2011. Regular aerobic and muscle-strengthening physical activity is recommended for all adults. According to the formula, the minimum recommended dose of aerobic physical activity (intensity x time) is 150 minutes per week moderately or 75 minutes at high intensity. If the dose administered is higher than the lowest recommended dose, much better results are obtained in terms of health.² With this method, individuals are enabled to avoid inactive behaviour for a longer period of time. In order to provide the level of mobility required for our health and to increase physical fitness, there are many practised physical activities such as walks, jogging, cycling, step, aerobic dances, etc. Step, aerobics and dance are a type of exercise in which large muscle groups are worked in coordination with music at a certain tempo. It is also one of the exercises in which cardiorespiratory health is protected and improved.³ Step-Aerobics; It can be counted among the new trend exercise types as it offers an enjoyable exercise with the movements and music performed in front of, next, behind, and diagonally on the platform. Nowadays, it is noteworthy that step-aerobic exercises have become an indispensable type of exercise in all private gyms.^{4,5} Exercise refers to activities performed regularly, and is very important for healthy living.¹⁹ Step aerobic exercises are known to have important effects on blood lipid profile in humans. Akbulut (2011) has been determined that regular and long-term step aerobic exercise causes positive effects on body composition and blood lipid parameters in middle-aged women. Blood lipids as a risk factor for cardiovascular disease are important to keep values within the normal reference range to improve health status and have a good quality of life. Although both aerobic dance and step dancing causes a decrease in triglyceride levels, the decrease of step

is significantly greater in dance exercise than aerobic dance. Step dance exercises are better than aerobic dance in terms of increasing red blood cells, which lowers cholesterol and LDL levels.⁶ Therefore, the study was aimed to investigate the effect of step aerobic exercises on lipid profile in sedentary women.

MATERIALS AND METHODS

Participants: The study group consisted of 16 voluntary sedentary women with a mean age of 20.2 ± 1.3 years and a mean height of 161.1 ± 5.2 . By asking whether the participants had a chronic disease that may prevent exercising and whether there was a medicine they use regularly, it was determined as the criteria for inclusion in the study. No diet program was applied to the participants. Pre-test - post-test model was used in the study.

Blood Fat Measurement Tests: Before and after the step aerobic exercises, the participants went to the previously determined health institution with an empty stomach and had their blood measurements taken by experts in the appropriate laboratory environment. Blood values; LDL, HDL, total cholesterol and triglyceride values were obtained by making complete blood counts measurements with Mindray BC-6800 device.

Exercise Program: The participants attended to 75-minute step aerobic exercises 3 days a week for 12 weeks. women participating in step-aerobics exercises were started with warming up for the first 15 minutes and then participated in 50 minutes of exercise on the step board at regular intervals (height 70 cm, width 30 cm, height 10 cm).⁸ The program was ended with 10 minutes of cooling exercises. The best way to improve the continuity in basic force and force was to make 1-3 sets of 12-20 repetitions at 50-70% of 1 RM density.⁷⁻⁸

Statistical Analysis: The data obtained in the research were analysed using the SPSS 22.0 package program. Wilcoxon Signed Ranks Test and descriptive statistics (mean, standard deviation) statistical techniques were used to reveal the difference between the pre-test and post-test values of the research group.

RESULTS

Table 1. Physiological characteristics of participants

Variables	$\bar{x} \pm SD$
Age (year)	$20,2 \pm 1,3$
Height (cm)	$161,1 \pm 5,2$
BMI (kg / m ²)	$21,4 \pm 2,7$

The mean age of women in the study group was found to be as 20.2 ± 1.3 , average height as 161.1 ± 5.2 and body mass index as 21.4 ± 2.7 .

Table 2. Participants' weight, fat percentage and BMI Wilcoxon Test Results

p<0,05*

When Table 2 was examined, we can say that the step-aerobic exercises caused a significant change in body weight, fat percentage and BMI values.

Table 3. Changes in weight, fat percentage and BMI before and after the 12-week step aerobic exercise program

Measurements (cm)	Ranks	N	Mean Rank	Rank Total	Z	p
Triglyceride mg/dL Pre and Post-Test	Negative Ranks	16 ^a	8,50	136,00	-2,52*	,012*
	Positive Ranks	0 ^b	,00	,00		
	Equal	0 ^c				
Total Cholesterol mg/dL Pre and Post-Test	Negative Ranks	16 ^d	8,50	136,00	-2,52*	,012*
	Positive Ranks	0 ^e	,00	,00		
	Equal	0 ^f				
HDL mg/dL Pre and Post-Test	Negative Ranks	1 ^g	1,00	1,00	-2,52*	,012*
	Positive Ranks	15 ^h	9,00	135,00		
	Equal	0 ⁱ				
					-2,10*	,036*
Measurements (cm)	Ranks	N	Mean Rank	Rank Total	Z	p
Weight Pre and Post-Test	Negative Ranks	15 ^a	8,93	134,00	3,42*	,001**
	Positive Ranks	1 ^b	2,00	2,00		
	Equal	0 ^c				
Percentage of Fat Pre and Post-Test	Negative Ranks	16 ^d	8,50	136,00	3,52*	,000**
	Positive Ranks	0 ^e	,00	,00		
	Equal	0 ^f				
BMI Pre and Post-Test	Negative Ranks	16 ^g	8,50	136,00	3,52*	,000**
	Positive Ranks	0 ^h	,00	,00		
	Equal	0 ⁱ				
LDL mg/dL Pre and Post-Test	Negative Ranks	16 ^j	8,50	136,00		
	Positive Ranks	0 ^k	,00	,00		
	Equal	0 ^k				

p<0,05*

When table 3 was examined, it was determined that there was a significant difference between the blood lipid levels (triglyceride, total cholesterol, HDL and LDL), pre-test and post-test values of the participants. Moreover, it can be said that the step-aerobic exercise program had a positive effect on the post-test results by decreasing the pre-test results in the blood lipid profiles of the participants.

DISCUSSION

The study aimed to examine the effect of 12-week step-aerobic exercises on lipid blood profile in sedentary women. According to the results, it was seen that step-aerobic exercises showed significant differences in lipid blood profiles of sedentary women. In literature, there were studies investigating effects of step-aerobic exercises on body composition and cardiovascular system.⁹ According to the information, it was observed that step-aerobic exercises had little information about lipoprotein concentration changes in sedentary women. It was known that step-aerobic exercises had a positive effect on the blood lipid profile, body composition and the cardiovascular system.¹⁰ It was seen that 16-week step-aerobic exercises in sedentary women showed significant changes in the inflammatory and lipid blood profile along with the cardiovascular system.¹¹ It was understood that step-aerobic exercises caused significant changes in body weight in overweight women and were similar to our current study.¹² When the results of this study were examined, it can be said that significant changes were observed in the sedentary blood lipid profiles (triglyceride, HDL, LDL and Total Cholesterol) of step-aerobic exercises. In a study conducted on sedentary women to increase aerobic capacity and reduce body mass showed that the desired result was achieved in step-aerobic exercise participants.¹³ In another study conducted on female university students, it was determined that a six-week aerobic practice significantly improves cardiovascular strength, mental health, and BMI.¹⁴ In another study, step aerobic

exercises were said to be an effective method for changing the lipid and lipoprotein profiles of female university-age students.¹⁵ It was found that young women who participated in a 12-week step-aerobic exercise program had significant decreases in body weight and percentage of body fat and improved aerobic capacity.¹⁶ Again, Şavkın (2014) found that there was a decrease in body weight as a result of his studies with sedentary women. Studies showing similarities with our current research result support our study. In this case, it can be said that regular step-aerobic exercises were effective in decreases in body weight, lipid blood profile and body fat percentage. It posed a serious and fatal risk such as coronary artery disease in physically inactive individuals, and it was emphasized that this disease was associated with high blood lipid and lipoprotein levels.¹⁸ Besides, blood lipids and lipoproteins appeared to be not only the cause of coronary artery diseases but also the cause of many diseases (Vikers & Remaet, 2014). Considering that aerobic exercises play an effective role in blood lipids and lipoproteins, it can be said that Step-aerobic exercises can be used in terms of applicability and difference. The results of this study showed that 12-week step-aerobic exercises caused changes in weight, BMI and blood lipid profiles of sedentary women. Moreover, like other aerobic exercises, step-aerobic exercises were also effective in maintaining the body composition of sedentary women in the desired range. It can be said that step-aerobic exercises were effective not only physiologically but also psychologically and aesthetically in sedentary women and would be an important method for developing a healthy lifestyle. It can be said that further studies will provide a significant gain to the literature from a different perspective to examine its effects such as different physiological (KAH, Lactate, Insulin Resistance).

CONCLUSION

As a result of the applied step-aerobic exercise program; it was seen that there was a significant improvement in physiologically sedentary women. Step-aerobic exercises can be an exercise program that can be preferred both to lead a healthy life and to reach the desired body mass index. Besides, it was thought that it might have a protective effect from metabolic disorders that may occur.

REFERENCES

1. Lundqvist, S., Börjesson, M., Cider, Å., Hagberg, L., Ottehall, C.B., Sjöström, J. & Larsson MEH. (2020): Long-term physical activity on prescription intervention for patients with insufficient physical activity level-a randomized controlled trial. *Trials*, Sep 15;21(1):793.
2. Jansson, E., Hagströmer, M. & Andersson S.A. (2015): Fysisk aktivitet - nya vägar och val i rekommendationerna för vuxna Physical activity--new paths and choices in the recommendations for adults. *Läkartidningen*. Nov 17;112.
3. Özdöl, P., Çetın, E. & Aktop, A. (2018): The effect of step-aerobic exercises on aerobic capacity and body composition in women of different ages. *Spormetr Journal of Physical Education and Sport Sciences*, 16 (1) , 49-54 .
4. Kurt, S., Hazar, S., İbiş, S., Albay, B. & Kurt, Y. (2010): Evaluation of the effects of eight-week step-aerobic exercise on some physical fitness parameters in middle age sedentary women. *International Journal of Human Sciences*, Cilt: 7, Sayı: 1.
5. Kurşun, Ş., Suna, G., & Alp, M. (2016): The effects of regular step-aerobic exercises on body fat values of adult sedentary women. *Journal of Human Sciences*, 13(3), 4973-4979.
6. Ceylan, H. İ., İrez, G. B., & Saygın, Ö. (2014): Examining of the effects of aerobic dance and step dance exercises on some hematological parameters and blood lipids. *Journal of Human Sciences*, 11(2), 980-991.
7. Akbulut, E. (2011): Effects of aerobic exercise program on blood lipids and body composition in sedentary women. Doctoral dissertation, Selçuk University, Turkey.
8. Clark, M.A., Lucett, S.C., & Sutton, B.G., (Ed.) (2012): NASM Essentials of Personal Fitness Training, s.335-368.
9. Kıvrak, B. (2019): The Effects of Step Aerobic and Resistance Exercises on Some Physical and Physiological Parameters in Middle Age Women. Master' Dissertation, Manisa Celal Bayar University, Turkey.
10. Mosher, P.E., Ferguson, M.A. & Arnold, R.O. (2005): Lipid and lipoprotein changes in premenstrual women following step aerobic dance training. *Int J Sports Med*. Oct; 26 (8): 669-74.
11. Marques, E., Carvalho, I., Soares, I.M., Marques, F. & Mota I. (2009): Effects of resistance and multicomponent exercise on lipid profiles of older women. *Maturitas*. May 20;63(1):84-8.
12. Cicek, G., Imamoglu, O., Gullu, A., Celik, O., Ozcan, O., Gullu, E. & Yamaner F. (2017): The effect of exercises on left ventricular systolic and diastolic heart function in sedentary women: Step-aerobic vs core exercises. *J Exerc Sci Fit*. Dec;15(2):70-75.
13. Suksom, D., Phanpheng, Y., Soogarun, S. & Sapwarabol, S. (2015): Step aerobic combined with resistance training improves cutaneous microvascular reactivity in overweight women. *J Sports Med Phys Fitness*. Dec;55(12):1547-54.

13. Zuzda, J.G., Pasek, M., Latosiewicz, R. & Bierkus M. (2019): Is there any effect of step aerobics training on physical fitness of female students? *AIP Conference Proceedings* 2186, 080012.
14. Ghorbani, F., Heidarimoghadam, R., Karami, M., Fathi, K., Minasian, & V. Bahram M.E. (2014): The effect of six-week aerobic training program on cardiovascular fitness, body composition and mental health among female students. *J Res Health Sci. Autumn*; 14(4): 264-267.
15. Kin Isler, A., Koşar, S.N. & Korkusuz F. (2001): Effects of step aerobics and aerobic dancing on serum lipids and lipoproteins. *J Sports Med Phys Fitness*. Sep;41(3):380-5.
16. Tortop, Y., Ön, B.O. & Öğün, E.S. (2010): The Effect of Step-Aerobic Exercise Program Applied for 12 Weeks to Women on Some Physical Fitness Parameters. Selcuk University *Journal of Physical Education and Sports Science*, 12 (2): 91–97.
17. Şavkın, R. (2014): Effects of Pilates training on body composition. Master' Dissertation Pamukkale University, Turkey.
18. Gordon, B., Chen, S. & Durstine, J.L. (2014): The effects of exercise training on the traditional lipid profile and beyond. *Curr Sports Med Rep*. 13(4): 253-259.
19. Vickers, K.C. & Remaley, A.T. (2014): HDL and cholesterol: life after the divorce?. *J Lipid Res*. 55(1):4-12.
- Yildirim, Z. & Bozkus, T. (2020): Effect of aerobic exercise on certain blood parameters of patients with type 2 diabetes. *Progress in Nutrition*, 22(2).
20. Yildirim, Z. (2020): "Autism Spectrum Disorder and Exercise" *Scientific Studies in Sports and Health – Vol.-I*, Publisher: Gece Kitaplığı, Turkey.

SP-51

THE RELATIONSHIP BETWEEN IN FINANCIAL MARKETS: A RESEARCH ON TURKISH FOOTBALL

Pınar KOÇ

Gümüşhane University, Faculty of Economics and Administrative Sciences, Department of Economics,
Gümüşhane/ Turkey

Corresponding author: ptorun@gumushane.edu.tr

ABSTRACT

The purpose of this paper is to analyze the relationship between risk and stock return on the basis of Turkish football teams traded in financial markets. The study consists of two stages. In the first stage, the most suitable GARCH models for the return series were estimated. In the second stage, the estimated GARCH models were used as risk indicators, and the causality relationship between risk and return was tested with the Fourier granger causality test. According to the results of the study, the best model for Fenerbahçe is ACGARCH (1,1,1) model, the best model Galatasaray is EGARCH model and the best model for Trabzonspor is APGARCH (1,1,1). In addition, there is causality relationship from risk to stock return.

Keywords: Risk, Return, GARCH Model, Fourier Causality

I. INTRODUCTION

Sports clubs, which operated under the law of associations 20 years ago, now, operate as incorporated company. The increase in the corporatization tendencies of football clubs caused serious increases in facility investments. Companies in search of suitable funding have started to enter stock markets and going public. There are four Turkish football teams traded in the financial markets. Galatasaray ve Beşiktaş went public in 2002. Fenerbahçe and Trabzonspor started to enter stock markets by going public in 2004. The informations of sport clubs' public offering are presented in the table 1.

Table 1: Descriptive Statistics

Sport Clubs	Beşiktaş	Galatasaray	Fenerbahçe	Trabzonspor
Public Offering Model	English	Income-Weighted Model	Income-Weighted Model	Income-Weighted Model
Public Offering Price	57.5	87 TL	10.50 TL	5.25 TL
Capital Receipts	2 Million TL	2 Million TL	25 Million TL	25 Million TL
Free Float rate	15 %	16 %	15 %	25 %
Public Offering Market Value	94 Million \$	132 Million \$	200 Million \$	96 Million \$

As you can see in the table 1, Income-weighted model was used in the public offering of all sports clubs except Beşiktaş. 15 percent of Beşiktaş and Fenerbahçe's capital receipts, 16 percent of Galatasaray's capital receipts and 25 percent of Trabzonspor's capital receipts was offered public. The unit stock prices are 57.5 TL for Beşiktaş, 87 TL for Galatasaray, 10.5 TL for Fenerbahçe, 5.25 TL for Trabzonspor.

Table 2. The main stock market indicators (2020:3)

Beşiktaş			
Free Float Rate	48.98	Capital	240.000.000
Price/Earning Ratio	0.00	Shareholder's Equity	-1.333.263.603
Market to Book Value Ratio	-0.68	Dividend Yield	0.00
Net Earning / Shareholder's Equity	0.03	Net Earning	-40.390.848
Coefficient of Beta	1.02	Stock Market Value	912.000.000
Fenerbahçe			
Free Float Rate	32.82	Capital	98.980.000

Price/Earning Ratio	0.00	Shareholder's Equity	-838.303.932
Market to Book Value Ratio	-4.00	Dividend Yield	0.55
Net Earning / Shareholder's Equity	0.04	Net Earning	-31.208.919
Coefficient of Beta	0.99	Stock Market Value	3.349.483.200
Galatasaray			
Free Float Rate	39.99	Capital	540.000.000
Price/Earning Ratio	0.00	Shareholder's Equity	-358.907.519
Market to Book Value Ratio	-6.15	Dividend Yield	1.79
Net Earning / Shareholder's Equity	0.11	Net Earning	-39.530.519
Coefficient of Beta	0.79	Stock Market Value	2.208.600.000
Trabzonspor			
Free Float Rate	49	Capital	236.390.631
Price/Earning Ratio	0.00	Shareholder's Equity	-615.357.408
Market to Book Value Ratio	-1.95	Dividend Yield	23.31
Net Earning / Shareholder's Equity	0.10	Net Earning	-60.264.196
Coefficient of Beta	0.15	Stock Market Value	1.198.500.499

The teams with the highest market value are Fenerbahçe and Galatasaray. It is seen that all sports clubs have negative shareholder's equity and are losing money. The reasons such as not being able to organize football competitions and playing the matches without spectators due to covid 19 significantly affected the revenues and profitability rates of sports clubs. In addition, high exchange rate increase the liabilities of sports clubs and increasing inflation negatively affects real returns. Increasing risk perception also changes stock market returns.

2. SELECTED LITERATURE

There are studies analyzing the relationships between risk and return in the literature; However, there are no studies analyzing the risk-return relationship on the basis of sports clubs. There are studies in the literature that examine the effects of match scores on stock returns. Brown and Hartzel¹, Ashton, Gerrard and Hudson², Solberg and Gratton³, Zuber et al.⁴, Duque and Ferraire⁵, Coates and Humphreys⁶, Scholtens and Peenstra⁷, Palomino, Renneboog and Zhang⁸, Bell et al.⁹ examined the relationship between match scores and stock returns for different football teams and for different periods. In all of the studies, with the exception of the study by conducted Zuber et al.⁴, were pointed out there is statistically significantly relationship between match scores and stock returns. While victories have a positive effect on stock returns, losses have a negative impact on stock returns. Zuber et al.⁴ found that there is no statistically significantly relationship between match scores and stock returns. Özcelik¹⁰, Aygören, Uyar and Sarıtaş¹¹, Demir and Danis¹², Berument et al.¹³, Demirhan¹⁴, Kırkkulak Uludağ and Sigalı¹⁵, Ektik¹⁶ analyzed analyzed the effect of the match scores of four major football teams traded in financial markets on stock returns for various periods. The general results obtained from the studies show that the match scores affect the stock returns. Özcelik¹⁰ indicated that match scores do not have a statistically significant effect on stock returns.

3. MATERIAL AND METHODS

In this study, the relationship between risk and return on the basis of three major Turkish football teams (Fenerbahçe, Galatasaray and Trabzonspor) traded in the stock exchange was analyzed. The study consists of two stages. In the first stage, The most suitable GARCH model is determined for the return series and GARCH values are estimated. The GARCH values estimated were used as risk indicators. In the second stage, the causality relationships between risk and return are analyzed by using the Fourier Causality test.

Table 3. Data set

Sport Club	Data	Risk Indicator	Return Indicator	Database
Fenerbahçe	FENER.IS's stock closing prices	GARCH values of ACGARCH (1,1,1) modeli	Return series based on FENER.IS's stock closing prices	Yahoo finance historical prices
Galatasaray	GSRAY.IS's stock closing prices	GARCH values of EGARCH (1,1,1) model	Return series based on GSRAY.IS's stock closing prices	

Trabzonspor	TSPOR.IS's stock closing prices	GARCH values of APGARCH (1,1,1) model	Return series based on TSPOR.IS's stock closing prices

3.1. GARCH Models

Financial time series are fat-tailed and more peaked compared to the normal distribution. In addition there is volatility clustering in the financial time series. For this reason, financial time series have heteroskedasticity problem. Therefore, it is more appropriate to use GARCH models instead of linear time series models in studies on financial time series. the first model based on ARCH effect was developed by Engle¹⁷. Bollerslev¹⁸ developed. the Generalized Autoregressive Conditional Variable Variance (GARCH) model by modeling the conditional variance with the ARMA process. GARCH (p, q) model can be formulated as seen below.

$$\varepsilon_t | \psi_{t-1} = (0, \sigma_t^2) \quad (2)$$

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 \quad (3)$$

Equation (2) shows that the conditional mean of the error terms by relying on the ψ_{t-1} information set is zero and its variance value is equal to σ_t^2 . α_0 is mean, α_i and β_j are ARCH and GARCH parameters. The following restrictions are imposed on the parameters in the GARCH model;

$$\alpha_0 > 0, \alpha_i \geq 0, \beta_j \geq 0; \text{ ve } \sum_{i=1}^q \alpha_i + \sum_{j=1}^p \beta_j < 1 \quad (4)$$

In the GARCH Model, it is assumed that news has the same effect on volatility. The leverage effect is not taken into account. The Exponential GARCH (EGARCH) model developed by Nelson¹⁹ and the Threshold GARCH (TGARCH) model developed by Zokaian²⁰ take into account the asymmetric effect of news on volatility.

EGARCH Model can be formulated as seen below.

$$\ln \sigma_t^2 = \alpha_0 + \sum_{i=1}^q \left(\alpha_i \frac{|\varepsilon_{t-i}|}{\sqrt{\sigma_{t-i}^2}} + \gamma \frac{\varepsilon_{t-i}}{\sqrt{\sigma_{t-i}^2}} \right) + \sum_{j=1}^p \beta_j \ln(\sigma_{t-j}^2) \quad (5)$$

In the EGARCH model, the conditional variance value depends on both the magnitude and the sign of the lagged error terms. There are no restrictions on parameters in the EGARCH model. The γ parameter measures the presence of the asymmetric effect. If $\gamma \neq 0$, there is an asymmetrical effect in the model. If < 0 , there is a leverage effect.

In the TGARCH model, asymmetric effects are included in the model by using dummy variables. The TGARCH model can be formulated as follows.

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 + \sum_{i=1}^q \gamma_i D_{t-i} \varepsilon_{t-i}^2 \quad (6)$$

$$D_{t-i} = \begin{cases} 1 & \varepsilon_{t-i} < 0 \\ 0 & \varepsilon_{t-i} \geq 0 \end{cases} \quad (7)$$

The effect of positive news is equal to α_i , The effect of negative news is equal to $\alpha_i + \gamma_i$. The γ parameter measures the presence of the asymmetric effect. If $\gamma > 0$, there is a leverage effect.

In the asymmetric CGARCH model developed by Engle and Lee²¹, it was taken into account that conditional variance may change over time, and it was possible to model how volatility changed in the short and long run.

Asymmetric CGARH model can be written as below.

$$\sigma_t^2 = \alpha_0 + p(q_{t-1} - \alpha_0) + \theta(\varepsilon_{t-1}^2 - \sigma_{t-1}^2) + \alpha(\varepsilon_{t-1}^2 - q_{t-1}) + \gamma(\varepsilon_{t-1}^2 - q_{t-1}) + \beta(\sigma_{t-1}^2 - q_{t-1}) \quad (8)$$

α and β parameters represent ARCH and GARCH effects, q_t and p also represents short-term and long-term memory, respectively. The model has the following restrictions;

$$0 < \alpha_i + \beta_i \leq 1; \quad \text{and } 0 < \theta < \beta < 1 \quad (9)$$

Asymmetric PGARCH model developed by Ding et al.²² can be formulated as below.

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i (|\varepsilon_{t-i}| - \gamma_i |\varepsilon_{t-i}|)^{\delta} + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 \quad (10)$$

The model has the following restrictions;

$$\alpha_0 > 0, \quad \delta \geq 0, \quad \alpha_i \geq 0, \quad -1 < \gamma_i < 1 \quad \text{and} \quad \beta_j \geq 0 \quad (11)$$

3.2. Fourier Causality Test

In analyzes based on Fourier equations, structural breaks with trigonometric terms in models are taken into account. The fourier granger causality test developed by Enders and Jones²³ is based on the following VAR equation.

$$x_t = \delta(t) + \sum_{i=1}^{11} A_i x_{t-i} + \varepsilon_t \quad (12)$$

$$\delta(t) = \alpha_i + \beta_i t + \sum_{k=1}^m \alpha_{ik} \sin\left(\frac{2\pi kt}{T}\right) + \sum_{k=1}^n \beta_{ik} \cos\left(\frac{2\pi kt}{T}\right) \quad (13)$$

The rejection of the basic hypothesis shows that there is a causality relationship between variables.

4. DIAGNOSTIC TESTS

GARCH models are the most frequently used models in risk measurements in financial markets. However, in order to use GARCH models, the return series should not have a normal distribution, there should be an ARCH effect in the mean equation used to estimate the GARCH model and finally, the residues should be free of ARCH effect in the estimated GARCH model. The descriptive statistics of the stock returns of football clubs are given in the Figure 1.

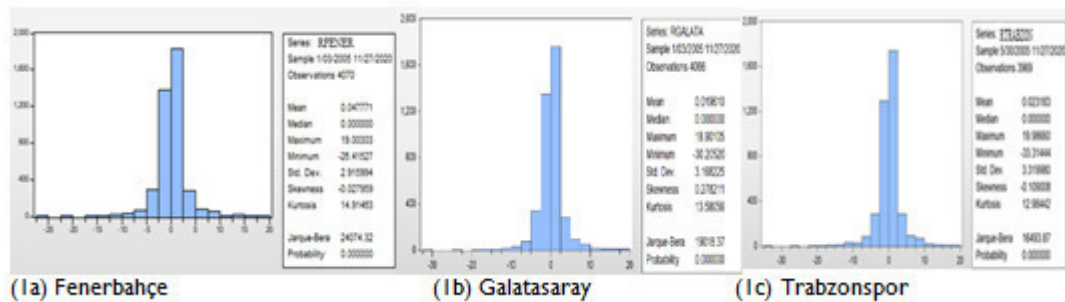


Fig 1. The descriptive statistics

Figure 1 shows that return series have a non-normal distribution. The return series of Fenerbahçe and Galatasaray have a right tail while the return of Trabzonspor has a left tail.

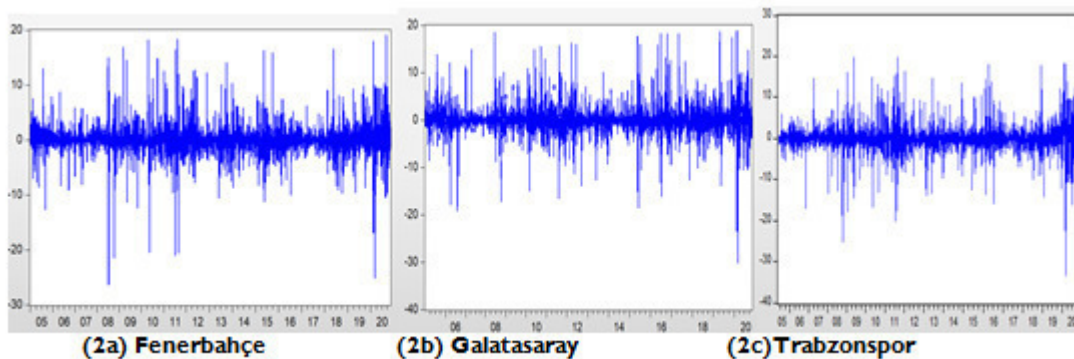


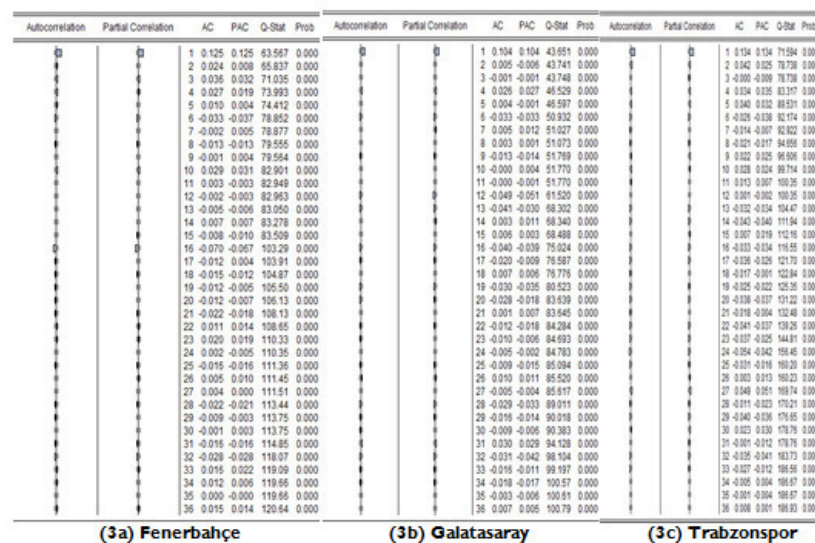
Fig 2. The volatility clustering

All sport clubs exhibit volatility clustering. In other words, large changes tend to be followed by large changes while small changes tend to be followed by small change. In GARCH models, the obtained GARCH equations are obtained from the mean equations obtained by using AR (p), MA (q), ARMA (p, q) or ARIMA (p, q, d) models. This models are models estimated by stationary series. Fractional Flexible Fourier ADF (FFFADF) Test developed by Omay²⁴ and ADF test developed by Dickey and Fuller²⁵ were used to test whether the series have a unit root. The results of unit root test are given in table 4.

Table 4. The results of unit root test

Series	Frequency	Min. SSR	F Test Stat	Optimal Lag	ADF		
					FADF Test Stat	Test Stat	Prob
RFENER	0.100000	3.402392	1.856324	2.000000	-33.91704	-16.770	0.0000
RGALATA	2.900000	40299.94	1.036527	0.000000	-57.36948	-12.682	0.0000
RRABZON	5.000000	42883.16	2.958510	0.000000	-55.09930	-13.016	0.0000

According to Table 4, all of series are stationary. Correlogram analysis is performed to determine the most suitable model for the mean equation to be estimated.

**Fig 3. The correlograms of return series**

The most suitable model for estimating the average equation for stock returns of all football clubs is the ARMA (1,1) model. It should be tested whether each model has ARCH effect and the correlograms of the residuals of estimated models should be examined.

Table 5. The results of ARCH test

ARCH Test of the ARMA (1,1) Model Estimated for Fenerbahçe			
F-statistic	288.5761	Prob. F(1,4067)	0.000
Obs*R-squared	269.5892	Prob. Chi-Square(1)	0.000
ARCH Test of the ARMA (1,1) Model Estimated for Galatasaray			
F-statistic	137.5192	Prob. F(1,4059)	0.000
Obs*R-squared	133.0783	Prob. Chi-Square(1)	0.000
ARCH Test of the ARMA (1,1) Model Estimated for Trabzonspor			
F-statistic	189.7492	Prob. F(1,3966)	0.0000
Obs*R-squared	181.1767	Prob. Chi-Square(1)	0.0000

Table 5 shows that the H_0 hypothesis, which states that the models do not have ARCH effects in the estimated ARMA models, is rejected. Correlogram graphs of the residuals of the models are also given in Figure 4.

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	0.001	0.001	0.0073	0.932		1	0.000	0.000	4.5-05	0.995		1	0.000	0.000	1.5-05	0.997	
2	-0.013	-0.013	0.7307	0.694		2	-0.009	-0.009	0.0001	1.000		2	0.002	0.002	0.0161	0.992	
3	0.028	0.028	3.4687	0.325		3	-0.004	-0.004	0.0550	0.997		3	-0.018	-0.018	1.3478	0.718	
4	0.022	0.021	5.3996	0.250		4	0.026	0.026	2.7179	0.606		4	0.028	0.028	4.5716	0.334	
5	0.010	0.011	5.8385	0.322		5	0.005	0.005	2.8068	0.730		5	0.040	0.040	10.902	0.053	
6	-0.035	-0.036	10.931	0.091		6	-0.033	-0.033	7.3148	0.293		6	-0.031	-0.031	14.620	0.023	
7	0.003	0.002	10.963	0.140		7	0.007	0.007	7.5310	0.376		7	-0.010	-0.009	15.003	0.036	
8	-0.013	-0.015	11.629	0.169		8	0.003	0.003	7.5807	0.475		8	-0.023	-0.022	17.113	0.029	
9	-0.003	-0.002	11.675	0.232		9	-0.047	-0.048	8.7571	0.480		9	0.022	0.019	19.065	0.025	
10	0.030	0.031	15.233	0.124		10	0.004	0.005	8.8093	0.550		10	0.025	0.025	21.579	0.017	
11	0.000	0.002	15.233	0.172		11	0.003	0.003	8.8359	0.637		11	0.010	0.012	21.960	0.025	
12	-0.002	-0.002	15.255	0.228		12	-0.045	-0.047	17.132	0.145		12	0.004	0.006	22.022	0.037	
13	-0.005	-0.006	15.369	0.285		13	-0.040	-0.039	23.625	0.035		13	-0.028	-0.028	25.212	0.022	
14	0.010	0.008	15.812	0.325		14	0.005	0.005	23.716	0.050		14	-0.041	-0.045	31.885	0.004	
15	0.000	-0.001	15.812	0.395		15	0.013	0.011	24.385	0.059		15	0.019	0.018	33.347	0.004	
16	-0.069	-0.067	35.329	0.004		16	-0.038	-0.036	38.432	0.016		16	-0.029	-0.029	36.704	0.002	
17	-0.002	-0.002	35.348	0.006		17	-0.018	-0.015	31.714	0.016		17	-0.030	-0.028	40.284	0.001	
18	-0.011	-0.013	35.861	0.007		18	0.009	0.006	32.015	0.022		18	-0.008	-0.001	40.529	0.002	
19	-0.009	-0.006	36.173	0.010		19	-0.026	-0.029	34.829	0.015		19	-0.017	-0.018	41.710	0.002	
20	-0.009	-0.006	36.470	0.014		20	-0.028	-0.025	37.976	0.009		20	-0.033	-0.038	45.926	0.001	
21	-0.023	-0.021	38.595	0.011		21	0.006	0.007	38.119	0.012		21	-0.006	-0.004	48.086	0.001	
22	0.012	0.009	39.194	0.013		22	-0.010	-0.015	38.563	0.016		22	-0.033	-0.034	50.480	0.001	
23	0.020	0.021	40.834	0.012		23	-0.007	-0.007	38.773	0.021		23	-0.025	-0.024	52.975	0.000	
24	0.001	-0.000	40.838	0.017		24	-0.002	-0.001	38.794	0.029		24	-0.046	-0.044	61.560	0.000	
25	-0.017	-0.017	42.061	0.018		25	-0.011	-0.018	39.311	0.034		25	-0.025	-0.025	64.082	0.000	
26	0.007	0.009	42.262	0.023		26	0.018	0.015	40.610	0.034		26	0.002	0.003	64.100	0.000	
27	0.006	0.003	42.427	0.030		27	-0.008	-0.005	40.881	0.042		27	0.053	0.054	75.521	0.000	
28	-0.022	-0.020	44.377	0.025		28	-0.025	-0.021	43.743	0.029		28	-0.013	-0.012	76.168	0.000	
29	-0.006	-0.005	44.522	0.033		29	-0.010	-0.015	44.181	0.035		29	-0.044	-0.040	83.971	0.000	
30	0.003	0.004	44.563	0.042		30	-0.010	-0.011	44.637	0.042		30	0.030	0.027	87.600	0.000	
31	-0.014	-0.012	45.312	0.047		31	0.038	0.036	50.505	0.015		31	0.002	-0.004	87.624	0.000	
32	-0.029	-0.032	48.748	0.029		32	-0.036	-0.040	55.882	0.006		32	-0.033	-0.040	92.041	0.000	
33	0.018	0.017	50.145	0.028		33	-0.015	-0.019	56.879	0.005		33	-0.022	-0.017	94.060	0.000	
34	0.011	0.007	50.598	0.033		34	-0.009	-0.010	57.227	0.008		34	-0.001	0.001	94.066	0.000	
35	-0.004	-0.001	50.648	0.042		35	-0.008	-0.014	57.517	0.010		35	-0.002	-0.006	94.076	0.000	
36	0.015	0.014	51.550	0.045		36	0.008	0.005	57.805	0.012		36	0.003	-0.003	94.125	0.000	

Fig 4. Correlograms of residuals of GARCH models

The estimated models provide all the assumptions of GARCH models. In order to decide the most suitable GARCH model for each football club, all models were estimated, and the model with the smallest AIC and SIC information criteria was selected as the optimum model.

Table 6. The selection of the best GARCH model

Fenerbahçe			
MODEL	AIC	SIC	Desicion
GARCH (I,I)	-4.159	-4.150	It is not the best model
TGARCH(I,I,I)	-4.586	-4.575	It is not the best model
EGARCH (I,I,I)	-4.592	-4.581	It is not the best model
APGARCH(I,I,I)	-4.594	-4.581	It is not the best model
ACGARCH(I,I,I)	-4.636	-4.622	It is the best model
Galatasaray			
MODEL	AIC	SIC	Desicion
GARCH (I,I)	5.114	5.123	It is not the best model
TGARCH(I,I,I)	4.855	4.866	It is not the best model
EGARCH (I,I,I)	4.844	4.855	It is the best model
APGARCH(I,I,I)	4.847	4.859	It is not the best model
ACGARCH(I,I,I)	4.855	4.869	It is not the best model
Trabzonspor			
MODEL	AIC	SIC	Desicion
GARCH (I,I)	5.190	5.199	It is not the best model
TGARCH(I,I,I)	4.820	4.831	It is not the best model
EGARCH (I,I,I)	4.820	4.831	It is not the best model
APGARCH(I,I,I)	4.814	4.827	It is the best model
ACGARCH(I,I,I)	4.826	4.841	It is not the best model

Table 6 exhibits that the best model for Fenerbahçe is ACGARCH (1,1,1) model, the best model Galatasaray is EGARCH model and the best model for Trabzonspor is APGARCH (1,1,1). In order to use the estimated GARCH models, the residuals of the models should not contain ARCH effects.

Table 7. ARCH Test for the estimated GARCH models

ARCH Test for ACGARCH (1,1,1) Model

F-statistic	0.017333	Prob. F(1,4066)	0.8953
Obs*R-squared	0.017342	Prob. Chi-Square(1)	0.8952

ARCH Test for EGARCH(1,1,1) Model

F-statistic	0.293813	Prob. F(1,4066)	0.5878
Obs*R-squared	0.293937	Prob. Chi-Square(1)	0.5877

ARCH Test for PGARCH (1,1,1) Model

F-statistic	0.19876	Prob F(1,3965)	0.6557
Obs*R-squared	0.198855	Prob. Chi-Square(1)	0.6556

According to table 7, there is no ARCH effect in the estimated GARCH Models. The models provides the necessary conditions.

5. ECONOMETRIC MODEL

The estimated GARCH Models are given in the table 8.

Table 8: GARCH Models

Dependent Variable: RFENERBAHÇE

$$Q = \alpha_0 + \rho * (Q(-1) - \alpha_0) + \theta * (\text{RESID}(-1)^2 - \text{GARCH}(-1))$$

$$\text{GARCH} = Q + (\alpha + \gamma * (\text{RESID}(-1) < 0)) * (\text{RESID}(-1)^2 - Q(-1)) + \beta * (\text{GARCH}(-1) - Q(-1))$$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	5.21E-05	0.000311	1.67621	0.08669
AR(1)	-0.269590	0.327702	-1.822666	0.04107
MA(1)	0.312529	0.322278	1.969749	0.03322

Variance Equation

α_0	0.050997	0.016281	3.132390	0.0017
ρ	0.999974	1.50E-05	66532.04	0.0000
θ	0.027688	0.001675	16.52705	0.0000
α	0.224549	0.009736	23.06399	0.0000
γ	0.051217	0.009801	5.225711	0.0000
β	0.560628	0.015090	37.15156	0.0000

Dependent Variable: RGALATA

$$\text{LOG}(\text{GARCH}) = \alpha_0 + \alpha * \text{ABS}(\text{RESID}(-1)/@SQRT(\text{GARCH}(-1))) + \gamma * \text{RESID}(-1)/@SQRT(\text{GARCH}(-1)) + \beta * \text{LOG}(\text{GARCH}(-1))$$

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.044013	0.034632	1.270888	0.2038

AR(1)	-0.502464	0.161661	-3.108132	0.0019
MA(1)	0.549588	0.155717	3.529392	0.0004
Variance Equation				
α_0	0.038534	0.004821	-7.993532	0.0000
α	0.312625	0.008313	37.60589	0.0000
γ	0.060619	0.005900	10.27457	0.0000
β	0.619961	0.002930	314.0056	0.0000
Dependent Variable: RTRABZON				
$@SQRT(GARCH)^{\delta} = \alpha_0 + \alpha*(ABS(RESID(-1)) - \gamma*RESID(-1))^{\delta} + \beta*@SQRT(GARCH(-1))^{\delta}$				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.056925	0.033832	1.682567	0.0925
AR(1)	0.073135	0.208315	1.351078	0.0725
MA(1)	0.002980	0.207839	1.234021	0.0988
Variance Equation				
α_0	0.336704	0.025962	12.96893	0.0000
α	0.211192	0.008639	24.44511	0.0000
γ	-0.227722	0.025528	-8.920391	0.0000
β	0.760309	0.008802	86.37441	0.0000
δ	1.203560	0.062536	19.24577	0.0000

The estimated GARCH equations can be written as follows.

$$\sigma_t^2 = 0.050 + 0.999(q_{t-1} - \alpha_0) + 0.027(\varepsilon_{t-1}^2 - \sigma_{t-1}^2) + 0.224(\varepsilon_{t-1}^2 - q_{t-1}) + 0.051(\varepsilon_{t-1}^2 - q_{t-1}) + 0.560(\sigma_{t-1}^2 - q_{t-1}) \quad (14)$$

$$\ln \sigma_t^2 = 0.038 + \sum_{i=1}^q \left(0.312 \left| \frac{\varepsilon_{t-i}}{\sigma_{t-i}} \right| + 0.060 \left| \frac{\varepsilon_{t-i}}{\sigma_{t-i}} \right| \right) + \sum_{j=1}^p 0.619 \ln(\sigma_{t-j}^2) \quad (15)$$

$$\sigma_t^{1+\delta} = 0.336 + 0.211(|\varepsilon_{t-1}| + 0.227|\varepsilon_{t-1}|)^{1+\delta} + \sum_{i=1}^p 0.760\sigma_{t-i}^{1+\delta} \quad (16)$$

Equation (14) shows ACGARCH model estimated for Fenerbahçe, Equation (15) exhibits EGARCH Model estimated for Galatasaray and Equation (16) shows APGARCH Model estimated for Trabzonspor. All of the coefficient in the estimated models is statistically significant. There is ARCH and GARCH effect in the stock returns of Turkish football teams and asymmetric effect.

Conditional variance values estimated by using GARCH models were used as risk indicators and the causality relationships between risk and return were analyzed. The results of Fourier Causality test are given in Table 9.

Table 9. The results of fourier causality test

Direction of causality	Football team	Optimal frequency	Wald stat	Asymptotic value	p	Optimal lag	Decision
Risk-return	Fenerbahçe	1	51.377	0.0000		8	H0 red
	Galatasaray	2	12.562	0.0835		7	H0 red
	Trabzonspor	2	25.793	0.0011		7	H0 red

According to Table 9, there is the causality from risk and return at % 1 significant level for Fenerbahçe and Trabzonspor while there is the causality from risk and return at % 10 significant level for Galatasaray.

6. CONCLUSION

The reasons such as not being able to organize football competitions and playing the matches without spectators due to covid 19 significantly affected the revenues and profitability rates of sports clubs. In addition, high exchange rate increase the liabilities of sports clubs and increasing inflation negatively affects real returns. It is expected to that increases in the risk perceptions affect on stock returns. In this context, in this study, the causality relationship between risk and stock return analyzed for three Turkish football teams traded in the financial markets. The study consists of two stages. In the first stage, the most suitable GARCH models for the return series were estimated. In the second stage, the causality relationship between risk and return by using as risk indicator estimated conditional variance values. According to the results obtained from the study, ACGARCH (1,1,1), EGARCH (1,1,1) and APGARCH (1,1,1) models are the best model for the stock returns of Fenerbahçe, Galatasaray and Trabzonspor, respectively. The results of Fourier Causality Test Show that there is the causality from risk and return.

7. AUTHORS CONTRIBUTION STATEMENT

Pınar Koç conceived the idea, designed the methodology

8. CONFLICT OF INTEREST

Conflict of interest declared none.

9. REFERENCES

1. Brown GW, Hartzell JC. Market reaction to public information: the atypical case of boston celtics. *Journal of Financial Economics*. 2001; 60 (2):333-370.
2. Ashton JK, Gerrard B, Hudson R. Economic impact of national sporting success: evidence from the london stock exchange. *Applied Economics Letters*. 2003; 10: 783-785.
3. Solberg HA, Gratton C. (2004): Would European soccer clubs benefit from playing in a super league? . *Soccer and Society*. 2004; 5(1):61-81.
4. Zuber RA, Yiu P, Lamb RP, Gandar JM. Investor–fans? an examination of the performance of publicly traded english premier league teams. *Applied Financial Economics*. 2005; 15 (5): 305-313.
5. Duque J, Ferreira NA. Explaining share price performance of football clubs listed on the euronext lisbon. Working Paper. Technical University of Lisbon. 2005.
6. Coates D, Humphreys BR. The effect on-field success on stock prices: evidence from nippon professional baseball. *NAASE Working Paper Series No:08-05*. 2008.
7. Scholtens B, Peenstra W. The effect of football matches on stock market returns. *Applied Economics*. 2009; 41(25):3231-3237.
8. Palomino F, Renneboog L, Zhang C. Information salience investor sentiment and stock returns: the case of british soccer betting. *Journal of Corporate Finance*. 2009;15(3):368–87.
9. Bell AR, Brooks C, Matthews D, Sutcliffe C. Over the moon or sick as a parrot? the effects of football results on a club's share price. *Applied Economics*. 2012; 44(26): 3435-3452.
10. Özçelik Ş. Derbi maç sonuçlarının hisse senedi üzerindeki etkisi. Yayınlanmamış Yüksek Lisans Tezi. Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü Bolu. 2007.
11. Aygören H, Uyar S, Sarıtaş H. Are investors influenced by the results of football matches? an empirical investigation in Istanbul Stock Exchange. *Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*. 2008; 26(1): 121-137.
12. Demir E, Danis H. The effect of performance of soccer clubs on their stock prices: Evidence from Turkey. *Emerging Markets Finance and Trade*. 2011; 47: 58–70
13. Berument MH, Ceylan Nildag B, Onar B. Football and the risk-return relationship for a stock market: Borsa Istanbul. *Emerging Markets Finance and Trade*. 2013; 49(2): 19–30.
14. Demirhan D. Stock market reaction to national sporting success: case of Borsa Istanbul. *Pamukkale Journal of Sport Sciences*. 2013; 4(3):107-121
15. Kırkkulak Uludağ B, Sigalı S. Impact of sporting performance on financial performance: an analysis of 4 big soccer clubs in turkey. *Ege Academic Review*. 2016; 16(4): 575-585.
16. Ektik D. Impact of football teams' field success on their stock returns. *Marmara Üniversitesi Öneri Dergisi*. 2018; Cilt 13 Sayı 49: 91-108.
17. Engle RF. Autoregressive conditional heteroscedasticity with estimates of the variance of united kingdom inflation. *Econometrica*. 1982; 50(4): 987-1008.

18. Bollerslev T. Generalized autoregressive conditional heteroscedasticity. *Journal of Econometrics*. 1986; 31: 307-327.
19. Nelson D. Conditional heteroskedasticity in asset returns: a new approach. *Econometrica*. 1991; 59(2):347-70.
20. Zakoian J. M. (1994): Threshold heteroskedastic models. *Journal of Economic Dynamics and Control* 18(5) 931-955.
21. Engle RF, Lee GGJ. A permanent and transitory component model of stock return volatility in R.F. Engle and H. White (eds.) *Cointegration Causality and Forecasting: A Festschrift in Honor of Clive W.J. Granger*. 475-497. Oxford UK: Oxford University Press. 1999.
22. Ding Z, Granger WJ, Engle RF. A long memory property of stock market returns and a new model. *Journal of Empirical Finance*. 1993; 1: 83-106.
23. Enders W, Jones P. Grain prices oil prices and multiple smooth breaks in a VAR. *Studies in Nonlinear Dynamics Econometrics*. 2016; 20(4):399-419.
24. Omay T. Fractional frequency flexible fourier form to approximate smooth breaks in unit root testing. *Economics Letters*. 2015; 134:123-126.
25. Dickey DA, Fuller WA. Distribution of the estimators for autoregressive time series with a unit root. *Econometrica*. 1981; 49: 1057-72.

SP-52

INTENSIVE PHYSICAL EXERCISE AND KETOSIS IN TYPE 1 DIABETES: LITERATURE REVIEW ON A CASE AFTER COVID-19 QUARANTINE

Tamer CİVİL¹, Gökmen Özen², Hüseyin DEMİRBİLEK³

¹ Trabzon University, Faculty of Sport Sciences, Department of Physical Education and Sports Teaching

² Çanakkale Onsekiz Mart University, Faculty of Sport Sciences, Department of Physical Education and Sports Teaching

³ Hacettepe University, Faculty of Medicine, Department of Pediatric Endocrinology

Corresponding author: tamercivil@trabzon.edu.tr

ABSTRACT

Type 1 diabetes (T1D) is characterized with elevated blood glucose due to insulin deficiency. In case of insulin deficiency glucose can not be used by the body cells to generate energy. Therefore, triglycerides (TG) and free fatty acids (FFA) become source of energy. Ketone bodies (KBs) are synthesized through beta oxydation of FFAs in the liver. KBs serves as an alternative source of energy. The ability of muscle cells to use KBs in energy production is dependent the insulin. Insulin deficiency in individuals with T1D causes both the increased synthesis of KBs and also inability to use the KBs as source of energy. Accumulation of KBs in the blood is known as hyperketonemia (ketosis). Elevated KBs cause a decrease in blood pH, thereby, a diabetic complication diabetic ketoacidosis develops. On the other hand ketosis in individuals with T1D can develop due to insulin deficiency and prolonged hyperglycemia, as well as prolonged fasting state or prolonged and intensive physical exercises. In this study, we present hyperketonemia situation in a child with T1D that was attributed to the intensive physical exercises in and reviewed the relevant literature data.

Key Words: Type 1 diabetes, Exercise, Ketosis

INTRODUCTION

T1D is a chronic disease that usually occurs in childhood. The treatment of the disease is provided by insulin, appropriate nutrition and controlled physical exercises. This disease must be well managed to reduce the risk of acute and chronic complications.¹⁻⁶ The most important issue for good management of T1D is to maintain the balance between insulin and carbohydrate (CHO). Disruption of this balance can cause serious problems for individuals with T1D. Hypoglycemia is the most serious acute complication in individuals with T1D. Many situations such as skipping meals, intense physical activity, using too much insulin can cause the development of hypoglycemia.¹ Hyperglycemia may occur due to eating too much, not making enough insulin, skipping insulin doses or infectious diseases.⁹ If glucose can not be taken into cells due to insulin deficiency, glucose oxidation will decrease dramatically. In this case, cells will use fats for their energy needs. In this process, the amount of FFAs passing from adipose tissue into the blood increases. The synthesis of KBs (acetone, acetoacetate, β -hydroxybutyrate) also increases as a result of metabolism from FFAs in the liver. Normally synthesized KBs are sent to tissues other than the liver and used for the energy needs of the tissues.¹⁸ Due to insulin deficiency in individuals with T1D, the production of KBs increases and these bodies cannot be used as energy in tissues. Thus, KBs accumulate in the blood and cause the development of a condition called ketosis. Uncontrolled ketosis causes ketoacidosis, which is a serious acute complication. Ketosis usually occurs with a prolonged high blood glucose level. However, due to intense physical exercises and skipping meals, individuals with T1D can develop ketosis without hyperglycemia. Especially in some children with T1D, this situation occurs with symptoms such as abdominal pain, nausea and vomiting. There is no doubt that there are children with T1D who usually have breakfast late in the summer. These children can skip lunch and finish the day with dinner. It is thought that long-term intense physical exercise in hot weather may increase the risk of ketosis. In addition, CHO and insulin deficiency caused by skipping meals further increase the risk of ketosis. In this study, the effect of intensive physical exercises and skipping meals on the development of ketosis was evaluated within the framework of the T1D child case and the literature.

MATERIALS AND METHODS

The study was conducted by examining the data of the child case with T1D within the framework of the literature. The data of the case were obtained from the interview with the parents of the case. In accordance with the Helsinki Declaration, a consent form was prepared and signed by the case and his parents.

Subjects

The case is a boy aged 9 years old and has T1D for 6 years. The height of the case is 128 cm and his body weight is 29 kg. The case uses fast acting (insulin lispro) for bolus and long acting insulin analogs (insulin glargine) for basal. The case makes CHO count as a nutritional method. Accordingly, 10 grams of CHO at breakfast, 15 g of CHO at lunch, 1 unit of fast acting insulin for 20 g CHO at dinner is used. In the evening, 8 units of long-acting insulin injections are applied. The insulin sensitivity factor (ISF) of the case is 100 mg / dL for 1 unit of fast acting insulin. The regulation factor (RF) for hyperglycemia was calculated as 1 unit of fast acting insulin per 100 mg / dL above 150 mg / dL. The patient uses the accucheck glucose meter for blood glucose control and measures blood glucose at least 8 times a day. He uses the FreeStyle Libre device to measure the ketone level in the blood.

The data of a day when the subject played children's games for 7 hours is presented in Table 1. These games include exercises with different load intensity. These data were recorded by the parent of the T1D case. Table 1; It includes fasting and postprandial blood glucose levels, the amount of CHO consumed in main and snack meals, bolus and basal insulin doses, ketone levels, activities performed during the day and some symptoms

Table 1. Measurements and some determinations made by parents at home.

First Day	Hour	Fasting Glucose mg/dL	Main Meal CHO(g)	Fast-acting Insulin Dose	Postprandial Glucose mg/dL	Long-acting Insulin Dose	Snack CHO(g)	Ketone mmol/L	Events and Situations
Morning	10.00	136	25	2.5	158	-	10	-	Rest at home until 11:50
Noon	15.00	130	-	-	-	-	-	-	He played a game with physical exercise between 12.00-19.00 in the residential garden. He did not eat lunch.
Evening	20.00	105	70	2	159	8	-	-	He rested and slept at 22:00.
Night	03.00	340	-	1,5*	-	-	-	-	He woke up with stomach ache, nausea, and vomited.
	06.00	140	-	-	-	-	-	-	
Second Day									
Morning	09.00	198	20	1,5	158	-	-	0,7	Abdominal Pain and Nausea
Noon	13.00	178	10	-	60	-	20	-	Abdominal Pain and Nausea
Evening	18.00	170	30	1,5	150	8	-	-	Abdominal Pain, Nausea and Vomiting
Night	00.00	129	-	-	-	-	-	1,1	Abdominal Pain, Nausea and Vomiting

* Additional insulin dose for regulation

As the vomiting continued on the night of the second day, as shown in Table 1, the emergency of the hospital was visited. Laboratory results and evaluation are presented in Table 2.

Table 2. Laboratory results and evaluation

Second Day	Hour: 01.30	Clinical evaluation and recommendations
Blood Glucose (mg/dL)	122	Ketone was found to be high in urine. The patient's abdominal pain continued to be mild, and the examination was normal. There was no nausea and vomiting. It was recommended that the insulin regimen be continued, the patient should rest and drink plenty of fluids.
Ketone in urine (mg/dL)	10	
Ph	7,390	
pO ₂ (mmHg)	36,5	
Sodium (mEq/L)	136	
Potassium (mEq/L)	3,7	
CRP (mg/L)	4,2	

Type I Diabetes and Hyperketonemia

Glycogenolysis, gluconeogenesis, lipolysis and ketogenesis are chemical processes which are carried by activation of anti-hormone insulin. The occurrence of these processes depends on whether there is sufficient insulin in the concentration. T1D is a chronic metabolic disease that develops due to insufficiency or deficiency in the secretion of insulin hormone. It is stated that many factors are effective in the development of this disease.³ T1D mostly (90%) develops by autoimmune destruction of the beta cells of the pancreas.³⁻¹⁶⁻¹⁷ Insulin is an anabolic hormone that provides glucose, protein and fat storage in the tissues. Storage of glucose in fat and muscle tissue with insulin deficiency causes a number of problems. The renal glucose threshold is exceeded when the plasma glucose concentration rises above 180 mg / dL. As a result, glucosuria, polyuria, electrolyte losses and dehydration develop. In some cases that cause stress in individuals with T1D, there is an increase in anti-insulin hormones. The increase in epinephrine (adrenaline), glucagon, growth hormone and cortisol stimulates glycogenolysis, gluconeogenesis, lipolysis and ketogenesis by antagonizing the effect of insulin.³² Cortisol, growth hormone, glucagon and adrenaline increase glucose production in the liver. Adrenaline activates four chemical processes. Glucagon, which activates the gluconeogenesis and ketogenesis. While cortisol activates gluconeogenesis, growth hormone activates lipolysis.⁴⁻²⁴ FFAs released as a result of increased lipolysis turn into acetylcoenzyme A (acetyl-CoA) in the liver. The increasing acetyl-CoA's cannot be fully oxidized and turn into KBs (acetone, acetoacetate, β hydroxybutyrate). In insulin deficiency, KBs are not used in energy production. Glycogen in skeletal muscle cells is the primary source of energy required for muscle contraction. Glycogenolysis occurs with the depletion of muscle glycogen stores and a decrease in blood glucose level. Thus, blood sugar is prevented from falling. During long hunger and intense physical exercises, the decrease in blood glucose is basically prevented by the release of hormones such as glucagon and adrenaline. Especially in long-lasting exercises, skeletal muscles meet their energy needs from TG and FFA. This process is not a problem for healthy individuals, but it may cause some health problems in individuals with T1D. These chemical processes are affected by the insulin dose and the amount of CHO in individuals with T1D. If the balance between CHO and insulin is not established, hypoglycemia or hyperglycemia may develop. In both cases, it carries serious risks. During the hyperglycemia that develops due to the inability of glucose into the cell, the cells obtain their energy need from TG and FFAs. Hormonal responses secondary to insulin insufficiency and intracellular glucose deficiency increase the formation of KBs (acetoacetate, hydroxybutyrate, acetone) from FFAs in the liver. Blood KBs level in normal individuals is >0.5mM. However, in case of long hunger, this level can rise up to 6–7.5 mM.¹³⁻²⁵ It is stated that KBs increase up to 25mM in individuals with uncontrolled T1D.¹¹ Individuals with T1D should replace muscle glycogen to reduce the risk of complications during and after physical exercises.⁸⁻²³ It is very important for these individuals to follow insulin regimens without skipping meals in terms of replenishing muscle glycogen stores. Insufficiency in glycogen stores increases the production of KBs and causes these bodies to accumulate excessively in the blood. In this way, blood pH is disrupted and a complication considered as ketoacidosis develops.¹⁷⁻³²

Type I Diabetes and Exercise

Physical activity is all bodily movements that require energy expenditure above the basal level.²⁶ Exercise is repetitive body movements that are performed in a planned way to improve or maintain physical fitness.⁷ Regular physical exercise has many positive physiological effects for individuals with T1D. In addition, it is also very important in terms of psychosocial.²⁻¹⁷⁻²⁶⁻³⁰

Regular exercise, as well as insulin and diet, is an important part of the treatment process to ensure glycemic control in T1D.¹⁷⁻²² Skeletal muscles are responsible for approximately 80% of glucose use and are highly determinant in the regulation of blood glucose.⁷ Regular exercise improves strength, cardiovascular endurance, flexibility, and body composition, which are health-related parameters of physical fitness. It is also recommended for providing psychosocial fitness and delaying macrovascular complications.¹⁷⁻²⁶ It is stated that it is important to include aerobic exercises in the physical exercise programs of individuals with T1D.² Aerobic activities include moderate exercises such as walking, jogging, cycling, swimming where 40-60% of VO_{2max} or 50-70% of HR_{max} .¹⁴⁻²⁰ Anaerobic exercise is a workload above the anaerobic threshold. These

exercises increase the muscle and blood lactic acid levels and create fatigue in a short time.³¹ The intensity of these exercises is expressed as 80% and above of VO_{2max} or 75% and above of HR_{max} .¹⁴⁻³⁵ 70-85% of HR_{max} is defined as mixed zone and 85% above of HR_{max} is defined as anaerobic zone for young people.²⁰⁻²¹ Resistance exercises are an exercise method against resistance to improve strength parameters such as maximal strength, rapid strength and continuity in strength.¹⁵ Hormonal and metabolic responses created by resistance exercises are similar to anaerobic exercises.²⁹⁻³⁵ It can be said that both aerobic and anaerobic metabolisms are effective in many games played by children and adolescents. These games, which include physical exercises, do not pose any risk for normal children. However, it carries serious risks for children with T1D, such as hypoglycemia, hyperglycemia, and hyperketonemia. Hyperglycemia and excessive ketosis during exercise are particularly undesirable since they cause dehydration and may decrease blood pH, both of which impair exercise performance. Anaerobic exercises may particularly aggravate this condition, since increases in catecholamines and glucocorticoids will further exaggerate the elevations in blood glucose concentrations and ketone production.²¹⁻²⁹

DISCUSSION

Muscle glycogen is the primary fuel source during moderate and high intensity exercise. Muscle glycogen is largely depleted in the first half hour of exercise. When the glycogen stores decrease in body, other fuel sources are used. In addition, glucose, which is added to the circulation from hepatic glycogenolysis and gluconeogenesis, is important for balancing blood glucose and providing energy. With the dramatic decrease in muscle glycogen and blood glucose levels, muscle TGs and circulating FFAs produced by hormone sensitive lipase act as a fuel source. Beta oxidation of fatty acids occurs in the liver. Thus, the productivity of KBs also increases. KBs are characterized as fasting ketones, unlike ketosis that develops during hyperglycemia due to insulin deficiency.³ Ketogenesis is a chemical process that normally occurs under fasting conditions. KBs play a role in energy production under conditions where glucose is limited. Gluconeogenesis, lipolysis and ketogenesis increase with the effect of insulin deficiency and opposite regulatory hormones in individuals with T1D.³⁴ The curfew imposed in the Covid 19 pandemic is very boring for all children. The case played in the residence garden for a long time in a day in the summer when the quarantine was relaxed. It was stated by her parents that the case played games with his friends for 6-7 hours and that these games such as football, catching, hide-and-seek, and cycling involved intense physical effort. During this time, he came home only once and measured his blood glucose level. Blood glucose level was determined as 130 mg / dL by his parents. The case did not want to eat lunch, only drank water and returned to the garden to play. It is clear that the case who did not skip meals before did not want to enter the house due to the boredom of the quarantine application. Especially in the covid-19 quarantine, the need for all children to play has increased. For this reason, it can be said that the case stayed on the street for a long time. It is seen that the blood glucose level of the case is not risky in terms of hyperketonemia. The good blood glucose course of the case may be associated with the effect of basal insulin. It is a known fact that glycogen is insufficient for the increased energy need with long-lasting intense physical exercises. In this process, due to the CHO deficiency caused by the case skipping meals, it accelerated the use of alternative sources for energy needs. Thus, it increased the amount of FFAs in circulation. In parallel with this, ketogenesis was activated and more KBs were produced than normal. Hyperketonemia that develops during and after prolonged hunger and physical exercise can cause symptoms such as abdominal pain, nausea and vomiting, especially in children with some sensitive T1D. In the study conducted by Albada and Waarde (2016), ketosis was detected in a patient with T1D at night of the exercise day. In the study, it was reported that the patient experienced nausea on these nights. Fry et al. (1987) emphasized that the hyperketonemic effect of prolonged exercise in T1D was not due to exaggerated stimulation of ketogenesis. In the study, it was stated that the probable cause of this situation was insulin deficiency.

CHO consumption is the main factor for glycogen synthesis. About a quarter of the consumed CHO's are stored in the liver in the form of glycogen. Hepatic glycogen storage peaks 4 to 5 hours after eating. More CHO is needed to replace muscle glycogen (Radziuk and Pye, 2001). In this respect, CHO consumption at meals is very important for individuals with T1D. Insulin dose should be adjusted according to the CHO rate consumed and the duration and intensity of exercise. This arrangement is very important in terms of preventing hypoglycemia caused by exercise as well as preventing hyperketonemia.

Conclusion and Recommendations

In healthy individuals, KBs are released into the blood after they are produced in the liver. Among these bodies, acetoacetate and β hydroxybutyrate are used as energy in the surrounding tissues outside the liver. It is known that insulin has an accelerating effect on the use of KBs as energy. KBs effectively cannot be used for energy production due to insulin insufficiency in individuals with T1D. As a result, acetoacetate and β -hydroxybutyrate except acetone accumulate in the blood. KBs that exceed a certain level in the blood can

cause conditions such as abdominal pain and nausea. Replenishing muscle glycogen after long and intense exercise is very important for health and exercise performance. In other words, hepatic glycogen must be recovered to prevent hyperketonemia that may occur after exercise. Depletion of glycogen stores during intense exercises in individuals and athletes with T1D may cause excessive synthesis of KBs. High KB levels due to prolonged physical activity and fasting were seen in the case. Therefore, it is very important to renew glycogen stores for physically active individuals with T1D. Especially children with T1D should not neglect their meals and insulin injection. This issue should be considered by both diabetic children and their parents. It should be kept in mind that the risk of ketosis is high, especially in the hot summer months. At these times, children with T1D should be careful in games that require physical effort and take necessary precautions, which will reduce the risk of complications. As a result, adjustments should be made in the meals and insulin doses of all individuals with T1D according to the duration and intensity of their physical activities. Recommendations of health professionals and past practices should be used for these regulations.

REFERENCES

1. ADA (American Diabetes Association). (2014). *Standards of medical care in diabetes*. Diabetes Care, 37:14-80.
2. ACSM (American College of Sport Medicine). (2014). *Guidelines For Exercise Testing and Prescription*. ABD, s.:278-284.
3. Altuntaş Y. (2001). All Aspects of Diabetes Mellitus (Her Yönlü Diabetes Mellitus). (Ed: YENİGÜN M), İstanbul: Nobel Tıp Kitabevi, 2. Baskı, s.:74.
4. Ahlborg G, Felig P, Hagenfeldt L, Hendler R, Wahren J. (1974). Substrate turnover during prolonged exercise in man. Splanchnic and leg metabolism of glucose, free fatty acids, and amino acids. *J Clin Invest*, 53: 1080–1090.
5. Albada ME, Bakker-van Waarde WM. (2016). Recurrent nightly ketosis after prolonged exercise in type 1 diabetes – the need for glycogen replacement strategies. Case report and review of literature. *Pediatric Diabetes*, 17: 531–534.
6. Bideci A, Döğre E. (2018). Type 1 Diabetes Mellitus Follow-up Criteria- Metabolic Control (Tip 1 Diyabetes Mellitus İzlem Kriterleri- Metabolik Kontrol). *Çocuk Endokrinolojisi ve Diyabet Derneği, Ulusal Çocuk Diyabet Grubu, Çocukluk Çağı Diyabeti: Tanı ve Tedavi Rehberi*, s.:55-64.
7. Biddle SJH. (1995). *European Perspectives on Exercise and Sport Psychology*. UK, Human Kinetics.
8. Boulinguez A, Staels B, Duez H, Lancel S. (2017). Mitochondria and endoplasmic reticulum: Targets for a better insulin sensitivity in skeletal muscle? *Biochimica et Biophysica Acta (BBA) - Molecular and Cell Biology of Lipids*, 1862(9):901-916.
9. Costill DL. (1988). Carbohydrates for exercise: dietary demands for optimal performance. *Int J Sports Med.*, 9: 1–18.
10. Darnaud L, Darnaud C. (2006). *Diabetes (Diyabet)*. (I ERGÜDEN Çev.). Ankara: Dost Kitapevi, s.:57.
11. Demirbilek H. (2018). Pathophysiology and Clinic (Patofizyoloji ve Klinik). *Çocuk Endokrinolojisi ve Diyabet Derneği, Ulusal Çocuk Diyabet Grubu, Çocukluk Çağı Diyabeti: Tanı ve Tedavi Rehberi*, s.:13-20.
12. Fukao T, Lopaschuk GD, Mitchell GA. (2004). Pathways and control of ketone body metabolism: on the fringe of lipid biochemistry, Prostaglandins Leukot. Es- sent. Fatty Acids, 70, 243–251.
13. Fry F, De Maertelaer V, Balasse EO. (1987). Mechanism of the hyperketonaemic effect of prolonged exercise in insulin-deprived Type 1 (insulin-dependent) diabetic patients, *Diabetologia*. 30:298-304.
14. Garber AJ, Menzel PH, Boden G, Owen OE. (1974). Hepatic ketogenesis and gluconeogenesis in humans, *J.Clin.Invest*, 54, 981–989.
15. Guelfi KJ, Jones TW, Fournier PA. (2007). New Insights into Managing the Risk of Hypoglycaemia Associated with Intermittent High-Intensity Exercise in Individuals with Type 1 Diabetes Mellitus. *Sports Med*. 37(11):937-946.
16. Günay M, Şıktar E, Şıktar E. (2017). *Training Science (Antrenman Bilimi)*. Ankara: Batman Belediyespor Kültür Eğitim ve Spor Yayınları, 1. Baskı. s.:96.
17. Haliloğlu B, Aycan Z. (2018). Difficulties in Typing Diabetes and Auxiliary Methods in Differential Diagnosis (Diyabet Tiplendirilmesinde Zorluklar ve Ayırıcı Tanıda Yardımcı Yöntemler). *Çocuk Endokrinolojisi ve Diyabet Derneği, Ulusal Çocuk Diyabet Grubu, Çocukluk Çağı Diyabeti: Tanı ve Tedavi Rehberi*, s.:5-12.
18. IDF (International Diabetes Federation). (2017). *Diabetes Atlas*. Eighth Edition.
19. ISPAD (International Society For Pediatric and Adolescent Diabetes). (2000). *Consensus Guidelines for the Management of Type 1 Diabetes Mellitus in Children and Adolescents*. PGF Swift.Publ.Medforum, Zeist, Netherlands.
20. Kanikarla-Marie P, Jain SK. (2016). Hyperketonemia and ketosis increase the risk of complications in type 1 diabetes, *Free Radical Biology and Medicine*, 95 268–277.
21. Leclair E, DE Kerdanet M, Riddell M, Heyman E. (2013). Type 1 Diabetes and Physical Activity in Children and Adolescents. *Journal of Diabetes & Metabolism*, 10:4.

- 20.Lukács A, Barkai L. (2015). Effect of aerobic and anaerobic exercises on glycemic control in type I diabetic youths. *World J Diabetes* 6(3):534-542.
- 21.Marliss EB, Vranic M. (2002). Intense exercise has unique effects on both insulin release and its roles in glucoregulation: implications for diabetes. *Diabetes*, 51:271-283.
- 22.Mendoza JA, Haaland W, D'agostino RB, Martini L, Pihoker C, Frongillo EA ve diğ. (2018). Food insecurity is associated with high risk glycemic control and higher health care utilization among youth and young adults with type I diabetes. *Diabetes Research and Clinical Practice*, 138:128-137.
- 23.Moore DR. (2015). Nutrition to support recovery from endurance exercise: optimal carbohydrate and protein replacement. *Curr Sports Med Rep.*, 14: 294–300.
- 24.Oşar Z. (2002). Hyperglycemic Emergencies in Diabetic Cases: Diabetic Ketoacidosis and Hyperglycemic, Hyperosmolar Nonketotic Syndrome (Diabetik Olgularda Hiperglisemik Aciller: Diabetik Ketoasidoz ve Hiperglisemik, Hiperozmolar Nonketotik Sendrom). *İ.Ü. Cerrahpaşa Tıp Fakültesi, Sürekli Tıp Eğitimi Etkinlikleri, İç Hastalıklarında Aciller, Sempozyum Dizisi* 29, s.:279.
- 25.Owen OE, Felig P, Morgan AP, Wahren J, Cahill Jr GF. (1969). Liver and kidney metabolism during prolonged starvation. *J.Clin.Invest*, 48, 574–583.
- 26.Özer K. (2015). Physical Fitness (Fiziksel Uygunluk). Ankara: Nobel Akademik Yayıncılık, 5. Baskı.
- Özbek MN. (2018). Exercise in Type I Diabetes (Tip I Diyabette Egzersiz). *Çocuk Endokrinoloji ve Diyabet Derneği, Ulusal Çocuk Diyabet Grubu, Çocukluk Çağı Diyabeti: Tanı ve Tedavi Rehberi*, s.:47-53.
- 27.Purdon C, Brousson M, Nyveen SL, et al. (1993). The roles of insulin and catecholamines in the glucoregulatory response during intense exercise and early recovery in insulindependent diabetic and control subjects. *J Clin Endocrinol Metab*;76:566– 573
- 28.Radziuk J, Pye S. (2001). Hepatic glucose uptake, gluconeogenesis and the regulation of glycogen synthesis. *Diabetes Metab Res Rev*: 17: 250–272.
- 29.Ramalho AC, De Lourdes Lima M, Nunes F, Cambui Z, Barbosa C. (2006). The effect of resistance versus aerobic training on metabolic control in patients with type-I diabetes mellitus. *Diabetes Res Clin Pract* 72(3):271-6.
- 30.Riddell MC. (2017). *Management of exercise for children and adolescents with type I diabetes mellitus*. 9 Eylül 2020, <https://www.uptodate.com/contents/management-of-exercise-for-children-and-adolescents-with-type-I-diabetesmellitus>
- 31.Safinaz AY. (2012). What is the Meaning of Aerobic and Anaerobic Capacity? (Aerobik ve Anaerobik Kapasitenin Anlamı Nedir?) *Solunum* 14:1–8.
- 32.Siperling M. (2004). *Diabetes Mellitus in children*. Nelson Textbook of Pediatrics, 17th Edition, Philadelphia. WB Saunders Company, p:1947-72.
- 33.Wahren J, Felig P, Ahlberg G, Jorfeldt L. (1971) Glucose metabolism during leg exercise in man. *J Clin Invest*, 50: 2715–2725.
- 34.Wolfsdorf J, Glaser N, Sperling MA. (2006). Diabetic ketoacidosis in infants, children, and adolescents: a consensus statement from the American Diabetes Association, *Diabet.Care* 29. 1150–1159.
- 35.Yardley JE, Sigal RJ, Perkins BA, Riddell MC, Kenny GP. (2013). Resistance Exercise in Type I Diabetes. *Canadian Journal of Diabetes*. 37:420-426.

SP-53

THE RELATIONSHIP BETWEEN MOTOR SKILLS AND TECHNICAL SKILLS SPECIFIC TO VOLLEYBALL IN ADOLESCENT VOLLEYBALL PLAYERS

Serdar Uslu¹, Denis Čaušević², Ensar Abazović², Ifet Mahmutović², Indira Mahmutović³, Barak Riza⁴

¹ Physical Education and Sport Teacher Department, Sport Science Faculty,
Gazi University, Turkey

² Faculty of Sport and Physical Education, University of Sarajevo, BiH

³ Faculty of Educational Sciences, University of Sarajevo, BiH

⁴ Spor Toto SC Ankara, Turkey

Corresponding author: usluserdar77@gmail.com

ABSTRACT

The aim of the study was to examine the relationship between motor skills and technical skills specific to volleyball in adolescent volleyball players. Eighty volleyball players (age=16,70±1,09) (male n=40, and female n=40) participated in this study voluntarily. Motoric performance tests (dynamic balance, claw strength, back strength, leg strength, vertical jump, flexibility, agility, medicine ball throw, nelson hand reaction, nelson movement speed) and volleyball skill tests (service, bump and finger passing hit rate) were enforced to volleyball players. Spearman correlation test was used to determine the relationship between the data obtained from the study with the help of the SPSS 23 package program. Results indicate a positive correlation between the volleyball skill tests of male and female volleyball players and the averages of shoulder ankle flexibility, right and left foot dynamic balance, claw strength (right-left), vertical jump, medicine ball throw, back and leg strength ($p<0,05$), a highly significant negative correlation was found between agility, hand reaction and arm movement speed rates ($p<0,05$). However, no significant relationship was found between bump passing hit rates and vertical jump, claw strength, right-left and hand reaction speed rates ($p>0,05$). Obtained results of this study indicate that there is a highly significant relationship between selected motor skills and technical skills specific to volleyball in male and female volleyball players.

Keywords: motor skill, volleyball, skill, performance, agility

INTRODUCTION

Motor skill is defined as the movements of body components towards programmed goals and the basic abilities that undertake the task of making these movements.^{1,2} The fact that motor skills is a strong index that reveals the health status and sportive success of athletes.^{3,4} leads sports scientists to work in this direction.⁵ The level of motor skills is closely related to intelligence, age, anxiety, fatigue, general motivation, environmental factors and the level of participation in sports.^{6,7} One of the factors that help to develop motor skills is undoubtedly sport. Since motor skills affect the general performance of athletes.^{8,9} It is important to direct athletes to physical activities. İri and¹⁰ also reported that the motor skills of children who do sports are more developed than children who do not do sports. In the literature, it is seen that there is a positive relationship between motor skills and sportive performance and sportive efficiency.¹¹ also reported that athletes with high levels of motor skills and participation in activities are more successful in physical fitness tests and sports-specific skills. When we look at the efficiency elements that an athlete should have in volleyball, important motor skills such as general endurance, special endurance, reaction speed, explosive strength, special rapid strength, rapid strength continuity, balance, agility, speed and flexibility come to the fore. To demonstrate these basic skills, to apply them optimally to the game and to achieve success, the required motor skills must be developed and at a high level.^{12,13} These features are important indicators that reveal the quality difference between athletes in volleyball. In athletes who do not have these motor skills at the desired level, fatigue starts early and the application levels of technical and tactical skills decrease.¹⁴ As in other sports branches, there are many basic skills in volleyball, those which service, reception and offence organizations are the most important factors stating the success in volleyball.¹⁵ In volleyball, the performance of the service.^{16,17} which is considered as one of the determinants of the team's success, is being affected by the technical skills and experience of the players and the placement of the opponent on the field.¹⁸ While it is possible to score points directly in the service, the opponent's chance of making an effective offence can also be reduced. This situation reveals the importance of the service in the volleyball game.^{19,20} Bump and finger passing, which are among the other determinants of

team success, play an important role in scoring and make offensive organizations after reception. ²¹⁻²³ reported that there is a high level of significant relationship between success and the average of excellent reception rates of the teams. In volleyball, in order for the game to continue, the application of the players' anthropometric features, combining their motor skills with technical components are seen as an important determinant of success. It is known that sportive performance depends on combining technical, tactical, physical, psychological and anthropometric factors. ²⁴⁻²⁶ For this reason, by determining which motor skills are related to the technical and tactical skills specific to the sport branch, necessary items can be combined with these skills to activate the muscle and nerve transmission functions in this direction and support the technical development of the athletes. ²⁷

When the literature is examined, there are studies in which motor skills are associated with technical skills specific to different branches (28-31). However, there are limited studies in the literature that examine the relationship between volleyball-specific skills and motor skills. In the light of this information, the aim of this study is to examine the relationship between motor skills and technical skills specific to volleyball in adolescent volleyball players.

METHODS

Working Group

A total of 80 volleyball players, 40 male volleyball players with a mean age of $16,91 \pm 0,91$ years, mean height of $191,3 \pm 2,10$ cm., mean weight of $76,68 \pm 8,00$ kg., mean body fat percentage of $\% 14,23 \pm 3,29$ and mean sports age of $3,2 \pm 1,00$ years, and 40 female volleyball players with a mean age of $16,5 \pm 1,27$ years, mean height of $178,65 \pm 6,51$ cm., mean weight of $66,46 \pm 7,28$ kg., mean body fat percentage of $\% 15,13 \pm 5,32$ and mean sports age of $3,85 \pm 0,98$ years participated in this study voluntarily. In order to minimize the differences between the athletes' technical levels, the athletes were included in a nine-week preparation period before the measurements. The athletes and their families were given detailed information about the risks and discomforts that may be encountered in the study, and the measurements were taken after having the "Informed Consent Form" read and signed.

Data Collection Method

Body Weight Measurement and Height Measurement

The height measurements of the volleyball players were made by a height measuring device (SECA, Germany) with an accuracy of 0.01 m by standing barefoot in the anatomical position. Body weight measurements of the athletes were made by an electronic scale (SECA, Germany) with an accuracy of 0.01 kg barefoot and with shorts (32, 33).

Segmental Professional Body Fat Percentage Analysis Measurement Tool

The Segmental Professional Body Fat Percentage Analysis Measurement Tool (Inbody 720) was used to determine the body fat ratio of athletes. This measurement tool sends 50 kHz electric current to 5 separate areas in the style of Bio Impedance Analysis. In this way, the fat ratio of the arms, legs and body are analyzed as lean mass and muscle weight. The user's fat loss / muscle gain ratio can be seen for 5 different regions, it prepares a report on total body weight, body mass index, body fat ratio, body fat mass, body lean mass, muscle resistance, body fluid ratio and regional muscle weight and it also shows the ideal fat ratios for the person concerned in the report (34, 35).

Dynamic Balance

In order to determine the dynamic balance performance of the subjects, the "Y Balance Test" platform, which was established to be 135° angle between anterior and posterior directions and 90° angle between posteromedial-posterolateral directions, was used. Each participant's leg length was recorded in centimeters in the supine position by measuring bilaterally from the anterior superior iliac point to the distal part of the medial malleolus (36). The athlete, who was in balance with the right foot at the starting point on the mat, was asked to lengthen with her/his left foot fingertip in 3 directions (anterior, postero-medial and posterolateral) and return to the starting position after reaching as far as possible without losing balance and then the subject balancing at the starting point on the mat with his left foot did the same with her/his left foot fingertip. The subjects lengthened 6 times for each direction (anterior, posteromedial and posterolateral) and the subjects were given 30 seconds' rest between each application. The right and left lower leg balance performance levels of the subjects were calculated by the following formula (37-39)

$$\text{Lower Leg Y Balance: } \left(\frac{\text{Anterior} + \text{Posteromedial} + \text{Posterolateral}}{3} \right) \times 100 \\ \div \text{Lower Leg Height}$$

Measuring Claw Strength

Takkei hand dynamometer (Hand Grip) was used to determine the claw strength of athletes. After five minutes of warming up, the measurement was taken while the athletes were standing when the arm was at an angle of

45 ° to the body without bending the arm and touching the body, and this situation was repeated three times for the right and left hands and the highest value was recorded in kg (40, 41).

Measuring Back and Leg Strengths

Back and leg dynamometer; Brand of Takkei was used to determine the back and leg strengths of the athletes. After five minutes of warm-up, the athletes stood on the dynamometer table and to determine the back strength, was asked to pull the dynamometer bar, which she/he grasped with her/his hands, vertically upwards, with the arms stretched, the back straight and the body slightly bent forward, without bending the knees. In order to determine the leg strength, the athletes were asked to pull the dynamometer bar, which she/he grasped with her/his hands, vertically upwards using the legs at the maximum rate, while the knees were bent, the arms were stretched, the back was straight and the body was slightly bent forward. After 3 repetitions, the best value was recorded in kg (40, 41).

Vertical Jump Test

The "Opto Jump Next" device was used to determine the vertical jump performance of the athletes. As the test protocol, the "BFS Vertical Jump" (CMVJ) test protocol, one of the version software protocols available in the device, was used. While the athletes were applying the "BFS Vertical Jump" protocol, in order to isolate the lower extremity, to eliminate the contribution of the technique and the swing of the arms, the athletes were to kneel rapidly from the knees and jump vertically upwards with maximal force in all active jumps, with hands on waist, knees in fully extended and upright position (42). For each jump test, three jumps were made with a 2-minute rest interval and the highest value was recorded in 'cm' (43).

Flexibility Measurements

In order to measure the shoulder and wrist flexibility of the research group, the hands were placed on top of each other in the facedown position. On the mechanism placed opposite the athlete, she/he was asked to raise her/his arms without lifting his body from the ground. The distance between the hand tip and the ground was measured and the best degree was recorded in 'cm' after three attempts (41).

Agility

T agility test was used to measure the agility performance of athletes. After the test area was designed as (Figure 1), a Newtest Powertimer 300 model (Finland) photocell was installed at the starting point A. The athlete starts the photocell by passing through point "A" with the start command and runs straight to point "B" and touches the cone with his right hand. Then she/he runs sideways to the "C" point on the left (side step) and touches the "C" cone with her/his left hand, then she/he runs to the right side steps again and touches the "D" cone with her/his right hand, then she/he runs sideways towards the "B" cone and touches it with her/his left hand, then runs back towards the "A" cone and stops the photocell by passing through the "A" cone. In this test, the athlete does 3 repetitions with 5 minutes of rest. The best degree of the athlete was recorded (40, 44).

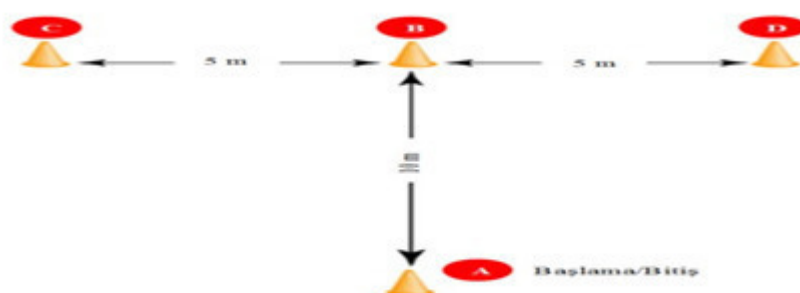


Figure 1. T Agility Test

Medicine Ball Throw Test

Medicine ball throw test was used to determine the explosive strength of athletes' arm muscles. The athlete has fixed his knees at the reference point on a mat. The athletes were asked to hold the medicine ball with both hands, after bending the body slightly back from the back of the head, and throw the ball to the farthest point from the head. The test was conducted with a medicine ball weighing 3 kg for males and 2 kg for females. Three repetitions were made at 3-minute intervals and the best degree was recorded in 'm'.^{45, 46}

Nelson Hand Reaction Test

Nelson's hand reaction test was used to determine the hand reaction speed of the athletes. The athlete was seated on a chair with his forearm and hand comfortably on the chair. While the thumb and index finger tips were 8-10 cm outside the table the upper parts of the thumb and index finger were readied as parallel to each other. The test manager held the ruler between the thumb and index fingers of the subject and the subject was told to look directly at the midpoint of the ruler. When the ruler was released, the subject was asked to catch the ruler. The value on the upper edge of the thumb where the subject caught the ruler was read and recorded. Ten measurements were taken and the best and worst values were discarded, and the average of the remaining eight measurements was recorded as the distance the ruler fell.⁴⁰

Nelson Movement Speed Test

Nelson Movement Speed test was used to determine the speed of movement of athletes. The athlete was seated on the chair with his hands resting on the edge of the table. The little fingers are placed on the table at a distance of 30 cm from each other with the palms facing each other. The test manager held the ruler in the middle of the subject's two hands and the ruler was released after the subject concentrated. Subject held the ruler by squeezing it between both hands at the highest possible speed. Five measurements were taken in all measurements, and the average of three measurements, except those reflecting the best and worst values, was recorded as the distance the ruler fell. The value read on the scale of the ruler was calculated in the formula below and the reaction times of the subjects were determined. (40). It is like;

$$\text{Reaction Time} = \sqrt{2 \times \text{Distance The Ruler Fell} / \text{Gravity Dependent Speed}}$$

$$\text{Reaction Time} = \sqrt{2 \times \text{Distance (cm)} / 980 \text{ msn}}$$

Volleyball Skill Tests

"Volleyball Skill Tests" developed by⁴⁷ were used to determine the branch-specific skill levels of athletes. Skill tests measure three basic skills related to volleyball: finger passing, bump passing and service (See Figure 1). The Cronbach Alpha values for each skill of the original measurement tool for pre-test are .74 for service, .76 for bump passing and .86 for finger passing, respectively. For the last test, these values are .76 for service, .77 for bump passing and .82 for finger passing.⁴⁷ In the service test, the participants who performed 10 float service shots from the top in accordance with the test protocol received the score of the region where the service fell in the opposite area (See Figure 1), which was previously determined and marked on the zone. If the ball touches the lines in the zones on the court, the athlete receives the score of the zone with the highest score. Unsuccessful services were not awarded points and were not re-entitled. The highest score that can be obtained from the test is 40.⁴⁷ In the bump passing test, the athlete returned the balls sent from the opposite court and by the expert trainer using a simple tennis service technique at two different service reception points, which were determined to be 3 m. from the sideline and 1.5 m. from the bottom line in the volleyball half area. The test athlete was asked to throw the ball over the rope with a height of approximately 2.40 m. using the bump passing skill to the target area. According to the area where the ball fell in the front game zone, she/he received the score previously determined in the test protocol (See Figure 1). Shots sent away from the athletes were considered void and repeated. Athletes must return every ball thrown at their position. If the ball is not hit properly, the ball does not cross the rope, touches the net or goes towards the center line, the athlete was not awarded points. In order to get points from the offensive hits return, the ball must fall over the 2.44 m rope and without touching the rope, in one of the point zones. If the ball touched the line between the scores, the higher score was considered valid. The test athlete was given ten hits in total, five from the right side and five from the left side. The highest score that can be obtained from the test is 50.⁴⁷ In the finger passing test, a ball sent by a ball thrower from zone 5 in the rear playground over the rope at a height of 3.55 m., the participants come from behind a funnel located 2 m. back and diagonal, after taking position under the ball they jump and pass. In order for the pass to be valid, it must be performed in accordance with the rules of the volleyball game and transferred to the offence zone over the 3 m. high rope and without touching the rope (See Figure 1). Participants tried to send the ball to the pre-determined areas 60 cm. from the net where each pass could get a score between 0 and 5. The score of the higher field is reflected in the passes that hit the line in two different score area ranges. No points were awarded for irregular passes, and passes made improperly by the shooter were repeated. The highest score that can be obtained from the test is 50.⁴⁷

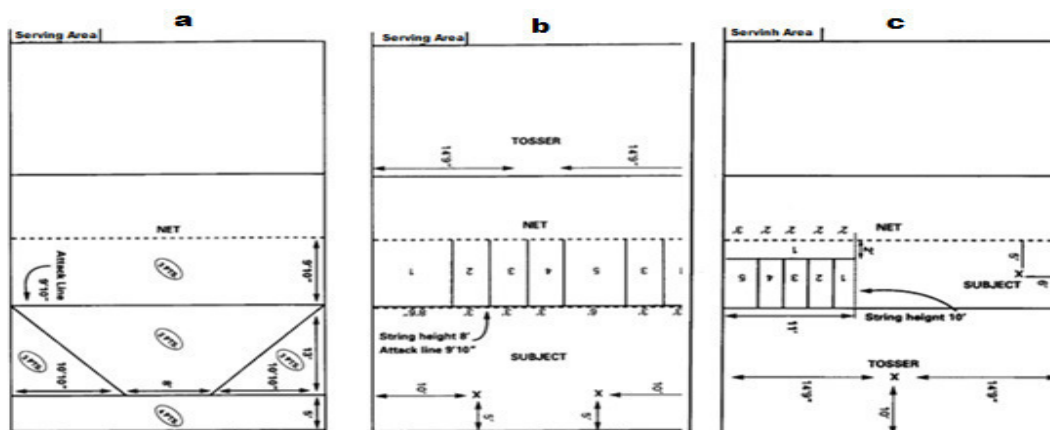


Figure 1. Diagram of the technical skill test regarding (1) serve, (2) reception and (1) set.

Statistical Analysis

Statistical analysis of the data obtained from the study was done using the Statistical Package for Social Sciences (SPSS) Version 23.0 program. Whether the data were suitable for normal distribution was determined by using the "Shapiro-Wilk Test". It was determined that the data did not conform to the normal distribution and nonparametric tests were used to evaluate the data. In the statistical analysis of the study, the mean and standard deviation (SD) values of the variables evaluated were calculated. Spearman correlation test was used to determine the relationship between the data obtained from the participants included in the study. The significance level was accepted as $p < 0.01$ and $p < 0.05$ in the study.

RESULTS

In Table 1; while the male volleyball players' mean age of $16,91 \pm 0,91$ years, mean height of $191,3 \pm 2,10$ cm., mean weight of $76,68 \pm 8,00$ kg., mean body fat percentage of $\% 13,23 \pm 3,29$ and mean sports age of $3,2 \pm 1,00$ years was determined; female volleyball player's mean age of $16,5 \pm 1,27$ years, mean height of $178,65 \pm 6,51$ cm., mean weight of $66,46 \pm 7,28$ kg., mean body fat percentage of $\% 15,13 \pm 5,32$ and mean sports age of $3,85 \pm 0,98$ years was determined as.

Table 1. Averages of Age, Height, Body Weight, Sports Age and Body Fat Percentage of Volleyball Players

PARAMETRELER	GENDER	XX	SS
AGE (YEAR)	MALE (n:40)	16,91	0,91
	FEMALE (n:40)	16,50	1,27
HEIGHT (CM)	MALE (n:40)	191,30	2,10
	FEMALE (n:40)	178,65	6,51
WEIGHT (KG)	MALE (n:40)	76,68	8,00
	FEMALE (n:40)	66,46	7,28
SPORTS AGE (YEAR)	MALE (n:40)	3,20	1,00
	FEMALE (n:40)	3,85	0,98
BODY FAT PERCENTAGE (%)	MALE (n:40)	13,23	3,29
	FEMALE (n:40)	15,13	5,32

XX- mean; SS – standard deviation

When Table 2 is examined it was determined that service hit rate of male ($32,5 \pm 4,78$) female ($29,85 \pm 5,15$) points, bump hit rate of male ($32,92 \pm 5,43$) female ($30,75 \pm 4,19$) points and finger passing hit rate of male ($34,35 \pm 4,99$) female ($35 \pm 4,82$) points of the volleyball players.

Table 2. Average of The Volleyball Players' Service Hit, Service Speed Ratio and Passing Performance

PARAMETERS	GENDER	XX	SS
SERVICE HIT RATE(2)	MALE (n:40)	32,50	4,78
	FEMALE (n:40)	29,85	5,15

BUMP HIT RATE (2)	MALE (n:40)	32,92	5,43
	FEMALE (n:40)	30,75	4,19
FINGER PASSING HIT RATE (2)	MALE (n:40)	34,35	4,99
	FEMALE (n:40)	35,00	4,82

XX- mean; SS – standard deviation

When Table 3 is examined, volleyball players' shoulder wrist flexibility of male ($49,3\pm 11,48$) female ($47,35\pm 11,37$) cm., right foot dynamic balance of male ($93,69\pm 9,77$) female ($70,76\pm 8,62$) cm., left foot dynamic balance of male ($90,51\pm 8,99$) female ($69,75\pm 7,44$) cm., agility of male ($11,38\pm 1,12$) female ($13,13\pm 1,44$) sn., vertical jump of male ($50\pm 13,16$) female ($36,51\pm 7,35$) cm., throwing medicine ball of male ($6,35\pm 1,15$) female ($4,61\pm 0,97$) cm., right claw strength of male ($43,12\pm 6,10$) female ($26,91\pm 6,52$) kg., left claw strength of male ($39,37\pm 5,70$) female ($24,15\pm 5,53$) kg., back strength of male ($87\pm 7,77$) female ($62,8\pm 13,5$) kg., leg strength of male ($78,09\pm 8,65$) female ($55,39\pm 10,15$) kg., hand reaction speed of male ($0,17\pm 0,02$) female ($0,18\pm 0,03$) ms., arm movement speed of male ($0,22\pm 0,02$) female ($0,25\pm 0,02$) ms., was determined as.

Table 3. The Relationship Between the Motoric Characteristics of Volleyball Players and Their Technical Performance

PARAMETERS	CATEGORY	XX + SS	CORRELATION	SERVICE HIT RATE	BUMP HIT RATE	FINGER PASSING HIT RATE
SHOULDER WRIST FLEXIBILITY (CM)	MALE (n:40)	49,3±11,48	r	,887**	,930**	,978**
			p	,000	,000	,000
	FEMALE (n:40)	47,35±11,37	r	,939**	,823**	,956**
			p	,000	,000	,000
RIGHT FOOT DYNAMIC BALANCE (CM)	MALE (n:40)	93,69±9,77	r	,904**	,851**	,889**
			p	,000	,000	,000
	FEMALE (n:40)	70,76±8,62	r	,845**	,833**	,895**
			p	,000	,000	,000
LEFT FOOT DYNAMIC BALANCE (CM)	MALE (n:40)	90,51±8,99	r	,879**	,858**	,907**
			p	,000	,000	,000
	FEMALE (n:40)	69,75±7,44	r	,823**	,821**	,875**
			p	,000	,000	,000
AGILITY (T TEST) (SN)	MALE (n:40)	11,38±1,12	r	-,915**	-	-,854**
			p	,000	,858**	,000
	FEMALE (n:40)	13,13±1,44	r	-,905**	-	-,916**
			p	,000	,772**	,000
VERTICAL JUMP (CM)	MALE (n:40)	50±13,16	r	,924**	,260	,850**
			p	,000	,269	,000
	FEMALE (n:40)	36,51±7,35	r	,939**	,331	,956**
			p	,000	,154	,000
THROWING MEDICINE BALL (I)	MALE (n:40)	6,35±1,15	r	,928**	,846**	,846**
			p	,000	,000	,000
	FEMALE (n:40)	4,61±0,97	r	,942**	,826**	,955**
			p	,000	,000	,000
CLAW STRENGTH- RIGHT (KG)	MALE (n:40)	43,12±6,10	r	,951**	,302	,869**
			p	,000	,169	,000
	FEMALE (n:40)	26,91±6,52	r	,942**	,323	,951**
			p	,000	,162	,000
CLAW STRENGTH - LEFT (KG)	MALE (n:40)	39,37±5,70	r	,928**	,324	,846**
			p	,000	,164	,000
	FEMALE (n:40)	24,15±5,53	r	,928**	,394	,965**
			p	,000	,085	,000
BACK STRENGTH	MALE (n:40)	87±7,77	r	,888**	,840**	,819**
			p	,000	,000	,000

(KG)	FEMALE	62,8±13,5	r	,938**	,823**	,954**
	(n:40)		p	,000	,000	,000
LEG STRENGTH (KG)	MALE (n:40)	78,09±8,65	r	,895**	,821**	,892**
			p	,000	,000	,000
	FEMALE	55,39±10,15	r	,853**	,629**	,899**
	(n:40)		p	,000	,000	,000
HAND REACTION SPEED (MS)	MALE (n:40)	0,17±0,02	r	-,717**	-,369	-,712**
			p	,000	,109	,000
	FEMALE	0,18±0,03	r	-,926**	-,340	-,946**
	(n:40)		p	,000	,142	,000
ARM MOVEMENT SPEED (MS)	MALE (n:40)	0,22±0,02	r	-,948**	-,853	-,870**
			p	,000	,000	,000
	FEMALE	0,25±0,02	r	-,943**	-	-,943**
	(n:40)		p	,000	,853**	,000
				,000	,000	,000

In addition, while a high level of positive correlation was found between volleyball skill tests of male and female volleyball players and the averages of shoulder wrist flexibility, right and left foot dynamic balance, claw strength (right-left), vertical jump, medicine ball throw, back and leg strength (p <0.05), a highly significant negative correlation was found between agility, hand reaction and arm movement speed ratios (p <0.05). However, there was no significant relationship between bump passing hit rates and vertical jump, claw strength, right-left and hand reaction speed rates (p > 0.05).

DISCUSSION

The aim of this study is to reveal the relationship between motor skills and technical skills specific to volleyball in adolescent volleyball players. In many studies, the anthropometric findings of male volleyball players in our study (48-51) and the anthropometric findings of female volleyball players (52, 53) seems to be similar. In addition, in our study, it is seen that the male volleyball players' right-left foot balance, ^{54, 55} agility, ⁵⁶ vertical jump, ⁵⁷⁻⁶¹ vertical jump, medicine ball throwing, ⁵⁶ claw strength right and left, ^{53, 62} back strength, ⁵³ leg strength, ⁶³ volleyball skill tests, ⁶⁴⁻⁶⁶ and female volleyball players' right and left foot balance, ²⁸ agility, ⁶⁷ vertical jump, ⁶⁸⁻⁷⁰ medicine ball throwing, claw strength right-left, ^{70, 53, 64-66, 70, 71} back strength, ⁵³ leg strength, ⁷² volleyball skill tests, ⁶⁴⁻⁶⁶ are similar to their findings. In the literature, it is seen that there is a positive relationship between motor skills and sportive performance and efficiency. ¹¹ also reported that athletes with high motor skills are more successful in physical fitness tests and at sports-specific skills and participate in activities more frequently. While a high level of positive correlation was found between volleyball skill tests of male and female volleyball players and the averages of shoulder wrist flexibility, right and left foot dynamic balance, claw strength (right-left), vertical jump, medicine ball throw, back and leg strength (p <0.05), a highly significant negative correlation was found between agility, hand reaction and arm movement speed ratios (p <0.05). However, there was no significant relationship between bump passing hit rates and vertical jump, claw strength, right-left and hand reaction speed rates (p > 0.05). When the literature is examined, in ⁷³ reported that there is a relationship between volleyball skills and motor skills such as reaction time, balance, and height e.t.c.. In ⁷⁴ reported that there was a relationship between volleyball skills and agility, coordination and reaction times in the study, where they examined the relationship between volleyball players' selected motor conditions and their playing abilities. ⁷⁵ reported that there is a relationship between volleyball skills and height and vertical jumping. ⁷⁶ found a high level of relationship between service performance and anaerobic power obtained from vertical jump, average power, right claw, left claw and shoulder wrist flexibility in their study to examine the effect of conditional parameters on service performance in volleyball players. In the study in which ⁷⁷ examined the relationship between motor performances and volleyball skills, it was reported that there was a relationship between hit and finger passing rates and balance, muscular strength and medicine ball throwing skills. ⁷⁸ in reported that there is a positive significant relationship between the arm length, claw strengths, back and leg strengths of the athletes and service performance in their study to investigate the relationship between hit service and body parts and strength parameters in volleyball players. Again, ⁷⁶ examined the relationship between service performance and conditional parameters in young female volleyball players and as a result; reported a significant relationship between vertical jump, leg strength, agility, upper extremity explosive force and hand reaction speed (p <0.05). The studies mentioned above are in support of our results that have been found that motor skills have an important contribution to sportive performance. As a result, it has been determined that there is a highly significant relationship between selected motor skills and technical skills specific to volleyball in male and female volleyball players. It can be said that volleyball players with high motor skills are better at demonstrating their branch-specific skills.

CONCLUSION

In summary, findings on relationship between motor skills and technical skills specific to volleyball indicate a significant correlation. Modern volleyball is characterized by an accelerated rhythm of play which has led to much more the anaerobic alactacid metabolism; which ultimately requires players to be as physically fit as possible. The results of this study confirmed the key parameters of the connection between high physical preparation and performance in volleyball. Obtained can greatly help coaches in the planning and programming phases of the training process.

REFERENCES

1. Goodway JD, Ozmun JC, Gallahue DL. Understanding motor development: Infants, children, adolescents, adults: Jones & Bartlett Learning; 2019.
2. Lopes L, Santos R, Pereira B, Lopes VP. Associations between gross motor coordination and academic achievement in elementary school children. *Human movement science*. 2013;32(1):9-20.
3. Vandorpe B, Vandendriessche JB, Vaeyens R, Pion J, Lefevre J, Philippaerts RM, et al. The value of a non-sport-specific motor test battery in predicting performance in young female gymnasts. *Journal of sports sciences*. 2012;30(5):497-505.
4. Callewaert M, Boone J, Celie B, De Clercq D, Bourgois JG. Indicators of sailing performance in youth dinghy sailing. *European journal of sport science*. 2015;15(3):213-9.
5. Iivonen S, Sääkslahti A, Laukkanen A. A review of studies using the Körperkoordinationstest für Kinder (KTK). *European Journal of Adapted Physical Activity*. 2016;8.
6. Sayın M. Movement and skill learning. Ankara: Sports Publisher and Bookstore pp. 2011;61.
7. Timmons BW, Naylor P-J, Pfeiffer KA. Physical activity for preschool children—how much and how? *Applied Physiology, Nutrition, and Metabolism*. 2007;32(S2E):S122-S34.
8. Haga M. The relationship between physical fitness and motor competence in children. *Child: care, health and development*. 2008;34(3):329-34.
9. Henderson SE. Movement assessment battery for children. The Psychological Corporation. 1992.
10. Aktug ZB, Iri R, Top E. The Investigation of the Relationship between Children's 50m Freestyle Swimming Performances and Motor Performances. *Asian Journal of Education and Training*. 2018;4(1):41-4.
11. Fransen J, Pion J, Vandendriessche J, Vandorpe B, Vaeyens R, Lenoir M, et al. Differences in physical fitness and gross motor coordination in boys aged 6–12 years specializing in one versus sampling more than one sport. *Journal of sports sciences*. 2012;30(4):379-86.
12. Koç H, & Büyükci, S. Comparison of some motor characteristics of male athletes in the branches of basketball and volleyball. *Journal of Physical Education and Sport Sciences*. 2010;1(1):16-22.
13. Koç H, & Günay, M. . The Effect of Eight-Week General Speed Training Program on Body Fat Percentage, Respiratory Functions and Blood Pressure in Handball Players. *National Sport Sciences Congress; Gazi University, Turkey*2003.
14. İşleğen Ç. Değişik liglerde oynayan bölgesel profesyonel futbol takımlarının fiziksel ve fizyolojik profilleri. *Spor Hekimliği Dergisi*. 1987;22(2):83-9.
15. Paulo A, Zaal FT, Fonseca S, Araújo D. Predicting volleyball serve-reception. *Frontiers in psychology*. 2016;7:1694.
16. Peña J, Rodríguez-Guerra J, Serra N. Which skills and factors better predict winning and losing in high-level men's volleyball? *The Journal of Strength & Conditioning Research*. 2013;27(9):2487-93.
17. Silva M, Lacerda D, João PV. Game-related volleyball skills that influence victory. *Journal of human kinetics*. 2014;41(1):173-9.
18. Palao JM, Manzanares P, Valadés D. Anthropometric, physical, and age differences by the player position and the performance level in volleyball. *Journal of human kinetics*. 2014;44(1):223-36.
19. Dinçer Ö. Voleybolda Kullanılan Kısa ve Uzun Servis Tekniğini Yüzeysel EMG ile İncelenmesi. *Uluslararası Anadolu Spor Bilimleri Dergisi*. 2016;1(1):85-90.
20. İlhan L. Voleybolda servis becerisi öğretimi motivasyonel bir yaklaşım. *Beden Eğitimi ve Spor Bilimleri Dergisi*. 2009;3(3):196-203.
21. Marelić N, Rešetar T, Janković V. Discriminant analysis of the sets won and the sets lost by one team in A1 Italian volleyball league-A case study. *Kinesiology*. 2004;36(1):75-82.
22. Mahmutović I, Osmankač N, Sattler T, Milenkoski J, Lakota R. The effect of hypothetical predictors on the representation of characteristic modality serves in volleyball. *Sport Science*. 2011:6.
23. Koçak Ç. Londra Olimpiyat Oyunları bayanlar voleybol avrupa kıta final etabı müsabakalarında bazı fiziksel ve teknik değişkenlerin başarı ile ilişkisi. *Gazi Üniversitesi,(Yüksek Lisans)*. 2012.

24. Mahmutović I, Rado I, Talović M, Lakota R, Alić H, Jelešković E. Level of transformation of motor skills in female volleyball players influenced by training operators. *Sport Mont.* 2016;14(2):39-43.
25. Bompá TO. *Periodization Training: Theory and Methodology-4th: Theory and Methodology-4th: Human Kinetics publishers; 1999.*
26. Palao JM. Normative profiles for serve speed for the training of the serve and reception in volleyball. *Sport Journal.* 2014.
27. İpek Z, Ziyagil MA. Erkek ve bayan voleybolcuların fiziksel özellikleri ve fizyolojik kapasitelerinin sedanterlerle karşılaştırılması/comparison physical characteristics and physiological capacities of male and female volleyball players with controls. *Beden Eğitimi ve Spor Bilimleri Dergisi.* 2002;4(2).
28. Akoğlu AS. Adolesan Voleybol Oyuncularında Kronik Ayak Bileği İnstabilitesinin Denge, Alt Ekstremitte Fonksiyonel Hareketleri ve Kalça Kaslarının Kuvvetleri Üzerine Etkisinin İncelenmesi. 2018.
29. Söğüt M. A comparison of serve speed and motor coordination between elite and club level tennis players. *Journal of Human kinetics.* 2017;55(1):171-6.
30. Canlı U. Adolesan basketbolcuların morfolojik yapıları, motorik performansları ve dikkat düzeylerinin teknik beceriler ile ilişkisi. *Sportmetre Beden Eğitimi ve Spor Bilimleri Dergisi.* 2019;17(1):187-96.
31. Ölmez C, Vedat A, Yüksek S, Öztaş M, Civil T. 11-13 yaş erkek taekwondo sporcularının somatotip yapıları ve performans özellikleri arasındaki ilişkinin incelenmesi. *Ulusal Spor Bilimleri Dergisi.* 2018;3(1):1-13.
32. Alpay CB, Ersöz Y, Karagöz Ş, Oskoue M. Elite güreşçilerde müsabaka öncesi ağırlık kaybı, vücut kompozisyonu ve bazı mineral seviyelerinin karşılaştırılması. *International Journal of Sport Culture and Science.* 2015;3(Special Issue 4):338-48.
33. Ergün A, Erten SF. Öğrencilerde vücut kitle indeksi ve bel çevresi değerlerinin incelenmesi. 2004.
34. Barak R, Özkan A, Ümit Ö. Comparison of Some Performance Variables of Lower and Upper Body In Sub-Elite Female Basketball and Handball Players. *International Journal of Sport Culture and Science.* 2016;4(Special Issue 3):882-9.
35. Radjo I, Mahmutovic I, Manic G, Mahmutovic I. Structure of the ontogeny of the morphological indicators of boy aged from 11 to 14. *HealthMED.* 2011:942.
36. Akın G, Tekdemir İ, Gültekin T, Erol E, Bektaş Y. *Antropometri ve spor.* Ankara: Alter Yayınları. 2013.
37. Plisky PJ, Gorman PP, Butler RJ, Kiesel KB, Underwood FB, Elkins B. The reliability of an instrumented device for measuring components of the star excursion balance test. *North American journal of sports physical therapy: NAJSPT.* 2009;4(2):92.
38. Hertel J, Miller SJ, Denegar CR. Intratester and intertester reliability during the Star Excursion Balance Tests. *Journal of sport rehabilitation.* 2000;9(2):104-16.
39. Robinson R, Gribble P. Kinematic predictors of performance on the Star Excursion Balance Test. *Journal of sport rehabilitation.* 2008;17(4):347-57.
40. Tamer K. *Measurement and Assessment of Physical-Physiological Performance in Sports.* Ankara: Bağırhan Publishing House. 2000.
41. Özer K. *Fiziksel Uygunluk,* Nobel Yayınları, 1. Baskı, Ankara. 2001.
42. Hara M, Shibayama A, Arakawa H, Fukushima S. Effect of arm swing direction on forward and backward jump performance. *Journal of Biomechanics.* 2008;41(13):2806-15.
43. Açıkada C. *Atletizm yetenek modeli raporu.* Atletizm Federasyonu Eğitim Kurulu Yayınları II, Ataofset Matbacılık. 2008.
44. Güllüöver A, Demirkan E, Kutlu M, Cigerci AE, Esen HT. The comparison of some physical and physiological features of elite youth national and amateur badminton players. 2012.
45. H.A. P. Normative Study on Some Variables in 10-12 Age Group Children Based on Talent Search in Athletics. Unpublished Doctorate Thesis, Gazi University Institute of Health Sciences, Ankara 2007.
46. Gozzoli C, Simohamed J, El-Hebil A. Educational Cards Kids' Athletics. IAAF URL: <http://www.iaaf.org/mm/Document/imported/37264.pdf>. 2006.
47. Bartlett J, Smith L, Davis K, Peel J. Development of a valid volleyball skills test battery. *Journal of Physical Education, Recreation & Dance.* 1991;62(2):19-21.
48. Gabbett T, Georgieff B. Physiological and anthropometric characteristics of Australian junior national, state, and novice volleyball players. *The Journal of Strength & Conditioning Research.* 2007;21(3):902-8.
49. Fonseca-Toledo C, Roquetti P, Fernandes-Filho J. Anthropometrical profile of Brazilian junior volleyball players for different sports requirement levels. *Revista de Salud Pública.* 2010;12(6):915-28.
50. Zary JCF. Identificação do perfil dermatoglífico e somatotípico dos atletas de voleibol masculino adulto, juvenil e infanto-juvenil, de alto rendimento no Brasil. *Revista Brasileira de Ciência e Movimento.* 2008;15(1):53-60.
51. Bozo D, Lleshi E. Comparative analysis of Albanian female volleyball players with anthropometric, performance and hematological parameters. *Ovidius University Annals, Series Physical Education and Sport/Science, Movement and Health.* 2012;12(2):S287-S.

52. Özveren YEU, Institute of Health Sciences, Sports Health Sciences Department, Master Thesis. Izmir. Effects of 12-Week Plyometric Training on Some Biomotor Abilities of Young Female Volleyball Players. European Journal of Physical Education and Sport Science. 2015.
53. Gökten H. U17-U18 yaş grubu plaj ve salon voleybolu milli takım altyapı hazırlık gruplarında antrenman eğitimi alan sporculardan elde edilen bazı değişkenlerin değerlendirilmesi: Bartın Üniversitesi, Eğitim Bilimleri Enstitüsü; 2016.
54. Plisky PJ, Rauh MJ, Kaminski TW, Underwood FB. Star Excursion Balance Test as a predictor of lower extremity injury in high school basketball players. Journal of orthopaedic & sports physical therapy. 2006;36(12):911-9.
55. Barak R. Periyotlanmış kor egzersizlerinin genç voleybolcularda bazı motorik özellikler ile servis hız ve isabet oranına etkisi: Bartın Üniversitesi, Sosyal Bilimler Enstitüsü; 2019.
56. Gabbett T, Georgieff B, Anderson S, Cotton B, Savovic D, Nicholson L. Changes in skill and physical fitness following training in talent-identified volleyball players. The Journal of Strength & Conditioning Research. 2006;20(1):29-35.
57. Sattler T, Sekulic D, Hadzic V, Uljevic O, Dervisevic E. Vertical jumping tests in volleyball: reliability, validity, and playing-position specifics. The Journal of Strength & Conditioning Research. 2012;26(6):1532-8.
58. Sattler T, Sekulic D, Esco MR, Mahmutovic I, Hadzic V. Analysis of the association between isokinetic knee strength with offensive and defensive jumping capacity in high-level female volleyball athletes. Journal of Science and Medicine in Sport. 2015;18(5):613-8.
59. Sheppard JM, Gabbett TJ, Stanganelli L-CR. An analysis of playing positions in elite men's volleyball: considerations for competition demands and physiologic characteristics. The Journal of Strength & Conditioning Research. 2009;23(6):1858-66.
60. Fattahi A, Ameli M, Sadeghi H, Mahmoodi B. Relationship between anthropometric parameters with vertical jump in male elite volleyball players due to game's position. Journal of human sport and Exercise. 2012;7(3):714-26.
61. Marques MC, Van den Tillaar R, Gabbett TJ, Reis VM, González-Badillo JJ. Physical fitness qualities of professional volleyball players: determination of positional differences. The Journal of Strength & Conditioning Research. 2009;23(4):1106-11.
62. Aslan CS, Hürmüz K, Karakollukçu M. Voleybol I. Liginde oynayan erkek sporcuların seçilmiş fiziksel, fizyolojik ve motorik özelliklerinin belirlenmesi. İnönü Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi. 2015;2(3):1-13.
63. Kalkavan A, Zorba E, Ağaoğlu SA, Karakuş S, Çolak H. Farklı spor branşlarında bazı fiziksel uygunluk değerlerinin sedanter grupla karşılaştırılması. Gazi Beden Eğitimi ve Spor Bilimleri Dergisi. 1996;1(3):25-35.
64. Asma M, Soytürk M. Examination of volleyball lessons performed by different forms in terms of learning outcomes Farklı öğretim biçimleri ile gerçekleştirilen voleybol derslerinin öğrenme çıktıları açısından incelenmesi. Journal of Human Sciences. 2018;15(2):779-98.
65. Lopes MC, Magalhães RT, Diniz LBF, Moreira JPA, Albuquerque MR. The influence of technical skills on decision making of novice volleyball players. Revista Brasileira de Cineantropometria & Desempenho Humano. 2016;18(3):362-70.
66. Nešić G, Ilić D, Majstorović N, Grbić V, Osmankač N. Training effects on general and specific motor skills on female volleyball players 13-14 years old. Sport Logia. 2013;9(2):p201.
67. Çağlayan a, ayşenur k, çerç b. Eksantrik ve konsantrik kas çalışmaları ile yapılan kuvvet çalışmalarının 15-18 yaş arası voleybolcuların sıçrama performansı üzerine etkisi. Spor Eğitim Dergisi. 2018;2(3):1-10.
68. Barnes JL, Schilling BK, Falvo MJ, Weiss LW, Creasy AK, Fry AC. Relationship of jumping and agility performance in female volleyball athletes. Journal of Strength and Conditioning research. 2007;21(4):1192.
69. Melrose DR, Spaniol FJ, Bohling ME, Bonnette RA. Physiological and performance characteristics of adolescent club volleyball players. Journal of strength and conditioning research. 2007;21(2):481.
70. Tapur SA. 14-19 Yaş Kadın Voleybolcularda 8 Haftalık Pliometrik Antrenmanın Bazı Fiziksel Ve Fizyolojik Özellikler Üzerine Etkisinin İncelenmesi. . Erciyes Üniversitesi, Sağlık Bilimleri Enstitüsü, Hareket Ve Antrenman Bilimleri Anabilim Dalı Yüksek Lisans Tezi Kayseri 2019.
71. Bilici ÖF, Selçuk M. Evaluation of the Effect of Core Training on the Leap Power and Motor Characteristics of the 14-16 Years Old Female Volleyball Players. Journal of Education and Training studies. 2018;6(4):90-7.
72. Sadak E. 12-14 Yaş Kız Voleybol Sporcularına Uygulanan Statik Denge Antrenmanlarının Dikey Sıçrama Üzerine Etkisi. Fırat Üniversitesi Sağlık Bilimleri Enstitüsü Beden Eğitimi Ve Spor Anabilim Dalı Yüksek Lisans Tezi Elazığ 2018.
73. Šimonek J. Coordination abilities in Volleyball: Walter de Gruyter GmbH & Co KG; 2014.
74. Gangey O, Kerketta I. Relationship between selected motor fitness and playing ability of volleyball players. Sciences. 2006;29(1):6-11.

75. Carlock JM, Smith SL, Hartman MJ, Morris RT, Ciroslan DA, Pierce KC, et al. The relationship between vertical jump power estimates and weightlifting ability: a field-test approach. *The Journal of Strength & Conditioning Research*. 2004;18(3):534-9.
76. Barak R, Uslu, S., Dönmez, A., Barak, İ., & Dirier, B.E. . Adölesan Kız Voleybolcularda Antropometrik Özellikler ve Bazı Kondisyonel Parametreler ile Servis İsabet Oranı Arasındaki İlişke. 17th International Sport Sciences Congress; Antalya, Turk 2019.
77. Kumar SVS. Relationsh ip of Gross Motor Proficiency with Volleyball Skill. . *International Journal of Physical Education and Sports Sciences* 2016;IX(XVI).
78. Das M, Roy B, Let B, Chatterjee K. Investigation of Relationship of Strength and Size of Different Body Parts to Velocity of Volleyball Serve and Spike.

SP-54

THE NATIONAL ENTERTAINMENTS AND GAMES OF THE KYRGYZ PEOPLE IN THE LATE 19TH CENTURY AND EARLY 20TH CENTURY*

Mehmet Turkmen**¹

Prof. Dr., Kyrgyzstan-Turkey Manas University & Muş Alparslan University, Bishkek / KGZ & TUR.

Corresponding author: turkmenafsin@hotmail.com; ORCID ID: <https://orcid.org/0000-0002-5926-7522>

ABSTRACT

This study tries to trace the cultural elements that the Kyrgyz people's national entertainments and games played in Kyrgyzstan embodied in the late 19th and early 20th centuries, and to determine their place in social structure and life. **Importance:** Traditional games performed in the national entertainments also serve as a cultural representation. Symbols, ceremonies and rituals that bring people together not only strengthen bonds between individuals in a society and provide social integration, but also keep the society alive by helping the society to maintain its traditions through sports tradition, and make value judgements and morals take root. Understanding the Kyrgyz people's national entertainments and traditional sports games undoubtedly shed light on other aspects of the social life of the Kyrgyz people and even other Turkestan peoples. **Objective:** It is aimed to define Kyrgyz national festivals and the traditional games performed in Kyrgyzstan; to define some social-cultural institutions, national and religious elements taking part in the form and intellectual elements of the games held in festival events; to explain important cultural elements that were changed or transformed, lost and about to disappear. **Method:** Descriptive research and comparison model, which is one of the patterns in the qualitative approach, was used in a chronological framework limited to the late 19th century and early 20th century. **Conclusion:** Kyrgyz national festivals took part in every stage of their social structure and life such as politics, religion, economy, family and etc. and the traditional games, whose performance in these activities is an ancient tradition, were performed intensively during the period of the study as well. The Kyrgyz people characterized the games as the supplements and protectors of their cultural heritage with the concern of losing their national identity and they were able to ensure the continuity of the traditional bond with these games and managed the continuity of the traditional bond with these games.

Key words: The Kyrgyz people, National entertainment, National games, Mourning ceremony

1. INTRODUCTION

The social environment in which an individual lives creates a framework for the form and content of common memories. Historical interpretations and perception patterns arise from the mutual relationship between individual and collective memory. Among Turkish communities, the Kyrgyz people are one of the most researched ones by social and human scientists for their traditional cultural elements, folkloric consumption and archetypal cultural codes. The most focused topics by researchers on Kyrgyz culture are: the national entertainments and the traditional sports exhibited in these entertainments with racing characteristics and games with entertainment characteristics. Therefore, the Kyrgyz people have the most potential resources among Turkic peoples in the culture of entertainment, in analyzing the origins of traditional sports and analyzing their character, in their theoretical and practical examination, in revealing the forgotten ones and the ones sunk into oblivion, and in accurately reflecting the unknown aspects and their original names. Sports games and its cultural aspect express the values, customs, lifestyles and the place of sport in the lifestyle of a certain group,¹

1.1. The importance of the study: One of the most important elements of entertainment culture that helps to preserve national identity and traditional connection between generations is traditional sports games unique to the community. These sports games are important not only in physical aspect but also in intellectual and moral aspect. The games displayed in entertainments also serve as a cultural representation. When people play any traditional game, symbols, signs and codes for the cultural characteristics of societies

¹* **Note:** This study was produced from the Scientific Research Project titled "Investigation of the Traditional Equestrian Sports in Turkey and Kyrgyzstan" ("*Kırgızistan ve Türkiye'de Geleneksel Atlı Sporların Araştırılması*") numbered KTMU-BAP-2018.GOSAUM.01.

also live. Moreover, existence and popularity of traditional sports can also provide insight about national feelings. Symbols, ceremonies and rituals bringing people together not only strengthen the bonds between individuals in a society and reinforce partnership, but also keep the society alive by helping the community to continue the traditions through sports tradition, to refresh beliefs, to make value judgements and morals take root.

1.2. The objective of the study: is to determine and explain the most important characteristics of Kyrgyz national entertainments before the October Revolution (especially in the period between late 19th century and early 20th century). Moreover, the study seeks an answer to the question of what effects of Tsarist and Soviet Russia's intervention had on the national characteristics of the aforementioned entertainments and the games displayed in Kyrgyzstan. Furthermore, as it is known, Turks lived in the Central Asia geography as tribes based on individualist tendencies and this lifestyle caused the understanding of tribalism to be more important than the sense of national unity. In this context, another objective is to examine the positive and negative effects on the national body of the entertainments and the games performed in these as a result of the tribal understanding of the Kyrgyz people and to prepare a report.

1.3. Method: Descriptive research and comparison model, which is one of the patterns in the qualitative approach, was used in a chronological framework limited to the late 19th century and early 20th century. In the study, the works basing on the studies carried out by scientists before Russia's October Revolution (1917) and in the Soviet period, the field records collected in different regions of Kyrgyz Soviet Socialist Republic and the manuscripts and archives preserved in Kyrgyz Soviet Socialist Republic Science Academy, Department of Social Sciences were used. Among the works published on ethnographic subjects after the October Revolution, only S.M. Abramzon's classification of ethnographic studies and games and his student G.N. Simakov's work in 1984 [2], M. Turkmen's monographic studies on traditional sports and games mentioned in this article were based on for this study. In the articles and books of the aforementioned author, the order of the national entertainments, sometimes their brief explanations and places in history and evaluations on the cultural heritage of the Kyrgyz people were discussed.

1.4. The general factors that prepare the Kyrgyz people for traditional games and national festivals where these games are consumed: For an outsider, understanding Kyrgyz traditional sport undoubtedly sheds a lot of light on other aspects of the social life of the Kyrgyz people and even other Turkic peoples. Traditional sports games of the Kyrgyz people and toy (festival), aş (mourning) ceremonies and all kinds of social-economic, familial, religious and secular ceremonial culture are based on traditional sources consisting of the economic life unique to itself for the development and continuity of the people and the geographical environment feeding this life. Moreover, Issik-Köl and its surroundings has been the geography where the Turks meet and mingle and where national sports are played for centuries. The "Kyrgyz people", who founded one of the oldest Turkish states in history and known as the "mighty lions of Mongolia", "lived in the geographies where the Turkish steppe culture was formed and developed, and determined their migrant settlements, economic and social life areas accordingly".³

Various national entertainments (here entertainments are perceived as games, races, national sports activities) have an important place among the rich and special cultural heritage of the Kyrgyz people. Unfortunately, this aspect of the national culture of the Kyrgyz people has only recently been taken into account by ethnographers. There is very short information with fragmented subtitles in the records of scientists and travelers such as P.P. Semenov-Tyan-Şanskiy,^{4,5} Ch.Ch. Valihanov,⁶ Ya. Severtsev,⁷ N.V. Sorokin,⁸ I.I. Grodekov,⁹ A.A. Divayev,¹⁰ etc. working on this issue in the pre-October Revolution periods. Towards the late 19th century and early 20th century, some members of the Russian Empire colonial administration and Russian intellectuals who lived in the territory of Kyrgyzstan were interested in the national entertainments of the Kyrgyz people. Some articles about national sports activities, games and entertainment were published from time to time in newspapers such as "Turkestanskiye Vedomosti", "Semireçenskiye oblastniye vedomosti", "Turkestanskiye vyskazyvaniya", over time (1850-1903), "Vestnik RGO".

2. Findings

By the late 19th century, there were more than ten different horse games and races in Kyrgyz culture. Among these, the *foal-racing* which was called *tay-çabiş* and performed with foals younger than two years old, the *horse racing* which was called *kunan-çabiş* and performed with three years old horses and the *horse-racing* which was called *at-çabiş* and performed with big horses are the most notable ones. *Çoñ-at-çabiş* (big horse racing) necessarily organized on the first death anniversary of a famous and wealthy deceased or extra long-distance and award-winning horse racing called *alaman-bayge* are remarkable.³

In the late 19th century and the early 20th century, the following entertainment became widespread: two horsemen wrestling on horseback called *oodariş* or *eñiş*¹¹, the archery race on horseback called *cambi-atış*, the game of taking kuruş (coins) from the ground on the back of a running horse known as *tyın-eñmey*, the riding

race between girls and boys called *kız-kuumay*,¹⁸ the pacer race known as *corgo salıŝ*¹³ etc. There were traces of nomadism and animal husbandry in other games that gained fame among the people.

The game of protecting sheep herds from predators, such as *kaŝkır-oyunu* (wolf-game), was rather common among children and young people. About 30 girls and boys over the age of 13 would participate in the game. The overcrowded participant group were divided into three groups as 'sheep', 'shepherds' and 'wolves'. On the flat ground, a large circle-shaped sheepfold where sheep were kept and which was called *koy-koroo* was drawn. Outside the circle, there were shepherds protecting the sheep from wolves trying to trick the sheep to get out of the sheepfold. While the wolves would try to get as many sheep out of the circle as possible, the sheep would try to lure in as many wolves as they could with the help of the shepherds. Those who were caught would become sheep or wolves, depending on the side they were in. The game would continue until all the participants became either sheep or wolves [10]. Apart from this, other games such as *eŝek-miñmey* (donkey-riding), *toktu-suramay* (asking for female calf), *uyçu* (cowman) and *taman-tuzak* (foot-trap) would reflect the characteristics of nomadic life.

Although most of the games are no longer related to nomadism, their names indicate that the ancestors originated from those lifestyles. In almost every stage of the national games such as the game of throwing ball into wells called *kök-buka* (cerulific-bull), the game of leapfrog called *kızıl-buka* (red-bull) and so on, the names of pets were used. Points gained or lost used to be called 'tay', throwing dice used to be called 'at-karmoo / *ukruk-salmaytuu*' meaning catching a horse, throwing dice in the game of knucklebones used to be called 'at-kaŝlaŝoo' (determining the first horse), the game object used to be called 'külük-at' (race horse), the player quitting the game for any reason used to be called *çok-baytal / mare whose mane was cut* [2]. Some games were played with the body or part of pets. For example, because kid body (carcase) called 'ulak' and calf body called 'torpok' in the southern part of Kyrgyzstan were generally used in *kök-börü* (cerulific -wolf / god-wolf) game, the other name of this game was 'torpok-tartıŝ/calf-catching' [14]. In crowded ceremonies and events such as weddings or death anniversaries, the game called 'öpkö-çabiŝ' was played in which lungs were used as a fighting tool. During the race, two men whose body parts above belly were naked would hit each other's heads and bodies with the lungs in their hands until their opponent left the field. The knucklebones called 'Çükö' (dib / tarsus) and played with the bones in the wrist of sheep was widespread among the Kyrgyz people. Today, the knucklebones called 'ordo' (khan-palace) is more common. According to S.M. Abramzon, the strategic idea of "capturing the Khan palace" lies at the heart of this game. In the game, the purpose of throwing the dibs out of the circle is for its war strategy.¹⁵

The game in question has many rules, so it requires lots of skill and agility. The winner would usually be rewarded with one or more pets. While pets were always given as a reward until the early 20th century; expensive clothes, household items and money were started to be given as a reward in the early 20th century. However, pets were still mostly preferred. Camels, horses and sheep were most valued. Cattle could be given as a reward only when other animals could not be presented [16]. This indicates that camels, horses and sheep were valued more than cattle in the nomadic tradition. Since many types of entertainment are related to the daily life and worldview of the Kyrgyz people, the national games were used as a means of preparing younger generations to work in the period between the late 19th century and late 20th century. Before the Kyrgyz tribes were included in the Russian Empire, wars, raids and conflicts always dominated the social and political agenda. Even in the middle of the 19th century, intertribal conflicts were in question. According to S.M. Abramzon, "the harsh climate and military lifestyle did affect the Kyrgyz people's material culture, life order, social relations and sense of national unity".¹⁷ Therefore, in some national games especially military motives are seen. Games such as 'Er-sayıŝ' (two riders fighting with bayonets on horseback), 'cambi atıŝ' (archery race on horseback), 'oodarıŝ' (wrestling on horseback), 'tyın eñmey' (the game of taking kuruŝ (coin) from the ground on a running horse), 'balban-küröŝ' (a traditional wrestling with keeping the waist belt attached) and various horse races used to be held to gain military skills rather than to entertain and train until 1930s.

Kyrgyz children used to prepare to fight against enemy from an early age. By contributing to skillfulness, agility, courage, sagacity and intelligence, national games and races were regarded to be one of the most important tools in preparing the future soldiers. The dynamic games in question, sort of a part of military education system was performed from simple to difficult as the children grew up. National games and sports types laid at the heart of the mounted troops training system, which used to form as a matter of course and even deliberately be exalted in certain historical periods. Obviously, such a method of training matched up with the traditional characteristics of the Kyrgyz army based on the national struggle.¹⁵ The Kyrgyz army was generally composed of light cavalry soldiers. The game of 'er-sayıŝ' (the confrontation of two horsemen with spears), held on the first anniversary of death, called 'aŝ' among horse races and games, had military characteristics. The game of 'er-sayıŝ' was definitely held at the events (*yug/mourning ceremony*) organized on the occasion of the first anniversary of death in the late 19th century and early 20th century. Sometimes it was even held at ceremonies held for other reasons. Starting from the middle of the 19th century and towards the

end, because this game was abstracted from its traditional style and real spears were used, bloody events would frequently occur. In the early 20th century, the artificial spears specially prepared for *er-sayış* started to be used and the rules of the game were determined at this time. After that, only chest became the target of the tip of the blunt spear since it was forbidden to hit waist down, back and face. Moreover, to protect chest, a kind of armor called 'soot' and made of a thick piece of felt and cow with horse skin called 'soot' started to be used instead of real soldier armors. *Er-sayış* disappeared in the early 20th century when the Russian Empire Colonial Government officially banned it.¹⁸

Horse games were so common because horses were so important in warfare. In the preparation of military expedition, the important thing was to train the horses for collisions with long distances rather than horse equipment. Thus, thanks to the horse games, both the soldier's and the horse's skills and strengths were developed. The horse tradition peculiar to the Kyrgyz culture was reflected in oral folk literature works such as the epic of "Manas". In the Kyrgyz army, there were also experts known as 'sıncı' who evaluated the warriors' and horses' war skills. There were also rumors that one could be an expert (sıncı) only at the behest of souls. Most probably, the experts had common features with shaman, fortune teller, etc. Towards the late 19th century, the experts were regarded as experts who were purified from religious attributes and prepared horses for races and evaluated the qualities of horses for racing. In great ceremonies, the bards called 'ırçı' used to sing heroic folk songs and lyrical chansonettes accompanied by special musical instruments. Musical instruments such as 'Kıyak', 'kerney', 'surnay', 'dobulbas', 'komuz' were necessarily played in military ceremonies in ancient times. The heroic demonstrations peculiar to Kyrgyz ceremonies (cigitovka / valiantly) referred to the military past. The common heroic tradition called *cigitovka* among the people also reinforced this situation. In the late 19th century and early 20th century, those who won races such as *at-çabış*, *oodarış*, *balban-küröş* and especially *er-sayış* were regarded as heroes and they had a special social status. In the late 19th century and early 20th century, women and girls were active participants in traditional sports such as *oodarış*, *balban-küröş* and *er-sayış*, which had war characteristics and are known to belong only to men today. Moreover, there were traditional equestrian games and races for women such as *kız-carış*, *kelin-carış*, *kız-börü*, *kız-uynak*, *kız-kumay*, *kelin-kumay*. In short, all kinds of races performed by Turkestan men at that time used to be performed by women too, and there were even more. This situation indicates the superior position of women in social life in the old Turkish culture.¹⁸

In the epic of "Manas" of the Kyrgyz people and in other epics sung in Turkestan, heroic women are mentioned. It is obvious that the common traditional women's competitions in the past disappeared over time and became available only as a demonstration in great ceremonies. The women coming out after the men used to fight sometimes jokingly and sometimes seriously. The winning woman would be rewarded with a pet. However, the rewards given to women were less than those of men.¹⁹ These women were called *balban kız* (strong girl), *balban kelin* (strong bride). These women sometimes competed even with men and could beat them.¹⁵ This situation indicates that Turkestan immigrants value women in their daily life. Moreover, in most cases the tribe names are female names such as *Almıralar*, *Nurmıralar*, *Ayzatlar* etc.^{20,19} Kyrgyz women did not remain limited to military races and also played an active role in daily life with men. The described national entertainments generally included in the class of national sports genres in the late 19th century and early 20th century, and only some details of them reminded that they were related to the military past. The entertainment, which was held without relation to religious traditions and calendar ceremonies, aimed to educate by playing in a joyful environment. All of the children's games, some of the teen games and most of the knucklebone games are included in the entertainment like this. The most common games were performed in family ceremonies, which partly had religious characteristics. Different entertainments and races were organized in the events such as the first anniversary of the deceased, called *Çoñ-aş* (the great mourning ceremony), *üylönüü-toyu* (marriage ceremony), '*beşik-toy / beşik-zıhı*' (cradling a baby boy) and '*tuşoo-kesüü*' (when a baby boy turns one and starts to walk) etc. ceremonies.

3. Discussion

In weddings, three types (*kök-börü*, *çab-ulak* ve *torpok-tartış*) of the game *kök-börü* (god-wolf) mentioned above could be encountered. In the first game, two teams consisting of participants coming separately from the groom's and the bride's sides would compete. The winning party would receive the grand prize from the bride's father. In the second game called "*Çab-ulak / lamb-grabbing*", the boys from the groom's family would go to the ceremony held in the bride's house and try to grab the lamb there. The main purpose of the participants was not to grab the lamb, but rather to show their respect by throwing the lamb in front of the bride's father's feet or in front of his tent. The boy who threw the lamb was rewarded with a pet. In the third game, *kök-börü* was played with a carcass of one year old calf or heifer and this was called *torpok-tartış*. The *torpok-tartış*, usually played in great toys was seen as a sign of wealth. S.P. Tolstov, argued the game of *kök-börü*

was related to the ancient wedding and totem tradition [21]. Although the game of *kök-börü* was perceived as entertainment until the 1930s, it is still noteworthy that it carries the attributes of (Kök-tanrı-Tengri) rituals. Traces of religious rituals were also observed in the events held on the occasion of the anniversary of death, called as or *çoñ-aş* (big aş). Because the aforementioned death anniversary event was of great importance in the social and religious lives of the Kyrgyz people, it was organized in a particularly pompous manner. Participants from all regions of Kyrgyzstan and even Turkestan would come to the aş of the rich and prestigious deceased. The number of participants sometimes exceeded tens of thousands. The rituals and entertainments performed in a certain order in the activity prove that they have a ritual characteristic.⁸ At the beginning of the death anniversary event called *Çoñ-aş* (great mourning ceremony), a race called *kemege-bayge* (digging pit award) was held. The race in question was so called because it was held when meat was cooked in the stove called *kemege*, which was made by digging the soil. The fact that the race of *kemege-bayge* was held only on the first day of *çoñ-aş* shows that it is related to the ancient rituals. On the following days, the number of which could be ten or more, the following activities would take turns; *cambı-atış*, *öpkö-çabış*, *balban-küröş*, and the game called *töö-çeçmey* (camel-thawing); this obscene game reportedly passed by Arab merchants with the fun of loosening the camel's bind which was tied to a pole with its precious load by a naked woman with her teeth. On the last day, the races of '*çoñ at-çabış*' or '*alaman-bayge*' (extra long-distance horse racing) were necessarily held in which the best and famous horses participated. According to what the elders said, previously *alaman-bayge* was held only during '*çoñ-aş*'. However, it was possible to come across it in other ceremonies from the second half of the 19th century. In written sources too, it was noted that the ancient traditions were gradually abandoned in the late 19th century and early 20th century. On death anniversary, especially in the south of Kyrgyzstan, tug of war called '*ip-tartış*' (rope-tugging) never seen before, the game of taking *kuruş* (coin) by lips from flour soup in cauldron called '*atalagabaşsal*', and *kök-börü*'s classic version '*çobaltma-tartış*' that was strictly prohibited in the 1860s and whose risk of death is high were started to be held. One of the reasons that triggered such striking changes is the efforts to eliminate the ancient traditions of the ancestors with Tengricism under the influence of Islamic culture.²² As it is seen the fact that some national entertainments of the Kyrgyz people was performed in a certain ritual order in the religious events such as the death anniversary proves that these are related to ancient religious rituals. The aforementioned entertainments are classified in relation to rituals. Social ceremonies with ancient religious motifs influenced some types of entertainment at that time. The traces of this effect are mostly seen in *kız-toy* (girl engagement feast) and *üylönüü-toy* (marriage wedding ceremony). Abramzon described the wedding in question with the following words: "On the eve and during this marriage feast, rituals based on ancient social-marriage institutions and religious-symbolic traditions were held. During the wedding, there were lots of entertainment such as games, singing and racing".²³

Sometimes the ritual and the game overlapped indistinguishably. As an example of the ceremony between the aforementioned game and the ritual, the entertainment called *töşök-talaşuu* (mattress-pulling) can be discussed. While the young men coming from the groom's side tried to pull the rope dug on the ground at one end, the women who were on the bride's side tried to prevent them by pouring water and beating them with knitted fabric pieces called *tomak* or *tokmok*. The winning party was given one or more pets by the bride's father. Usually, the prize was cut and prepared right there and eaten together. Such entertainments like this were regarded as "The race between the groom and the bride's tribes...", or in other words, as "ancient family structure trying to protect itself, that is the struggle of the patriarchal order getting stronger with the marriage tradition",¹⁷ The participation of mostly young people in the entertainment called '*Töşök-talaşuu*' (mattress-pulling), the game's relation to fun, rituals and symbols and the game's tight attachment to the wedding ceremony show that this belongs to the transition phase between ritual and game. Although the Kyrgyz people lived according to the social class system in the Soviet period, the traces of the archaicism that affected the mentality and daily life were still seen in the national entertainments. L.F. Kostenko explained this situation in his book titled "Turkestarskaya ...": "The teams that would oppose each other during a race were formed based on ancestral belonging. Awards used to be shared among kinsmen, not winners... Interests of an ancestry always came first, while individual interest came later. The whole life of the Kyrgyz people is subject to this principle ...".²⁴ I.I. Grodekov, wrote the same about the Kazakhs: "In great ceremonies, first of all, races were held between ancestries, not between individuals. The prize does not belong to the winner only, but it belongs to his ancestry and is shared with everyone. Therefore, in horse races everyone shouts his/her own ancestral name".⁹ The tradition of sharing the prize with kinsmen or tribe would be the same in all regions of Kyrgyzstan. The principle of sharing was especially important in races with big prizes such as '*at-çabış* / horse-race'. Only in *er-sayış* (confrontation of two horsemen with spears) race, the winner could take the prize for himself, probably because he would put himself at a great risk.

The aforementioned traditions generally affected the development of the national entertainments positively. However, there were also negative situations. The rivalry between ancestries which was highly

effective until the beginning of the 20th century sometimes caused cheating and breaking the rules while having fun. This would darken the mood and even caused armed conflicts. Semenov-Tyan-Shansky, explains that foreigners could not participate in races due to their ancestral traditions as follows: *"Although foreigners were treated like everyone else in daily life (which shows that patriarchy and ancestral order was not as effective as they used to be), they were sent away and even contempted in great feasts. Because not knowing one's own ancestry or tribe is not tolerated among the Kyrgyz people."*⁴

Other than those mentioned above, examples of financial support such as *çigim* (expense) ile *'koşumça'* (help) symbolizing the joint participation of cognates, are noteworthy. The financial participation of relatives and cognates required to organize an event is called *çigim*. *Koşumça* includes gifts, pets, precious clothes or money brought by cognates and guests. According to Pogorelskiy and Batrakov, in traditional activities such as *aş* and *toy* in a closed society in itself, versatile ancient common mindset such as ancestries and ancestral culture etc. and religious and economic motives were seen.²⁵ Towards the late 19th century, it was an inevitable fact that major national events were held according to the rules of social class order such as the following. The ancestral-rich people known as *manap* or *bay* started to use their superiority and rights to assert their personal interests. After all, they could make the people obey themselves. Often during big events, the wealthy host and the rich guests would publicly attempt to rob ordinary livestock farmers.^{5,7} D. Aytmbetov explained this situation as follows: *"During events such as aş, ordinary members of tribes hosting rich and important guests suffered a lot. When the host of the tent did not host the guests properly, according to the guests, the guests would beat him and even take the animals of that village with the excuse of revenge"*.¹⁸ Feasts lasting a few days, entertainments, expensive prizes, these activities that appear to be unity and kinship behind the religious ritual with everyone's right to participate were actually nothing more than colonialism. While the middle-class livestock owners having around ten to twenty cattle opposed this because they lost their animals each time, the poor who had no cattle were in favor of the feasts. It is difficult to grasp the contrast of strange views that belong to the same nomadic society [26]. The wealthy, who pursued personal interests, would deviate from all ancestral rules at events under the pretext of keeping ancient traditions alive. As D. Aytmbetov stated, *"in earlier times (until the middle of the 19th century) horse races were held only on death anniversaries. However, later the wealthy started to hold these races at every opportunity such as having a baby boy, a successful principality or tribal head election etc."*¹⁸ The timing of the death anniversaries called "ash", which, according to the traditions, should have been organized one year after a respectable person died, was no longer applied.

CONCLUSION

The national entertainments of the Kyrgyz people and the traditional sports games they exhibit are based on the nomadic lifestyle dominated by animal husbandry. Festivals were held on the anniversaries of important historical events; on calendar days such as Nawruz, Ramadan Bairam and Eid al-Adha; the first (kemege-bayge), the third, the seventh and fortieth days and the first year of death; when a boy is born (beşik-toyu), when the boy turns one and starts to walk (tuşo-kesuu), for the event of engagement (kız-toy/ little festivity) and marriage (üylönü-toy/big festivity); in the elections of chieftain, master, khan or in the event when the khan died and one of the dynasty member enthroned, on national, religious, family, economic days. Although the Kyrgyz people lived according to the social classes system in the early years of the Soviet era, the traces of the archaic cultural codes still affecting the mentality and daily life were seen in the national entertainment. The groups participating in the races necessarily consisted of separate ancestries within the framework of the tribal understanding, and such a rule was applied at every stage from ancestry to family. In the early 19th century and late 20th century, the ties with the past began to break, and contrary to ancient rules, entertainment started to be held whenever desired, except for national-religious and family ceremonies. It was concluded that the tribal understanding of the Kyrgyz people took precedence over the sense of national unity, divided the nation into classes, prevented the development and even the progress of the national entertainments; caused traditions, which were harsh enough to endanger life with the hostility between participants during national games and to humiliate human dignity, to continue; that as a result of the division into classes, the rich pursued personal interests and tried to make the people obey them through the national entertainments; that due to wealth inequality, the ordinary people could not participate in different races and games.

REFERENCES

1. Bartold, VV. (1964). "Istoriya kul'turnoy zhizni Turkestana The history of the cultural life of Turkestan", Soch. T. 2. 646-64 pp, Moskova: Nauk.
2. Simakov, GN. (1984). *Obshchestvennyye funktsii kirgizskikh narodnykh razvlecheniy v kontse XIX- nachale XX v.*, Leningrat: Nauk.

3. Turkmen, M.- Ozmaden, H. (2000). "Kırgızlarda Popülerliğini Yitirmiş Geleneksel Binicilik Sporları ile Türkiye'deki Versiyonları", *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, Cilt: V., S.: (2): 43-66.
4. Semenov-Tyan-Shansky, PP. (1947). *Puteshestviye na goru Boga v 1851-1852 gg*, Moskova: Tom I.
5. Semenov-Tyan-Shanskiy, PP. (1958). *Puteshestviye v Tyan'-Shan' v 1856-1857 gg.*, Moskova: Tom II.
6. Valihanov, Ch.Ch. (1961). *Sobraniye sochineniy* Collected works. T. I., AN Kaz. SSR, Alma-Ata 1961.
7. Severtsov, NA. (1873) *Puteshestviya po Turkestanskomu krayu i issledovaniye gornoy strany Tyan-Shanya*. St. Petersburg: Tipografiya K.V. Trubnikova.
8. Sorokin, N. (1871). "Zametka o posmertnykh kirgizskikh obryadakh", *Tobol'skiye gubernskiy vedomosti*. Tob. № 5.
9. Grodekov, NI. (1889). "Kirgizy i karakirgizy Syr-Dar'inskoy oblasti: Yuridicheskiy byt. Kirghiz and Karakirgiz of the Syr-Darya region: Legal life", T. I, (№ 42), *Tipolit. S.I. Lakhtina*, Tashkent: Tipo-lit.
10. Divayev, AA. (1905). "Igry Kyrgyzskikh detey Games of Kyrgyz children", «*Turkestanskiye vyskazyvaniya*», (№ 152): 1-12 pp.
11. Turkmen, M. (2010). *11th International Sport Sciences Congress*, "Enish/ Oogdarish/ Mounted Wrestling in Middle and North Asia Turkish Tribes", November 10-12, 2010, 268-273 pp. Antalya/Turkey,
12. Turkmen, M.- Imamoğlu O.- Turkmen, L. (2005). "Dünden Bugüne Türklerde Kız ve Kelin Kovu Oyunu", *Gazi, Kırşehir Eğitim Fakültesi Dergisi*, Haziran 2005, Cilt: 6, Sayı: (1): 49-57.
13. Turkmen, M. (1998). "Geçmişten Günümüze Türklerde Rahvan (Yorga) Binicilik", *Gazi Beden Eğitimi ve Spor Bilimleri*, Ekim 1998, Cilt 3, Sayı (4): 53-64.
14. Turkmen, M.- Mete, B.- Turkmen, L. (2007). "Geçmişten Günümüze Türklerde Kök-börü / Ulak-tartış / Buz-kaşı / Torpok-tartış Oyunu", *Türk Dünyası Araştırmaları*, ISSN:0255-0644, Ocak-Şubat, 2007, (Sayı:166): 95-108.
15. Abramzon, SM. (1946). "Tul" kak perezhitok animizma u kirgizov "Tul" as a relic of animism among the Kirghiz // Belek S. Ye. Malovu. Frunze: Kirg. FAN,
16. Vasiliyev, AV. (1898). "Obratstvy Kirgizskoy narodnoy slovesnosti: Kirgizskiy skazki", *Tipolithography*, FB. Sachkova, Vyp (№), 1-18, Orenburg.
17. Abramzon, SM. (1971). *Kirgizy i ikh etnogeneticheskiye i istoriko-kul'turnyye svyazi* Kirghiz and their ethnogenetic and historical and cultural ties, Leningrat: Nauka.
18. Aytmambetov, D. (1967). *Kul'tura kirgizskogo naroda vo vtoroy polovine XIX v. i nachale XX v* The culture of the Kyrgyz people in the second half of the 19th century. and the beginning of the XX century, Frunze: Ilim.
19. Abramzon, SM. (1968). *Kirgizy v ikh etnogeneticheskikh i istoriko-kul'turnykh svyazyakh s narodami sopredel'nykh stran* Kirghiz in their ethnogenetic, historical and cultural ties with the peoples of neighboring countries.. Leningrat: Avtoref. dok. diss.
20. Levshin, AI. (1832). *Opisaniye Kirgiz-Kazach'ikh, ili Kirgiz-kaysatskikh ord i stepey*, SPb: Karla Krayya.
21. Tolstov, SP. (1935) "Perezhitki totemizma i dual'noy organizatsii u turkmen", *Problemy istorii dokapitalisticheskikh obshchestv*, № 9 (10): 14-23, Moskova- Leningrat.
22. Sokolovskiy, VG. (1926). *Kazakskiy aul* Kazakhstan villages. *Tsentr. Stat upravl.* Tashkent: KazASSR.
23. Abramzon, SM. (1976). "Normy braka u kirgizov v proshlom" Marriage rates among Kyrgyz in the past, *Sovetskaya etnografiya*, ISSN 0869-5415, (№ 1): 49-57 pp.
24. Kostenko, LF. (1880). *Turkestanskaya oblast* Turkestan region, T.: I, Sankt-Peterburg.
25. Pogorelskiy, Ya. & Batrakov, V. (1930). *Ekonomika kochevogo aula Kirgizstana*, Moskova: Izd. Sovn. KASSR.
26. Vámbéry, HÁ. (1874). *Puteshestviye po Sredney Azii* Travel to Central Asia, 2-ye izd. / Moskova: Gosudarstvennaya publichnaya istoricheskaya biblioteka.

THE EFFECT OF STATIC AND DYNAMIC CORE TRAINING ON SOME MOTORIC CHARACTERISTIC AND TENNIS SERVICE VELOCITY OF TENNIS ATHLETES

Halit Egesoy^{*1}, Aysegül Yapıcı Oksuzoglu¹, Aydin İlhan¹

¹ Department of Sports Sciences, Pamukkale University, Denizli, Turkey

Corresponding Author: hegesoyl@hotmail.com

Abstract

The aim of this study is to investigate the effect of static and dynamic core trainings on some motoric characteristics and tennis service velocity of tennis athletes. Thirty-six healthy male (n = 21) and female (n = 15) junior tennis players who were between the ages of 10-14 participated in this study voluntarily. Subjects were randomly and equally divided into control (n = 12), static core training (n = 12) and dynamic core training (n = 12) groups. It was implemented the tests of ages, length, weight, body mass index, vertical jump, flexibility, handgrip strength, 10 m speed, y-balance, seated medicine ball throw tests, velocity analysis and radar specifications to subjects attended to this study. The normality distribution of data was checked with using Shapiro-Wilk test and parametric analysis techniques were employed. The differences between pre and post tests were analyzed using Paired Samples T test and variation ratio of numerical difference between some motoric characteristics and tennis service velocity of the training and control groups were analyzed with Independent Samples T test. While there was a statistically significant increase ($p < 0.05$) between some motoric characteristics and tennis service speed pre-post test values of the training group athletes, there was no significant difference in the control group ($p > 0.05$). Core region strength is very important in terms of being the starting point of force and balance in a branch such as tennis where there is a lot of change of direction, mobility and imbalance. The inclusion of core exercises in the training programs of athletes, trainers and conditioners who work with tennis athletes can contribute to the performance development of athletes.

Key words: Core training, performance, athlete, tennis

INTRODUCTION

Tennis is a branch of sport which has physiological requirements similar to team sports, can be played on different grounds, includes both aerobic and anaerobic energy metabolisms.²² Achievement in tennis involves various physical, technical/tactical and psychological factors together with a combination of abilities of agility, speed and power.²⁶

It is stated that the most important batting technique in tennis is the service shot, both because it is the kick that starts the game and provides an advantage to the user, and it is a single hit that does not affect the opponent.¹⁴ However, due to the nature of the game, the most time the ball is in the game during a tennis match occurs in the rally part. The duration of the rally for one point in tennis is approximately 8 seconds. The longest rallies are up to 43 seconds.¹⁴ This covers 10-15% of the total game time on fast courts and 20-30% on slow courts. A tennis player who makes a minimum of 2-3 hits even in the shortest rally must accelerate, stop and make strong hits in a balanced position. When we look at the researches, some performance criteria come to the fore in order to be successful in tennis. These criteria are stated as quickness, static and dynamic balance, force, reaction time and coordination.^{2, 9, 14, 26, 31, 33,}

In recent years, core trainings have been included in training programs by trainers and athletes in order to achieve more sportive efficiency in tennis, as in many sports branches.²⁹

The importance of core region strength increases in branches such as tennis where there are many changes of direction, acceleration, rotations, jumps and the sequence of the kinetic chain frequently changes. The success of an athlete in tennis depends on having developed muscular fitness.¹ In terms of sportive performance, better core stabilization supports higher force generation for the lower and upper extremities.³⁷

Core exercises are described in the literature as exercises that work the central part of our body.³⁶ According to researchers, it is the motor part that provides the production of the power required for the extremities.³ It is the 37 lumbo-pelvic-hip complex, which is accepted as the starting point in all movements of the trunk and the production center of power and called the core region.²⁹ Following the kinetic chain during hitting the ball, the force is transferred from the ankle to the knees, from there to the legs, then to the hip, and then to the trunk, shoulder, arm, wrist and then the racket.¹⁴ From the point of view of the tennis athlete, the importance of the core muscles is once again revealed, as described by Kibler (2006) as "internal stability for external mobility". All muscles generate high power when the ball is hit, and if the trunk cannot provide proximal balance and stabilization at this stage, problems may occur in distal mobility that will reduce efficiency.³² In other words, the core muscles play an important role in both supporting the production of force and keeping the body stable by resisting that force. The improvement and strengthening of such an effective muscle group is of great importance for athletes and trainers in terms of performance development in tennis.¹⁴ The aim of this study is to investigate the effects of static and dynamic core training on some motoric characteristics and tennis service speed of tennis athletes.

Methods

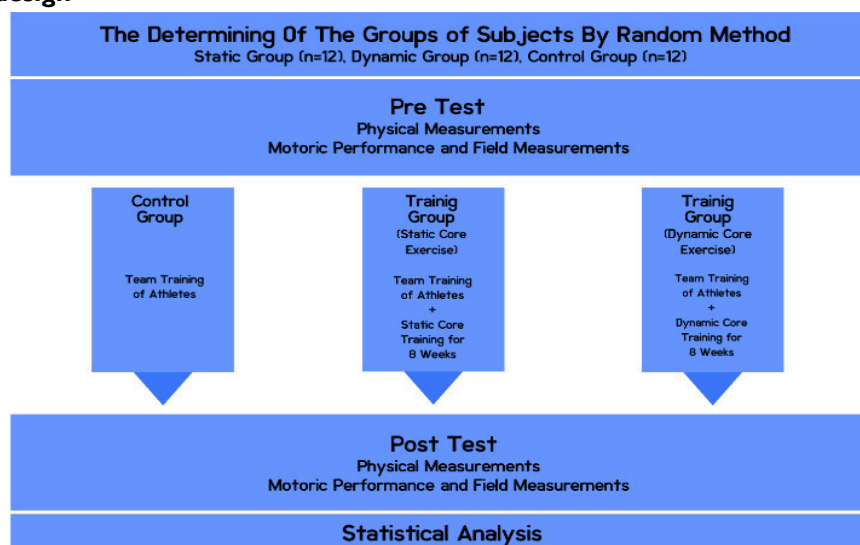
Subjects

Thirty-six healthy male (n = 21) and female (n = 15) junior tennis players (mean $\pm$ SD: age 11.75 ± 0.5 years, weight 44.45 ± 8.8 kg, height 1.48 ± 0.07 m) who were between the ages of 10-14 participated in this study voluntarily. Subjects were randomly and equally divided into control (n = 12), static core training (n = 12) and dynamic core training (n = 12) groups. There were 7 males and 5 females athletes in each group. The training groups followed the exercise programs presented in Table 1 and Table 2, which were designed as 2 sessions (each session 25-30 min.) a week in addition to on-court trainings for 8 weeks. All players had a minimum of 3 years of prior tennis specific training. Inclusion criteria for all subjects required each participant to be a healthy tennis player, no history of upper extremity surgery, no shoulder pain for the past 6 months, no rehabilitation for the past 6 months, and no participation in a formal strength-training program the 4 weeks before the study. 30 players were right-handed and 6 were left-handed. The subjects were informed about the possible risks and benefits of the study and gave their informed consent to participate in this study, which was approved by the Clinical Research Ethical Committee of Pamukkale University (60116787-020/63661).

Experimental set up

This study examined the effects of a 8-week core training program on some motoric characteristics and tennis service speed of junior tennis athletes. Because young athletes increase muscle through maturation, which can affect serve velocity, we used a control group to compare to the experimental (training) group. To control the effects of age and training status on service velocity, we employed a randomization process in assigning the subjects to the experimental and control groups. During the testing sessions players were advised to have no strength or endurance training at least 48 h prior to the test and to take a carbohydrate rich meal 2 h before testing.

Study design



Measurements

Physical Measurements

The information about height, weight and body mass index (BMI) measurements of the subjects participating in the study was recorded. The height of the subjects participating in the study was measured with Holtain brand stadiometer with a sensitivity of 0.01 cm. The length of the subjects was determined in anatomical position (barefoot) and the result was recorded as "cm". The weight measurements of the subjects were measured with a sensitivity of 0.01 kg in anatomical position (barefoot) and the result was recorded as "kg". BMI values were determined by "BMI = weight (kg) / (height)²" formula.

Motoric Performance and Field Measurements

In the study, various tests were used to determine the motoric characteristics of junior tennis players.

Vertical jump test: The vertical jump (VJ) is one of the most frequently used tests of power and explosiveness in strength and conditioning. Standing erect with the feet flat on the floor, the client reaches as high as possible on the tape, with the arm and fingers fully extended and the palm toward the wall. This is recorded as the beginning height. Standing about a foot away from the wall, the individual brings the arms downward and backward, while bending the knees to a balanced semisquat position, and then jumps as high as possible, with the arms moving forward and upward. The tape should be touched at the peak height of the jump with the fingers of the arm facing the wall. The best of three trials were recorded as "cm" (Nieman, 2011).

Flexibility test: Flexibility of the trunk was determined from a sit-and-reach test using a standard sit-and-reach box. The subjects sat in front of a sit-and-reach testing box, where the feet meet the testing box. The subjects were informed to reach forward, with palms down and one hand on top of the other along the measuring scale of the testing box. The recorded score for this test was the average of 2 trials.¹⁵

Handgrip strength test: To assess upper limb strength, a handgrip strength test was performed with dominant hand using a TKK5101 Grip D-class III dynamometer (Takey, Tokyo, Japan), accurate to 0.1 kg and complying with standardization standards. Each participant performed the test twice with dominant hand with 1 min of rest between trials. Participants were instructed to gradually and continuously squeeze for at least 2 s, standing throughout the whole test, keeping their arm straight and avoiding touching the dynamometer with any part of their body, with the exception of the hand being measured. Subjects were encouraged to do their best when performing the tests (Molina-López et al., 2020).

10 m speed tests: The speed skills of the subjects were measured by 10 meter tests. The subjects started the test from the starting line located 1 meter behind the starting photocell (Newtest 2000; Newtest Oy, Oulu, Finland). Acceleration and speed values of the subjects were recorded through the photocells placed at 10th meter. Each participant repeated the test twice, and the best one was recorded as "seconds".

Y-balance test: The Y Balance Test (YBT) is a simple, yet reliable, test used to measure dynamic balance for three reach directions as the anterior (ANT), posteromedial (PM), posterolateral (PL). Subjects maintain a onelegged stance on an elevated stance platform from which three pieces of plastic pipe extend in the specific ANT, PM and PL directions. With the nonstance foot, participants push an indicator to a maximum distance along the pipe, marked with 0.5 cm increments. The average of three successful test trails for each reach direction was used for data analysis. Limb length (LL) was measured from the anterior superior iliac spine to the most distal aspect of the ipsilateral medial malleolus in supine lying.² All reach distances were normalized as a percentage of the stance limb length using the formula $[\% = (\text{excursion distance}/\text{LL}) \times 100]$.

A composite score, which is an average of all three reach distances, $[\text{Comp} = ((\text{ANT} + \text{PM} + \text{PL}) / (3 \times \text{LL})) \times 100]$ was also calculated for each limb. The absolute difference in the anterior reach direction distance (centimeters) between limbs was calculated to assess side-to-side asymmetry (Stiffler et al., 2017).

Seated medicine ball throw test: The subjects were asked to sit on the ground facing to the throwing section, with their knees bent, their soles on the ground and their toes just above the zero point. Later subjects grasped the medicine ball and were instructed to forcefully push the ball away from the overhead as far as possible with double hands. The spot where the front end of the ball hit the measuring tape was recorded. Subjects performed 3 trials with the 3 kg ball, with a 90-second rest between trials. The best score was used for analysis (Chad et al., 2011).

Velocity analysis and radar specifications

A radar gun (Stalker Professional Sports Radar, Radar Sales, Plymouth, MN) was used to measure the serve velocity of tennis players. The radar gun was set on "Peak mode" to detect maximal ball velocity between the range of 80 to 232 km h⁻¹. Before each experimental session, the radar gun was calibrated in accordance with the manufacturer's specifications. The radar was positioned on the center of the baseline, 2 m behind the server, aligned with the approximate height of ball contact (~ 2.2 m) and pointing down the center of the court. After a brief warm-up for the joints involved in the service motion (i.e., dynamic movements in the shoulder, plus five slow services), players performed five maximum serves, all to the advantage court. To be recorded, serves had to be in the service box. The highest speed recorded was used for analysis. The intertrial reliability for serve velocity was 3.2%, similar to previous research (Hornery et al., 2007).

Training Program

The training groups followed the exercise programs presented in Table 1 and Table 2, which were designed as 2 sessions (each session 25-30 min.) a week in addition to on-court trainings for 8 weeks.

Table 1: Static core exercise program for 8 weeks

Exercises	1-3 rd weeks	4-6 th weeks	7-8 th weeks
	Exercise Time/Rest Time/Sets	Exercise Time / Rest Time / Sets	Exercise Time / Rest Time / Sets
Front Plank	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Side Plank (Right / Left)	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Leg Raise Hold	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Dead Bug	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Bird and Dogs	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Banana	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Superman	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Posterior Plank	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Glute Bridge Hold	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2

(Willardson;

2007)

Table 2: Dynamic core exercise program for 8 weeks

Exercises	1-3 rd weeks	4-6 th weeks	7-8 th weeks
	Exercise Time / Rest Time / Sets	Exercise Time / Rest Time / Sets	Exercise Time / Rest Time / Sets
Plank Climbers	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Supine Plank Leg Lift	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Russian Twist	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Dead Bug	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Bird and Dogs	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Leg Raise (up and down)	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Side Plank Leg Lift	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Plank Leg Extension	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2
Reverse Crunch	20 sec / 20 sec x 2	30 sec / 30 sec x 2	40 sec / 40 sec x 2

(Willardson;

2007)

Statistical Analysis

Data analysis was carried out using Statistical Package for the Social Sciences Version 21. The normality distribution of data was checked with using Shapiro-Wilk test and parametric analysis techniques were employed. The differences between pre and post tests were analyzed using Paired Samples T test and variation ratio of numerical difference between some motoric characteristics and tennis service velocity of the training

and control groups were analyzed with Independent Samples T test. The values obtained are presented as means and standard deviation. Statistical significance was set at $p \leq 0.05$.

RESULTS

The demographic characteristics of the participants are presented in Table 3. According to the pre and posttest analysis results, there was no significant difference between the groups in the specified parameters ($p > 0.05$) (Table. 4,5). As a result of the tennis specific strength training exercises, It was determined that the service velocities developed as 5.96% in the static core group and 6.24% in the dynamic core group. These changes are statistically significant ($p < 0.05$). In the control group, on the other hand, this change occurred as 0.72%. It is statistically insignificant ($p > 0.05$) (Table. 6).

Table 3. The Demographic Characteristics of the Participants

Variables	n	Min	Max	X	Sd
Age (year)	36	10	14	11,75	1,48
Height (cm)	36	129	175	147,916	11,804
Body Weight (kg)	36	30,9	60,7	44,455	8,414
Training Age (year)	36	3,00	8,00	5,10	1,74
BMI (kg/m^2)	36	18,01	24,45	20,01	2,25

Table 4. One-Way Anova Analysis Table of the Pre-test Results of the Groups

Test	Group	X	Ss	F	p
Countermovement jumps (cm)	Static Core	25,10	6,81	1,06	0,36
	Dynamic Core	22,90	5,24		
	Control	26,31	5,31		
Flexibility (cm)	Static Core	18,39	3,96	0,11	0,90
	Dynamic Core	17,67	2,99		
	Control	18,16	4,41		
Handgrip strength dominant side (kg)	Static Core	20,03	6,29	0,33	0,72
	Dynamic Core	18,18	6,22		
	Control	20,23	7,86		
10 m sprint (s)	Static Core	1,98	0,12	0,35	0,71
	Dynamic Core	2,00	0,18		
	Control	2,03	0,10		
Y-Balance with right leg (cm)	Static Core	110,05	11,95	0,47	0,63
	Dynamic Core	105,02	11,58		
	Control	107,04	14,62		
Y-Balance with left leg (cm)	Static Core	0,30	10,90	0,30	0,74
	Dynamic Core	109,28	9,48		
	Control	109,16	11,60		
Seated medicine ball throw (cm)	Static Core	2,98	0,65	0,17	0,85
	Dynamic Core	2,88	0,49		
	Control	2,88	0,14		
Serve velocity (km.h^{-1})	Static Core	98,25	30,08	0,03	0,97
	Dynamic Core	95,58	30,87		
	Control	96,37	25,30		

According to Table 4, there was no significant difference between the pretest analysis results of the groups ($p > 0.05$). It can be said that the groups are homogeneous.

Table 5. One-Way Anova Analysis Table of the Posttest Results of the Groups

Test	Group	X	Ss	F	p
Countermovement jumps (cm)	Static Core	27,37	5,93	0,22	0,80
	Dynamic Core	25,94	5,01		
	Control	26,80	4,86		
Flexibility (cm)	Static Core	18,74	3,38	0,54	0,68
	Dynamic Core	17,85	3,18		
	Control	19,22	3,32		
Handgrip strength dominant side (kg)	Static Core	24,52	7,18	0,77	0,47
	Dynamic Core	23,03	6,12		
	Control	20,95	7,79		
10 m sprint (s)	Static Core	1,97	0,15	0,53	0,59
	Dynamic Core	1,99	0,17		
	Control	2,03	0,10		
Y-Balance with right leg (cm)	Static Core	113,67	12,87	0,37	0,69
	Dynamic Core	109,64	16,46		
	Control	108,77	14,96		
Y-Balance with left leg (cm)	Static Core	113,79	10,90	0,53	0,59
	Dynamic Core	111,11	9,33		
	Control	109,27	11,99		
Seated medicine ball throw (cm)	Static Core	3,11	0,66	0,63	0,54
	Dynamic Core	3,03	0,51		
	Control	2,89	0,16		
Serve velocity (km.h ⁻¹)	Static Core	104,11	31,51	0,18	0,83
	Dynamic Core	101,54	29,39		
	Control	97,07	25,75		

According to the posttest analysis results, there was no significant difference between the groups in the specified parameters ($p > 0.05$).

Table 6. Pretest-Posttest Within Groups T-test Analysis Table in Dependent Groups

Test	Test	Mean	Ss	t	p
Static Core Group	Countermovement jumps (cm)	Pretest	25,10	-2,86	0,02*
		Posttest	27,37		
	Flexibility (cm)	Pretest	18,39	-1,59	0,14
		Posttest	18,74		
	Handgrip strength dominant side (kg)	Pretest	20,03	-11,50	0,00*
		Posttest	24,52		
	10 m sprint (s)	Pretest	1,98	0,88	0,40
		Posttest	1,97		

Dynamic Core Group	Y-Balance with right leg (cm)	Pretest	110,05	11,95	-1,33	0,21
		Posttest	113,67	12,87		
	Y-Balance with left leg (cm)	Pretest	112,17	10,90	-3,99	0,00*
		Posttest	113,79	10,90		
	Seated medicine ball throw (cm)	Pretest	2,98	0,65	-6,43	0,00*
		Posttest	3,11	0,66		
	Serve velocity (km.h⁻¹)	Pretest	98,25	30,08	-4,00	0,00*
		Posttest	104,11	31,51		
	Countermovement jumps (cm)	Pretest	22,90	5,24	-3,65	0*
		Posttest	25,94	5,01		
	Flexibility (cm)	Pretest	17,67	2,99	-0,95	0,36
		Posttest	17,85	3,18		
Control Group	Handgrip strength dominant side (kg)	Pretest	18,18	6,22	-10,36	0*
		Posttest	23,03	6,12		
	10 m sprint (s)	Pretest	2,00	0,18	1,35	0,2
		Posttest	1,99	0,17		
	Y-Balance with right leg (cm)	Pretest	105,02	11,58	-2,61	0,02*
		Posttest	109,64	16,46		
	Y-Balance with left leg (cm)	Pretest	109,28	9,48	-5,2	0*
		Posttest	111,11	9,33		
	Seated medicine ball throw (cm)	Pretest	2,88	0,49	-8,83	0*
		Posttest	3,03	0,51		
	Serve velocity (km.h⁻¹)	Pretest	95,58	30,87	-7,83	0*
		Posttest	101,54	29,39		
Control Group	Countermovement jumps (cm)	Pretest	26,3	5,3	-1,42	0,18
		Posttest	26,8	4,9		
	Flexibility (cm)	Pretest	18,2	4,4	-2,69	0,02*
		Posttest	19,2	3,3		
	Handgrip strength dominant side (kg)	Pretest	20,2	7,9	-2,17	0,05*
		Posttest	21,0	7,8		
	10 m sprint (s)	Pretest	2,0	0,1	0,51	0,62
		Posttest	2,0	0,1		
	Y-Balance with right leg (cm)	Pretest	107,0	14,6	-3,59	0,00*
		Posttest	108,8	15,0		
	Y-Balance with left leg (cm)	Pretest	109,2	11,6	-0,13	0,90
		Posttest	109,3	12,0		
	Seated medicine ball throw (cm)	Pretest	2,9	0,1	-0,78	0,45
		Posttest	2,9	0,2		
	Serve velocity (km.h⁻¹)	Pretest	96,4	25,3	-1,64	0,13
		Posttest	97,1	25,8		

We look at the difference between the pre-test and post-test values of the static core group, when a significant difference was found between the pre-test and post-test values of countermovement jump, dominant side handgrip strength, Seated medicine ball throw, left leg y-balance and serve velocity values ($p < 0.05$). Accordingly, it can be said that static core exercises have an effect on jump and strength values.

We look at the pre-test and post-test values of the dynamic core group, when we also see countermovement jumps, dominant side handgrip strength, y balance right and left leg. It was observed that there was a significant difference ($p < 0.05$) in seated medicine ball throw and serve velocity values. Compared to the static core group, a significant difference was found in more parameters between the pre-test and post-test values in the dynamic core group. Accordingly, it can be said that dynamic core exercises are more effective in performance parameters than static core exercises. In the control group, it is seen that there is only a significant difference

($p < 0.05$) between flexibility and y balance with right leg values as the effect of unit training during the week of exercises. It can be said that this difference has an effect on the flexibility and lower extremity balance parameters of tennis training.

We look at the pre-test-post-test comparisons in all groups, when it can be said that core exercises do not have a significant effect on flexibility and sprint values of tennis athletes.

Table 7: Effect Size Values

Parametres	η^2
Countermovement jump (cm)	0,01
Flexibility (cm)	0,03
Handgrip strength test – DH*(kg)	0,05
10 m sprint (sn)	0,03
Y-Balance with right leg (cm)	0,03
Y-Balance with left leg (cm)	0,02
Seated medicine ball throw (m)	0,03
Service velocity (km/h)	0,04

*DH: Dominant hand

According to the effect size values, it can be said that the 8-week core training program applied to athletes has a low effect on countermovement jump, flexibility, 10m sprint, y balance, seated medicine ball throw, valueline, and medium effect on handgrip strength test and service velocity values.

Discussion

The aim of this study is to investigate the effects of static and dynamic core training on some motoric properties and tennis service speed of tennis athletes. According to the findings of the study; While there was a statistically significant increase ($p < 0.05$) between some motoric characteristics and tennis service speed of the training group athletes participating in the study and the flexibility pre-post test values of the control group, no significant difference was found in the other parameters of the control group ($p > 0.05$).

It has been determined that there are few studies in the literature investigating the effect of core muscles on the service speed of tennis athletes ²⁶ (Thompson et al., 2007; Lephart et al., 2007; Lust et al., 2009; Hamed and Hassan 2017). In this study, a significant correlation was found between the speed of the ball and the dominant hand isometric force in the static and dynamic core group ($p < 0.05$), and a non-significant relationship in the control group ($p > 0.05$). In a study similar to this study, it was found that while the service speed values of young tennis athletes increased significantly compared to the control group as a result of 6-week strength training, the service hits did not change. ²⁶ Similarly, the positive effects of core exercises have been clearly demonstrated in most of the studies on hitting and launching speed (belonging to the shoulder joints). Thompson et al. (2007), in a study conducted on golf athletes, it was found that after 8 weeks of functional training, there were significant increases in golf club kick speeds. In another study on the subject, a training program consisting of open and closed chain exercises was applied to the players of the 3rd League college baseball team for 6 weeks. In the study, a group performed extra core stabilization exercises. According to the study findings, significant improvements were reported in the launch speed of the athletes in the group that performed extra core stabilization exercises. ³⁵ Sever et al. (2017), an 8-week core training program was applied to some of the male tennis players in the 11-13 age group and at the end of the process, it was determined that the accurate service speed of the core training group increased by 6.6%.

Lephart et al. (2007), in their research on golf athletes, reported that core exercises applied for 8 weeks increased the swing speed of the golf club by 5.2%, the speed of the ball by 5% and the total distance traveled by the ball was 6.8%. Szymanski et al. (2007), similar characteristics were measured in the study of baseball athletes and statistically significant increases were found in the swing speed and swing distance of the baseball bat. Hamed and Hassan (2017), in their similar study, also applied an 8-week core training program to athletes and reported that there was a 28% improvement in dunk hitting speed and 14% in dunk hitting rates of badminton athletes. In another similar study by Eren (2019), it was found that the 8-week core training program applied to tennis athletes caused significant improvements in the forehand and backhand ground strike speeds of athletes.

In our study; tennis strength program was designed so as to include both upper and lower extremity exercises and service simulations. In this respect, by using the lower extremities, the produced strength during service movement was also transferred instead of using only the upper extremity muscle groups. For high velocity services, trunk rotation should be maintained, which enables power production. Energy transfer from the lower extremity to the upper extremity through kinetic chain is an assisting factor in power production and medicine balls and core exercises are recommended to perform in power production (Ellenbecker and Roetert, 1999). For tennis players, the speed of transition from the lower extremity to the upper extremity, achieving trunk rotation and the transfer of the strength to the racket and finally to the ball are considerably important.

Medicine ball throwing test was used in our study, where we examined the effect of core training on upper extremity strength, as used in the literature. According to the posttest findings of the study, medicine ball throwing value of 10-14 age group female and male tennis athletes was determined as 3.01. It is seen that there are inconsistencies in this regard in the literature. Gül et al. (2006), while the medicine ball throwing value of 10-12 age group male students was 6.14 m, Aslan et al. (2007), the throwing values of 8-13-year-old male students were found to be 3.37 m. Arabacı et al. (2008) The values of the 11-12 age group 112 girls and boys were found to be 8.04 m for boys and 6.6 m for female students. Erikoglu et al. (2009), in the measurements made according to the Eurofit test battery, the medicine ball throwing performance average of 40 students in the age group of 12 was reported as 2.82 m for girls and 2.81 m for boys. According to these results, our results were lower than all other results except Eriklioglu's and Ayan's studies. Similar to our study, only the sitting medicine ball throwing method was used in the study of Ayan and Mulazimoglu (2009). But Eriklioglu et al. (2009), the method of ball throwing technique above the knees was used in their study. In other studies, it is understood that the standing throwing method was used, even though it was not clearly explained in all of them. In addition, the weight of the medicine ball used in most studies was not specified. Due to these factors, it was difficult to compare our study with the literature.

In the literature, it has been determined that the studies examining the effect of core training on flexibility differ from each other. In the study conducted by Pense and Serpek (2010) on female basketball players aged 14-16, while the flexibility values of female athletes playing basketball were 28.14 cm, it was 24.01 cm for those who did not. Aktas et al. (2011) in their study on male tennis players aged 12-14, the average flexibility values were found to be 17.70 cm in the experimental group and 18.05 cm in the control group. In Yilmaz's (2014) study, the average flexibility for the 13-16 age group was found to be 18.70 cm for women and 14.58 cm for men. In the study conducted by Diker and Muniroglu (2016) on football players aged 10-12, the average flexibility values were reported as 16.40 cm. In Bagci's (2016) study on 12-14 age group wrestlers, the average flexibility values were found to be 24.35 cm in the experimental group and 20.80 cm in the control group. Diker et al. (2017) found flexibility values as 12.26 cm in females and 10.15 cm in males in her study on 9-13 age group tennis players. According to the posttest results of our study, the flexibility values of the participants were determined as 18.74 cm in the static core group, 17.85 cm in the dynamic core group and 19.2 cm in the control group. It can be said that these results are in line with the results in the literature.

The vertical jump results of the participants are examined in the literature, different results are encountered. According to the posttest findings of our study, the vertical jump values of the participants were 27.37 cm in the static core group, 25.94 cm in the dynamic core group, and 26.8 cm in the control group. In terms of the vertical jump performance of the athletes, a significant improvement was found between the pre-test and post-test values in the static and dynamic core group ($p < 0.05$) and a non-significant ($p > 0.05$) improvement in the control group. Behm et al. (2008) found that the vertical jump values of 12 age group tennis players were 37.09 cm. In Bagci's (2016) study on wrestlers in the 12-14 age group, the average vertical jump values were found as 43.65 cm in the experimental group and 35.10 cm in the control group.

In the literature, it has been determined that there are few studies showing the effects of core exercises on the sprint performance of athletes. In the study, it was determined that there was no significant improvement between the pre-test and post-test values of the athletes in terms of 10 m sprint values ($p > 0.05$). In the study by Steffen et al. (2008) in which female soccer players evaluated core stabilization, balance, dynamic stabilization and eccentric hamstring strength, it was found that athletes did not have significant improvements in lower extremity isokinetic strength, isometric hip strength, vertical jump, 40m sprint and shot distances. In another similar study by Sever (2016), the effect of static and dynamic core exercises on the speed and quickness performance of football players was investigated. It was determined that there was no significant improvement between the pre-test and post-test values of the athletes in terms of 10 m sprint values.

However, contrary to the scientific data that positively affect the performance above, in some scientific studies on the subject, core training; max. VO₂, running economies, ⁴⁶ lower extremity isokinetic strength, 40m sprint,

jump force,⁴⁷ abdominal force,¹⁹ concentric force,²⁰ medicine ball throwing backwards and vertical jumping⁴² have been reported to have a significant effect on factors affecting sportive performance.

Conclusion and Recommendations

As a result, in the study, it was determined that core training has positive effects on the ground strike speed and some motoric properties of the athletes due to their functional structure.

It is very important to include strength, which is one of the important factors affecting performance in tennis, in training programs in terms of being developable. Core region strength is very important in terms of being the starting point of force and balance in a branch such as tennis where there is a lot of change of direction, mobility and therefore imbalance. In addition, its protective feature from possible injuries and its ability to be used in the post-injury period are among the things that should be known. For these reasons, the inclusion of core exercises in the training programs of athletes, trainers and conditioners who work with tennis athletes can contribute to the performance development of athletes.

Acknowledgment

The author would like to thank all athletes for their willingness to participate in this study. There was no grant funding for this study.

Conflicts of interest

The authors declare that there is no conflict of interest about this manuscript.

References

1. Akşit T, Özkol MZ. Investigation of the relationship between match performance and field tests in 8-10 years old tennis players, 9 International Sport Sciences Congress, 3 - 5 November, 2006, Antalya
2. Aktaş F, Akkuş H, Harbili E, Harbili S. The effect of strength training on some motor abilities in 12- 14 years-old male tennis players, Nigde University J Phys Edu Sport Sci. 2011; (5):7-11.
3. Akuthota V, Ferreiro A, Moore T, Fredericson M. Core stability exercise principles. Curr Sports Med Rep. 2008; 7(1): 39-44.
4. Arabacı R, Koparan Ş, Öztürk F, Akın M. Examining the I. level results of the talent selection in sports and directing to sports project for the olympic games (Bursa sample), e-Journal of New World Sciences Academy. 2008, 3(2): 86- 98.
5. Arslan F, Kaplan T, Sanioglu A. Determination of ability and performance profiles of 8-13 age group students in primary education schools, 4th International Mediterranean Sport Sciences Congress, 2007, Ankara.
6. Asgharifar S. The comparison of core stability and agility between female handball players and ballet dancers. Master Thesis. Hacettepe University, Health Sciences Institute, 2009, Ankara.
7. Ayan V, Mülazimoğlu O. Talent selection in sports and assessment of the physical characteristics and some performance profiles of male children between 8-10 years old in guidance to sports (Ankara sample). F.Ü. J Health Sci.Med. 2009; 23 (3): 113-118.
8. Bağcı O. The effects of 8-week strength training on some physical fitness parameters in wrestlers between the ages of 12-14. Master Thesis. Selcuk University, Health Sciences Institute. 2016, Konya.
9. Barber-Westin SD, Hermeto A, Noyes FR. A six-week neuromuscular and performance training program improves speed, agility, dynamic balance, and core endurance in junior tennis players. J Athl Enh. 2015; 4(1): 1-8.
10. Behm DG, Faigenbaum AD, Falk B, Klentrou P. Canadian society for exercise physiology position paper: resistance training in children and adolescents. Appl. Physiol. Nutr. Metab. 2008; 33: 547-561.
11. Bergmark A. Stability of the lumbar spine. acta orthopaedica, 60 (s230), 1989;1-54. <http://doi.org/10.3109/17453678909154177>.
12. Chad H, Andrew W, Mark D, Patricia SA, Joseph B, Kent A. The seated medicine ball throw as a test of upper body power in older adults. J Strength Cond Res, 2011; 25(8): 2344-48.
13. Chimera NJ, Smith CA, Warren M. Injury history, sex, and performance on the functional movement screen and y balance test. J Ath Train. 2015; 50(5):475-485.
14. Crespo M, Miley D. Advanced Coach's Handbook. Vural, B., Bulca, Y. (Translation). Ata Ofset Printing, 2009, Ankara.

15. Genc H, Cigerci AE, Sever O. Effect of 8-week core training exercises on physical and physiological parameters of female handball players. *Phys edu student*, 2019;23(6):297–305. <https://doi.org/10.15561/20755279.2019.0604>
16. Demirkan E, Koz M, Kutlu M, Favre M. Comparison of physical and physiological profiles in elite and amateur young wrestlers. *J Strength Cond Res*, 2015;29(7):1876-1883. <https://doi.org/10.1519/JSC.0000000000000833>
17. Diker G, Müniroğlu S. Investigation of physical features of young players who are between 8-14 according to age, Ankara Üniv. Sport Sci Fac, 2016;14 (1), 45-52.
18. Diker G, Zileli R, Özkamçı H, Ön S. Evaluation of some physiological and biomotor features of young tennis players, *Int J Sport Exe Train Sci, IJSETS*, 2017; 3(1); 25–32.
19. Donahoe-Fillmore B, Hanahan NM, Mescher ML, Clapp ED, Addison NR, Weston CR. The effects of a home pilates program on muscle performance and posture in healthy females: a pilot study, *J Women's Health Phys Ther*, 2007; 31(2):6–11.
20. Drinkwater EJ, Pritchett EJ, Behm DG. Effect of instability and resistance on unintentional squat-lifting kinetics. *Int J Sports Phys Perf*, 2007; 2(4): 400-13. doi: 10.1123/ijsp.2.4.400.
21. Ellenbecker TS, Roetert EP. Testing isokinetic muscular fatigue of shoulder internal and external rotation in elite junior tennis players. *J Orth Sports Phys Ther*, 1999; 29: 275-281.
22. Elliott B, Dawson B, Pyke F. The energetics of single tennis. *J Hum Mov Stud*, 1985; 11(1): 11-20.
23. Eren E. Examination of the effect of 8 week core training on groundstroke velocities and some motor parameters in 12-14 age group tennis players, Master Thesis. Bartın University, Social Sciences Institute 2019, Bartın.
24. Erikoğlu G, Özkamçı H, Golmoghani N, Suveren C, Tot T, Şahin N, Selçuk Z, Zorba E, Atalay Güzel N. Assesment of performance parameters with eurofit test battery according to gender and age groups at 7-12 years old children. *Gazi J Phys Edu Sport Sci*. 2009; 14(4): 49-64.
25. Fernandez FJ, Sanz RD, Mendez VA. A Review of the activity profile and physiological demands of tennis match play. *Strength Cond J*, 2009; 31(4): 15-26. DOI: 10.1519/SSC.0b013e3181ada1cb.
26. Fernandez J, Ellenbecker T, Sanz-Rivas D, Ulbricht A, Ferrauti A. Effects of a 6-week junior tennis conditioning program on service velocity. *J Sports Sci Med*. 2013; 12, 232-239.
27. Gül GK, Seyrek E, Sugurtin M. Comparison of some anthropometric and motoric properties between boys 10-12 years old basic athletics sports training and not. 9 International Sport Sciences Congress, Muğla, 3-5 November, 2016, 181.
28. Hamed I, Hassan I. The effect of core stability training on dynamic balance and smash stroke performance in badminton players. *Int J Sports Sci Phys Edu*. 2017; 2(3): 44-52. doi: 10.11648/j.ijsspe.0203.12.
29. Handzel TM. Core training for improved performance. *NSCA's Performance Training Journal*. 2012; 2(6): 26-30.
30. Hornery DJ, Farrow D, Mujika I, Young WB. Caffeine, carbohydrate, and cooling use during prolonged simulated tennis. *Int J Sports Phys Perf*, 2007; 2: 423-438 [PubMed] [Google Scholar]
31. Karagöz Ş, Erdoğan M, Celepaksoy F, Bozlak K, Alkan F. Inspection of the affects of some physical and physiological parameters on groundstroke performances of junior tennis players, *Niğde Uni J Phys Edu Sport Sci*, 2015, (9):19-25.
32. Kibler WB, Press J, Sciascia A. The role of core stability in athletic function. *Sports Med*, 2016; 36(3): 189-198.
33. Kovacs MS, Ellenbecker TS. A performance evaluation of the tennis serve: implications for strength, speed, power, and flexibility training. *Strength Cond J*. 2011; 33(4): 22-30.
34. Lephart SM, Smoliga JM, Myers JB, Sell TC, Tsai Y. An eight-week golf-specific exercise program improves physical characteristics, swing mechanics, and golf performance in recreational golfers. *J Strength Cond Res*, 2007; 21: 860–869.
35. Lust KR, Sandrey MA, Bulger SM, Wilder N. The effects of 6-week training programs on throwing accuracy, proprioception, and core endurance in baseball. *J Sport Rehabil*, 2009;18(3):407-426. <https://doi.org/10.1123/jsr.18.3.407>
36. McGill S. Core training: evidence translating to better performance and injury prevention. *Strength Cond J*, 2010; 32 (3): 33-46.
37. McCurdy KW, Langford GA, Doscher MW, Wiley LP, Mallard KG. The effects of short-term unilateral and bilateral lower-body resistance training on measures of strength and power. *J Strength Cond Res*, 2005; 19(1): 9–15.

38. Molina-López J, Zarzuela IB, SáezPadilla J, Tornero-Quñones I, Planells E, Mediation effect of age category on the relationship between body composition and the physical fitness profile in youth handball players. *Int. J. Environ. Res. Public Health* 2020; 17: 2350; doi:10.3390/ijerph17072350
39. Nadler SF, Malanga GA, Bartoli LA, Feinberg JH, Prybicien, M, DePrince M. Hip muscle imbalance and low back pain in athletes: influence of core strengthening. *Med Sci Sports Exe*, 2020; 34(1): 9-16.
40. Nieman D. Exercise testing and prescription: A health related approach. 7th ed. New York: McGraw Hill; 2011.
41. Pense M, Serpek B. The determination of female 14-16 years old basketball players biomotor and physiological features by Eurofit test battery. *Selçuk Ün J Phys Edu Sport Sci*, 2010; 12:191-8.
42. Schibek JS. The effect of core stabilization training on functional performance in swimming. ProQuest Digital Dissertation [online]. 2001, ATT 7742498.
43. Sever O. Comparison of static and dynamic core exercises effects on speed and agility performance in soccer players, Gazi University, health sciences institute, doctoral thesis, 2016, Ankara.
44. Sever O, Kır R, Yaman M. The impact of periodized core training program on accurate service velocity of male tennis players aged 11-13. *J Hum Sci*, 2017;14(3):3022. <https://doi.org/10.14687/jhs.v14i3.4760>.
45. Smart J, McCurdy K, Miller B, Pankey R. The effect of core training on tennis serve velocity. *J Strength Cond Res*. 2011; 25(1): 22-28.
46. Stanton R, Reaburn PR, Humphries B. The effect of short-term swiss ball training on core stability and running economy, *J Strength Cond Res*, 2004; 18(3):522-8. doi: 10.1519/1533 4287(2004) 18<522: TEOSSB> 2.0.CO;2.
47. Steffen K, Bakka HM, Myklebust G, Bahr R. Performance aspects of an injury prevention program: a ten-week intervention in adolescent female football players. *Scand J Med Sci Sports*, 2008; 18 (5): 596-604.
48. Stiffler MR, Bell DR, Sanfilippo JL, Hetzel SJ, Pickett KA, Heiderscheit BC. Star excursion balance test anterior asymmetry is associated with injury status in division I collegiate athletes. *J Orthop Sports Phys Ther*. 2017; 47(5): 339-346.
49. Szymanski DJ, McIntyre JS, Szymanski JM, Bradford TJ, Schade RL, Madsen NH, Pascoe DD. Effect of torso rotational strength on angular hip, angular shoulder, and linear bat velocities of high school baseball players. *J Strength Cond Res*, 2007; 21(4): 1117-1125.
50. Thompson CJ, Cobb KM, Blackwell J. Functional training improves club head speed and functional fitness in older golfers. *J Strength Cond Res*, 2007; 21: 131–137.
51. Willardson JM. Core stability training: Applications to sports conditioning programs. *J Strength Cond Res*, 2007; 21(3): 979-985. <https://doi.org/10.1519/R-20255.1>
52. Yıldizer G. Effects of 8-week core stability training on junior male soccer players static balance performance. Master Thesis. Middle East Technical University, Social Sciences Institute, 2014, Ankara.
53. Yılmaz M. Investigation of the effect of 8-week strength training on physical fitness parameters in children between 13-16 years old. Master Thesis. Selçuk University, Health Sciences Institute, 2014, Konya.

INVESTIGATION OF THE RELATIONSHIP BETWEEN THE ATTITUDE TOWARDS DANCE AND HAPPINESS LEVELS OF INDIVIDUALS ATTENDING DANCE EDUCATION

Asst. Prof. Dr. Hayri AKYUZ

Bartın University Faculty of Sport Sciences

Corresponding author: akyuz61@live.com

Assistant professor, Faculty of Sport Sciences, Bartın University, Bartın, Turkey.

ABSTRACT

The purpose of this study is to examine the investigation of the relationship between the attitude towards dance and happiness levels of individuals attending dance education and to determine the differentiation status of attitudes towards dance and happiness in terms of demographic variables. In the research, "Descriptive (Figurative) and Relational Search Model" was used. The research group consists of 228 (132 women, 96 men) people who participated in the dance education in Bartın Dance Group in April and May 2020 and were selected by simple random sampling method. As a data collection tool, "Personal Information Form", "Attitude Scale Towards Dance (ASTD)" and "Oxford Happiness Scale Short Form (OHS)" were used. In research findings, a significant difference was found in OHS, ASTD and sub-dimensions in terms of gender variable ($p < 0.05$). These significant differences are in favor of female participants in terms of ASTD and male participants in terms of OHS. In another finding, a low level positive and significant correlation was found in OHS, ASTD and sub-dimensions in terms of age variable ($p < 0.05$). Moreover, a significant difference was found in OHS in terms of perceived income variable ($p < 0.05$). This significant difference is in favor of the high income group between high and low, high and middle income groups. Furthermore, a significant difference was found in ASTD and awareness sub-dimension in terms of education status variable ($p < 0.05$). These significant differences are in favor of the undergraduate group between undergraduate and high school and below groups. On the other hand, a significant difference was found between the frequency of participation in leisure activities variable and the total score averages of OHS, the total score averages and sub-dimensions of ASTD. Finally, a low level positive correlation was found between the total score averages of OHS and the total score averages of ASTD, "avoidance" and "motivation" sub-dimensions. As a result, it was determined that as the attitude towards dance levels of the participants increased, their happiness levels increased.

Keywords: Dance education, Attitude towards dance, Happiness

INTRODUCTION

Dance has a very important place in human life. This importance stems from the fact that dance is a form of communication rather than an element that entertains people in leisure. Since the first human being, all people have conveyed their feelings, thoughts, experiences and knowledge through dance and used dance as a means of expression.¹⁷ Many definitions have been made by different researchers and authors in the literature regarding the concept of dance, and some of these definitions are as follows. The concept of dance has been defined as a special expression of human motor behavior according to Hugel et al. (1999).¹¹ On the other hand, Cantekin (2011) defined the concept of dance as the art of expressing the individual with movements.⁷

Kraus and Chapman cite eight main goals of dance education:

- Thanks to movement training, it regulates health and movement ability.
- Improves personal creativity.
- It makes students open to aesthetic experiences.
- It provides a rich cultural and unifying environment.
- Provides social order.
- It helps students to spend their leisure fun and full in the future.
- Provides more career chances.
- It provides the opportunity to exercise more (Kraus & Chapman, 1991; cited by: Lin, 2005).¹²

Attitude is an acquired internal condition that affects an individual's choice in individual activities against any group thing, individuals, events and a wide variety of situations.¹⁵ According to Unal (1981), attitude can be considered as "a reaction or preparation of a certain type of attention or activity".¹⁶ Therefore, the attitude itself is not a behavior but a precondition for behavior. According to him, attitudes are the guide for movement; mental states in which new experiences are consulted and evaluated before a reaction is made.

Additionally, some researchers use some concepts such as involvement in explaining the attitude levels of individuals.^{9,3} On the other hand, in the literature happiness is defined as the fact that the positive emotions that a person feels more than the negative ones and the satisfaction from life in general.¹³

In the light of the literature, it is thought that the possible positive effects of dance education on individuals will affect the attitudes of individuals positively. Based on the association of this situation with the happiness of individuals, the purpose of this study is to examine the investigation of the relationship between the attitude towards dance and happiness levels of individuals attending dance education and to determine the differentiation status of attitudes towards dance and happiness in terms of demographic variables.

METHOD

Research Model, Scope and Limitations

- In the research, "Descriptive (Figurative) and Relational Search Model" was used.
- The research is limited to April and May 2020.
- Within the scope of the research, there are individuals who participated in dance education in Bartın Dance Group in Bartın province.

Purpose of the Research

The purpose of this study is to examine the investigation of the relationship between the attitude towards dance and happiness levels of individuals attending dance education and to determine the differentiation status of attitudes towards dance and happiness in terms of demographic variables.

Data Collection Tools

Three different tools were used under this title. These are "Personal Information Form", "Attitude Scale Towards Dance (ASTD)" and "Oxford Happiness Scale Short Form (OHS)". Research data were obtained through Google form.

Personal Information Form

The form consists of 5 demographic questions: gender, age, perceived income, educational status and frequency of participation in leisure activities

Attitude Scale Towards Dance (ASTD)

The scale was developed by Ayyıldız Durhan in 2019.⁴ The Attitude Scale Towards Dance consists of 3 sub-dimensions and 39 items. It is a 5-point Likert type scale. The sub-dimensions with internal consistency coefficients of 0.96, 0.93, and 0.90, respectively, were named as awareness, avoidance and motivation towards dance. Participants respond to the 5-point Likert-type scale as (1) Strongly Disagree - (5) Fully Agree.

Oxford Happiness Scale Short Form (OHS)

The scale was developed by Hills and Argyle in 2002.¹⁰ Turkish adaptation of the scale was made by Dogan and Akinci Cotok in 2011. The Oxford Happiness Scale Short Form consists of a single sub-dimension and 7 items. It is a 5-point Likert type scale. Participants respond to the 5-point Likert-type scale as (1) I do not agree at all - (5) I completely agree.⁸

Research Group

The research group consists of 228 (132 women, 96 men) people who participated in the dance education in Bartın Dance Group in April and May 2020 and were selected by simple random sampling method.

Data Analysis Techniques

The analysis of the data was carried out using computer SPSS (Statistical Package for Social Sciences) 23.0 package program. Cronbach's Alpha test was used in reliability analysis. Arithmetic mean, standard deviation, frequency and percentage values were analyzed for personal information. T-test and ANOVA for differentiation status, Correlation test for relationship status were used. In addition, TUKEY test was used to describe the differences between groups. The level of significance was evaluated as ($p < 0.05$) in the analysis for the research.

Reliability

Table I. Internal Consistency Coefficients of ASTD and OHS

Sub-Dimensions and Total Values	Item Numbers	Cronbach Alpha Internal Reliability Coefficient
Awareness	21 items	,823
Avoidance	10 items	,896
Motivation	8 items	,868
ASTD Total	39 items	,760
OHS Total	7 items	,872

It can be stated that these values obtained in Table 1 are at a statistically reliable level. ⁶

FINDINGS

Table 2. Demographic Values Table

Gender	N	%
Female	132	57,9
Male	96	42,1
Education Status	N	%
High school and below	45	19,7
Undergraduate	147	64,5
Postgraduate	36	15,8
Frequency of Participation in Leisure Activities	N	%
Rarely	42	18,4
Sometimes	111	48,7
Often	75	32,9
Perceived Income	N	%
Low	57	25,0
Middle	108	47,4
High	63	27,6
Variables	x	Ss
Age	26,6053	8,67638

According to Table 2, 57.9% of the participants are women and 42.1% are men. 45 of the participants have high school and below, 147 undergraduate and 36 postgraduate level education. 42 of the participants stated that they attend leisure activities rarely, 111 sometimes and 75 often. In terms of the perceived family income variable, 57 of the participants have low, 108 middle and 63 high income. The average age of the individuals participating in dance education is 26.6053 ± 8.67638 .

Table 3. T-Test Results for Participants' Attitudes Towards Dance and Happiness Levels According to the Gender Variable

Dimensions	Gender	N	X	S	sd	t	p
Awareness	Female	132	4,6970	,36929	226	4,667	,000
	Male	96	4,3869	,56964			
Avoidance	Female	132	4,6636	,41504	226	3,274	,001
	Male	96	4,4281	,60952			
Motivation	Female	132	3,9574	,76649	226	3,341	,001
	Male	96	3,5273	1,07853			
ASTD	Female	132	4,5367	,38920	226	4,558	,000
	Male	96	4,2212	,59164			
OHS	Female	132	3,7987	,64734	226	-2,244	,026
	Male	96	4,0312	,85242			

When Table 3 was examined in terms of gender variable, a significant difference was found in OHS, ASTD and sub-dimensions ($p < 0.05$). These significant differences are in favor of female participants in terms of ASTD and male participants in terms of OHS.

Table 4. Correlation Test Results for Participants' Attitudes Towards Dance and Happiness Levels According to the Age Variable

	Awareness	Avoidance	Motivation	ASTD	OHS
Age	,180**	,192**	,304**	,258**	,356**

When Table 4 was examined in terms of age variable, a low level positive and significant correlation was found in OHS, ASTD and sub-dimensions ($p < 0.05$).

Table 5. ANOVA Test Results for Participants' Attitudes Towards Dance and Happiness Levels According to Perceived Income Variable

Dimensions	Source of Variance	Sum of Squares	sd	Average of Squares	F	p	Significant Difference
Awareness	Between Groups	,455	2	,227	,954	,387	
	Within Groups	53,581	225	,238			
	Total	54,035	227				
Avoidance	Between Groups	,575	2	,288	1,072	,344	
	Within Groups	60,367	225	,268			
	Total	60,942	227				
Motivation	Between Groups	1,872	2	,936	1,075	,343	
	Within Groups	195,876	225	,871			
	Total	197,748	227				
ASTD	Between Groups	,043	2	,022	,083	,921	
	Within Groups	58,589	225	,260			
	Total	58,632	227				
OHS	Between Groups	5,711	2	2,855	5,300	,006	High>Low High>Middle
	Within Groups	121,220	225	,539			
	Total	126,930	227				

When Table 5 was examined in terms of perceived income variable, a significant difference was found in OHS ($p < 0.05$). This significant difference is in favor of the high income group between high and low, high and middle income groups.

Table 6. ANOVA Test Results for Participants' Attitudes Towards Dance and Happiness Levels According to Education Status Variable

Dimensions	Source of Variance	Sum of Squares	sd	Average of Squares	F	p	Significant Difference
Awareness	Between Groups	1,528	2	,764	3,273	,040	Undergraduate > High school and below
	Within Groups	52,507	225	,233			
	Total	54,035	227				
Avoidance	Between Groups	,543	2	,271	1,011	,366	
	Within Groups	60,399	225	,268			
	Total	60,942	227				
Motivation	Between Groups	4,326	2	2,163	2,516	,083	
	Within Groups	193,423	225	,860			
	Total	197,748	227				
ASTD	Between Groups	1,510	2	,755	2,974	,053	Undergraduate > High school and below
	Within Groups	57,122	225	,254			
	Total	58,632	227				
OHS	Between Groups	1,703	2	,851	1,530	,219	
	Within Groups	125,228	225	,557			
	Total	126,930	227				

When Table 6 was examined in terms of education status variable, a significant difference was found in ASTD and awareness sub-dimension ($p < 0.05$). These significant differences are in favor of the undergraduate group between undergraduate and high school and below groups.

Table 7. ANOVA Test Results for Participants' Attitudes Towards Dance and Happiness Levels According to Frequency of Participation in Leisure Activities Variable

Dimensions	Source of Variance	Sum of Squares	sd	Average of Squares	F	p	Significant Difference
Awareness	Between Groups	7,853	2	3,927	19,130	,000	Often>Sometimes
	Within Groups	46,182	225	,205			

	Total	54,035	227				Often>Rarely
Avoidance	Between Groups	7,358	2	3,679	15,447	,000	Often>Sometimes
	Within Groups	53,585	225	,238			
	Total	60,942	227				Often>Rarely
Motivation	Between Groups	63,916	2	31,958	53,728	,000	Often>Sometimes
	Within Groups	133,832	225	,595			
	Total	197,748	227				Often>Rarely
ASTD	Between Groups	14,213	2	7,106	35,997	,000	Often>Sometimes
	Within Groups	44,419	225	,197			
	Total	58,632	227				Often>Rarely
OHS	Between Groups	17,762	2	8,881	18,304	,000	Often>Sometimes
	Within Groups	109,169	225	,485			
	Total	126,930	227				Often>Rarely

When Table 7 was examined in terms of frequency of participation in leisure activities variable, a significant difference was found in OHS, ASTD and sub-dimensions ($p<0.05$). These significant differences are in favor of the often group between often and sometimes and often and rarely groups.

Table 8. Results of the Correlation Test Regarding the Relationship Between ASTD and OHS

	Awareness	Avoidance	Motivation	ASTD
OHS	,097	,149**	,163**	,151**

According to Table 8, when the relationship between ASTD and OHS was examined, a low level positive and significant correlation was found between ASTD, avoidance and motivation sub-dimensions and OHS ($p<0.05$).

DISCUSSION

According to demographic variables, 57.9% of the participants are women and 42.1% are men. 45 of the participants have high school and below, 147 undergraduate and 36 postgraduate level education. 42 of the participants stated that they attend leisure activities rarely, 111 sometimes and 75 often. In terms of the perceived family income variable, 57 of the participants have low, 108 middle and 63 high income. The average age of the individuals participating in dance education is 26.6053 ± 8.67638 .

A significant difference was found in OHS, ASTD and sub-dimensions in terms of gender variable ($p<0.05$). These significant differences are in favor of female participants in terms of ASTD and male participants in terms of OHS. Within the scope of this finding, it can be said that female individuals participating in dance education have higher attitude levels towards dance and male individuals have higher levels of happiness. This situation can be justified by the fact that dance activities are more appropriate for the nature of women. It can be said that the participation of men with little dance experience in dance activities affects happiness positively. Yoncalik (2007), in his study stated that female students' attitudes towards dance are more positive than male students.¹⁸ This finding in the literature supports the research findings. On the contrary, Akyuz et al. (2017) found no significant difference between the gender variable and happiness in their study.¹ This finding differs with the research findings.

In another finding, a low level positive and significant correlation was found in OHS, ASTD and sub-dimensions in terms of age variable ($p<0.05$). According to this finding, it can be said that as the age of the individuals participating in dance education increases, their attitude towards dance and happiness level increase. It can be explained by the positive effect of the life experience that comes with the age increase on both the attitude towards dance and happiness levels. Moreover, as we get older, people think less about their bad experiences and become more in control of their emotions can be seen as some of the reasons for happiness. Ryff (1989) concluded that subjective well-being increases with age and does not decrease after a certain age.¹⁴ The finding coincides with the research findings.

Additionally, a significant difference was found in OHS in terms of perceived income variable ($p<0.05$). This significant difference is in favor of the high income group between high and low, high and middle income groups. We can say that individuals with high income groups have an advantage in participating in different and various types of activities. However, this finding can be explained by many reasons such as high-income individuals having the opportunity to take better care of themselves, feel more free and self-confident, reach their basic needs more easily, and have a higher standard of living. When the study supporting the research finding was examined, Aydemir (2008) concluded in her study that those with very good income are happier than others.²

Moreover, a significant difference was found in ASTD and awareness sub-dimension in terms of education status variable ($p<0.05$). These significant differences are in favor of the undergraduate group between undergraduate and high school and below groups. The determination of a significant difference in favor of the

individuals in the undergraduate group can be explained by the fact that these individuals participate in dance-oriented activities during their undergraduate education and gain experience in dance in this process. Since there is not much research on the scale of attitude towards dance in the literature, inference and interpretation of the finding are stated rather than studies supporting this finding. On the other hand, Bulbul and Giray (2011) found a significant relationship between education level and happiness variables in their research and found that individuals with higher education level are closer to happiness.⁵ Considering research findings and the study supporting the research findings in the literature, it has been revealed how important the education level is on the happiness levels of individuals.

In another finding, a significant difference was found in OHS, ASTD and sub-dimensions in terms of frequency of participation in leisure activities variable ($p < 0.05$). These significant differences are in favor of the often group between often and sometimes and often and rarely groups. Participation in leisure activities brings along many positive emotions and attitudes in individuals. This situation may be a reason for positive results in favor of individuals who frequently participate in leisure activities.

Finally, when the relationship between ASTD and OHS was examined, a low level positive and significant correlation was found between ASTD, avoidance and motivation sub-dimensions and OHS ($p < 0.05$). According to this finding, it can be said that as the attitude levels of the participants towards dance increase, their happiness levels also increase. In this context, it was found that participants' attitudes towards dance activities are one of the factors that positively affect their happiness level.

CONCLUSION

In a general outcome evaluation, a difference was found in terms of variables such as gender, perceived family income, educational status and participation in leisure activities. On the other hand, a relationship was found between the age variable and the scales sub-dimensions and total scores. Finally, a relationship was determined between the two scales. As a result, it was determined that as the attitude towards dance levels of the participants increased, their happiness levels increased.

REFERENCES

1. Akyuz H, Yasarturk F, Aydin I, Zorba E, Turkmen M. The investigation of the relationship between university students' levels of life quality and happiness. *International Journal of Cultural and Social Studies (IntJCSS)*. 2017;3(SI):253-262.
2. Aydemir RE. Religiosity and Happiness Relationship (First Adult Period). Master Thesis. Ondokuz Mayıs University Institute of Social Sciences. Samsun. 2008.
3. Aydin I, Yasarturk F. Level of involvement of fitness participants towards recreational activities: The status with refence to various demographics of them. *International Journal of Science Culture and Sport*. 2016;4(20):704-711.
4. Ayyildiz-Durhan T. Development of attitude scaletowards dance. *OPUS - International Journal of Society Research*. 2019;11(18):676-692. doi: 10.26466/opus.552080
5. Bulbul S, Giray S. Analysis of the relationship structure between sociodemographic characteristics and perception of happiness. *Ege Academic Overview*. 2011;11(SI):113-123.
6. Can A. Quantitative Data Analysis in the Scientific Research Process with SPSS. (Third Edition). Ankara: Pegem Academy. 2014.
7. Cantekin D. Analysis of Terms Related to Movement Used in Dance. Master Thesis. Sakarya University Institute of Social Sciences. Sakarya. 2011.
8. Dogan F, Akinci-Cotok N. Adaptation of the short form of the oxford happiness questionnaire into Turkish: A validity and reliability study. *Turkish Journal of Psychological Counseling and Guidance*. 2011;4(36):165-172.
9. Gurbuz B, Cimen Z, Aydin I. Leisure involvement scale: Validity and reliability study of Turkish form. *Ankara University Journal of Physical Education and Sport Sciences Spormetre*. 2018;16(4):256-265.
10. Hills P, Argyle M. The oxford happiness questionnaire: A compact scale for the measurement of psychological well-being. *Personality and Individual Differences*. 2002;33:1073-1082.
11. Hugel F, Cadopi M, Perrin P. Postural control of ballet dancers: a specific use of visual input for artistic purposes. *International Journal Sports Medicine*. 1999;20:86-92.
12. Lin CM. Perception of Dance Instructors Regarding General Dance Education Curricula in Taiwan. The University of South Dakota. USA. UMI No: 3188198. 2005.
13. Ozdemir Y, Koruklu N. Investigating relationship between values and happiness among university students. *Yuzuncu Yil University Journal of the Faculty of Education*. 2011;8(1):190-210.
14. Ryff CD. Happiness is everthing, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*. 1989;57(6):1069-1081.

15. Senemoglu N. Development, learning and teaching: from theory to practice. Ankara: Gazi Publishing House. 2004.
16. Unal C. A research on the psychology of general attitudes or values. Educational Psychology Series-I. Ankara: Ankara University Faculty of Language, History and Geography Publications. 1981.
17. Yanik E. Dance and Communication. Master Thesis. Sakarya University Institute of Social Sciences. Sakarya. 2010.
18. Yoncalik O. The effect of gender on attitude towards "dance" in the context of culture and sports: An analysis on students studying in the field of physical education and sports. Journal of National Education. 2007;36(176):109-118.

THE ANALYSIS OF GOALS SCORED AT 2018 FIFA World Cup RUSSIA AND WOMEN'S WORLD CUP FRANCE 2019

Hayrettin GÜMÜŞDAĞ¹, Halit EGESÖY², İzzet Kırkaya¹, Eylem ÇELİK², Özgür DÖNER²

¹Yozgat Bozok University, Faculty of Sport Sciences, Yozgat, Turkey

²Pamukkale University, Sports Sciences, Denizli, Turkey

Abstract

The aim of this study is to analyse the goals of the competitions played at the 2018 FIFA World Cup and the 2019 FIFA Women's World Cup. In this study, 32 national soccer teams competing in the 2018 World Cup scored 64 goals during the tournament and 24 National soccer teams competing in the 2019 Women's World Cup scored 52 goals during the tournament. The distribution of the goals scored in 15-minute periods, the techniques of shooting the goals, the way the goals are scored, the position of the goals scored by the players who play, the number of goals scored by the region, the number of touches of the player scoring the goal, how the result of the match ended according to the team scoring the first goal and The distribution of the goal scored by the ending point in the goal was examined. In the 2018 FIFA World Cup, a total of 166 goals were scored and the average goal per game of the tournament was 2.59. In the 2019 Women's World Cup, a total of 144 goals were scored and the average goal per game of the tournament was 2.76. 76.-90. The reason for this can be explained as a result of the fatigue caused by the decrease in the physical strength of the teams in these minutes. In addition, the referees' addition to the end of the match may have led to more goals in this time interval. It is thought that the goals scored as a result of this study will contribute to the formation of training models by determining the structure of offensive organizations.

Keywords: Woman, Football, Goal, World Cup, Competition, Analysis.

1. INTRODUCTION

The FIFA World Cup is an international association football competition contested by the senior men's national teams of the members of the FIFA, the sport's global governing body. Nevertheless, behaviours like intending to interfere or interfering in a harmful manner need be punished.¹⁰

Organizations such as FIFA and UEFA, which have international competition environments, make billions of football fans settle in front of TV screens at the same time. It is said that the average number of live viewers in the World Cup final may reach up to 450 million. The cost of the 2014 Brazil World Cup is estimated to be about \$ 15 billion. FIFA has announced that the broadcasting rights agreements for World Cup 2018 and 2022 has been concluded for approximately 2 billion dollars. With the broadcasting rights to be marketed, the 2018 Russia World Cup will be watched and followed in 134 different countries, over internet, radio, television and mobile technology tools.¹⁵ Giulianotti and Robertson¹⁴ have explored the complex and increasingly significant interrelationships of globalization and football, with specific reference to their historical, cultural, economic, political, and social dimensions.⁸ The goal is the point where billions of people connect to football. But the spectator's disregard for the aesthetics of the final kick and the moment before the ball meets the Nets, only to be concerned with the results section, leads to great misconceptions. These misconceptions are seen even in coaches. One of the ways to get away from this error is Analysis.¹⁵

Coaches and performance analysts seek the critical performance features to describe and diagnose past performances and also try to use them to predict and prescribe future behaviours.¹⁷

The aim of this study is to determine the structure of the offensive organizations of goals scored in FIFA 2018 World Cup and FIFA 2019 Women's World Cup competitions in terms of new football schools within the scientific framework and to investigate the factors affecting goal formation according to technical and tactical criteria.

2. MATERIALS AND METHODS

2.1 Participants

This study was intended to examine the 166 goals scored by the 32 national soccer teams that competed at the FIFA 2018 World Cup in 64 competitions during the tournament and the 146 goals scored by the 24 National soccer teams that competed at the FIFA 2019 Women's World Cup in 52 competitions during the tournament.

2.2 Procedure

The research data was taken into account the goals scored during the normal match time (90 min) of the competitions. In normal time, the time limit (30 min) in the matches leading to an extension and the goals scored in the matches leading to penalties as a result of the extension were not taken into account. The research data was obtained from the official website of FIFA. The distribution of the goals scored in 15-minute periods, the techniques of shooting the goals, the way the goals are scored, the position of the goals scored by the players who play, the number of goals scored by the region, the number of touches of the player scoring the goal, how the result of the match ended according to the team scoring the first goal and The distribution of the goal scored by the ending point in the goal was examined.

The analysis criteria were created by considering the criteria used in similar research in the literature and the data entry draft analysis forms were prepared.

?	TIME PERIODS OF GOALS SCORED						THE SHAPE OF GOALS ARE SCORED			THE WAY GOALS ARE SCORED			THE GOAL SCORER PLAYER				GOAL SCORING		# TOUCHES OF THE PLAYER SCORING			
Games	0-15	16-30	31-45	46-60	61-75	76-90	FOOT		HEAD	OTHER	SET GAMES	STANDING BALL		KEEPER	BACK	MIDFIELD	STRIKER	PEN. AREA IN	PEN. AREA OUT	1 TOUCH	2 TOUCH	3 TOUCH (+)
							R	L				Corner	Frekick									
							1															
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
Total																						

* Goal Analysis Form by Gümüşdağ

3. STATISTICAL ANALYSIS

All data obtained in the research were transferred to the computer. The frequency and percentage (%) values of the obtained data were calculated in order to examine the scored goals in terms of tactics (time, position, stroke technique and from which region the goals were scored).

4. RESULTS

A total of 166 goals were scored in the FIFA 2018 World Cup, and the average goal of the tournament was 2.59 per game. In the FIFA 2019 Women's World Cup, a total of 144 goals were scored and the average goal per match of the tournament was 2.76.

Table 1. Time periods of goals scored and figurative representation

	MEN			WOMAN	
	Minutes	Frequency	Percentage (%)	Frequency	Percentage (%)
Time of goal scored	0-15'	21	12.65	20	13.99
	16-30'	18	10.84	19	13.29
	31-45'	26	15.66	24	16.78
	46-60'	34	20.48	27	18.88
	61-75	29	17.47	19	13.29
	76-90'	38	22.89	34	23.78

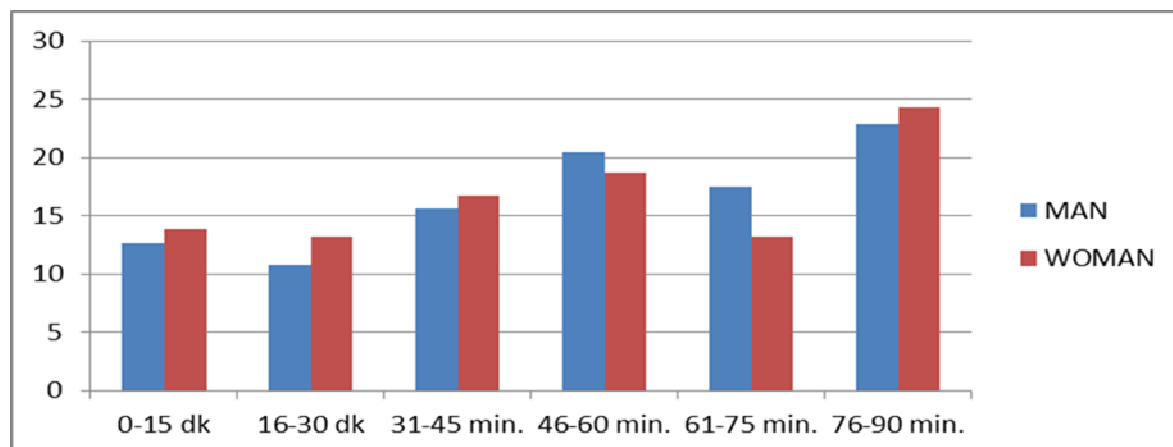
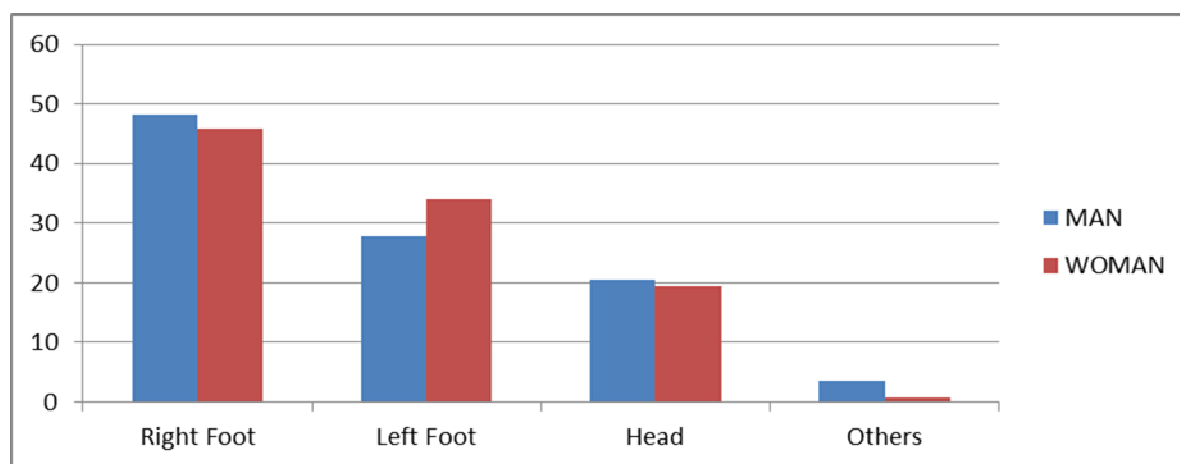


Table 1 examined; the most goals scored in men 76-90. between minutes, the fewest goals scored is 16-30. it was scored between minutes. The most goals scored in women is 76-90. between minutes, the fewest goals scored is 16-30. with minutes 61-75. it was scored between minutes.

Table 2. Goal scoring techniques and figurative representation

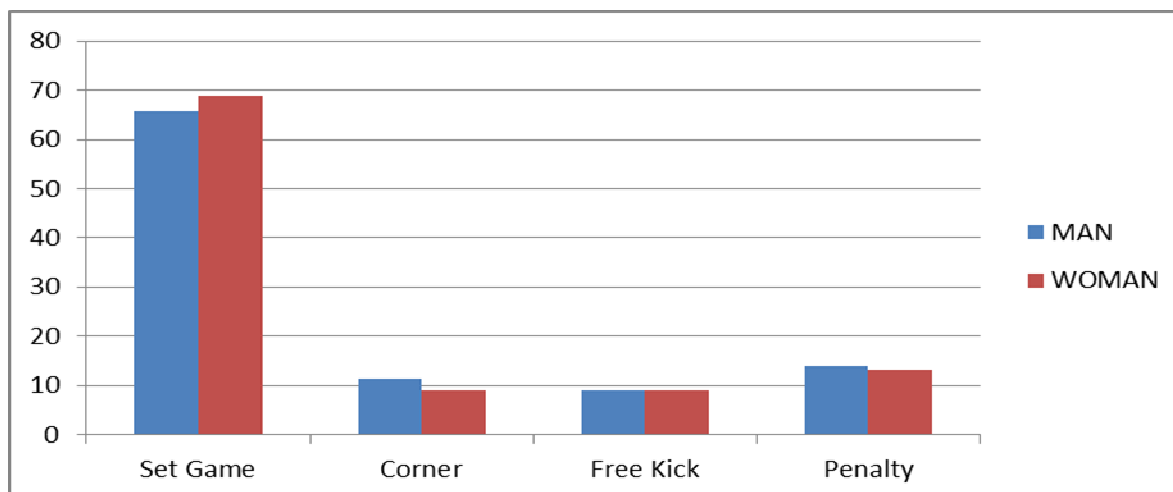
		MEN		WOMAN		
		Minutes	Frequency	Percentage (%)	Frequency	Percentage (%)
Type of shot	Right Foot		78	46.99	66	45.83
	Left Foot		47	28.31	49	34.03
	Head		36	21.69	28	19.44
	Other		5	3.01	1	0.69



In Table 2, the highest share of goals scored by right foot kicks was scored by men and women. Women have a higher share of left-footed goals than men.

Table 3. Way of scoring goals and figurative representation

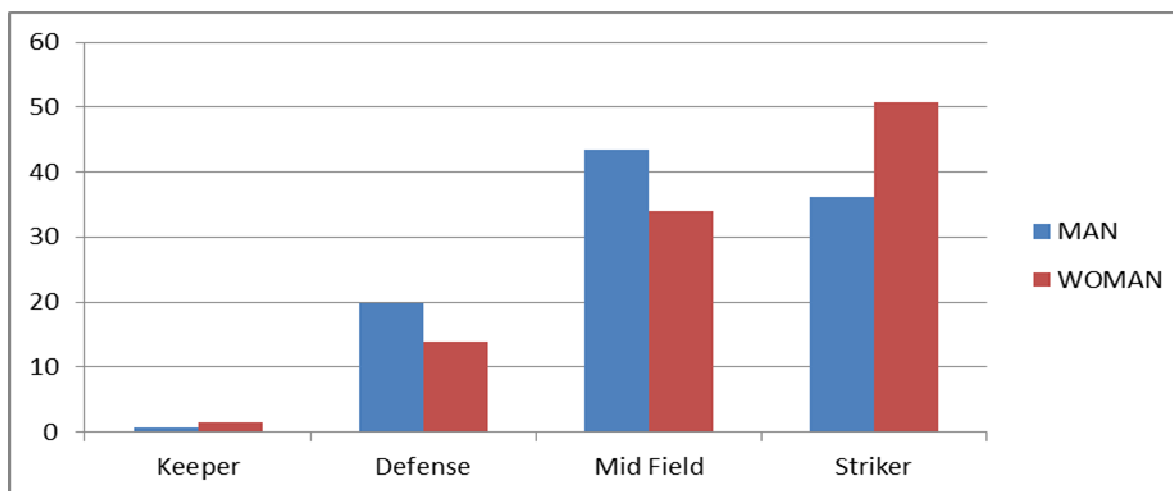
		MEN		WOMAN		
		Stopped ball	Frequency	Percentage (%)	Frequency	Percentage (%)
Type of set play	Set game		110	65.48	99	68.75
	Corner		19	11.31	13	9.03
	Free kick		16	9.52	13	9.03
	Penalty		23	13.69	19	13.19



In Table 3, 65.66% of the 166 goals scored in the 2018 Men's World Cup (109 goals) and 68.75% of the 144 goals scored in the 2019 Women's World Cup (99 goals) were in the form of a set game.

Table 4. Player to score goal and figurative representation

		MEN		WOMAN	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Goal scorer player	Goalkeeper	0	0.00	2	1.38
	Defender	35	20.83	20	13.79
	Midfield	72	42.86	50	34.48
	Striker	61	36.31	73	50.34



In Table 4, the share of midfielders in goals scored at the 2018 Men's World Cup is higher, while the share of strikers in goals scored at the 2019 Women's World Cup is higher.

Table 5. Goal scoring zone and figurative representation

		MEN		WOMAN	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Goal zone	Penalty area inside	144	85.21	127	89.44
	outside	25	14.79	15	10.56

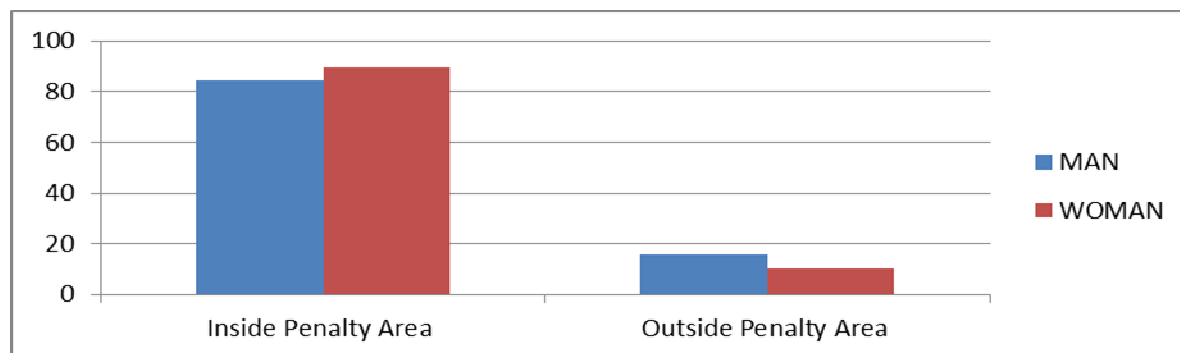
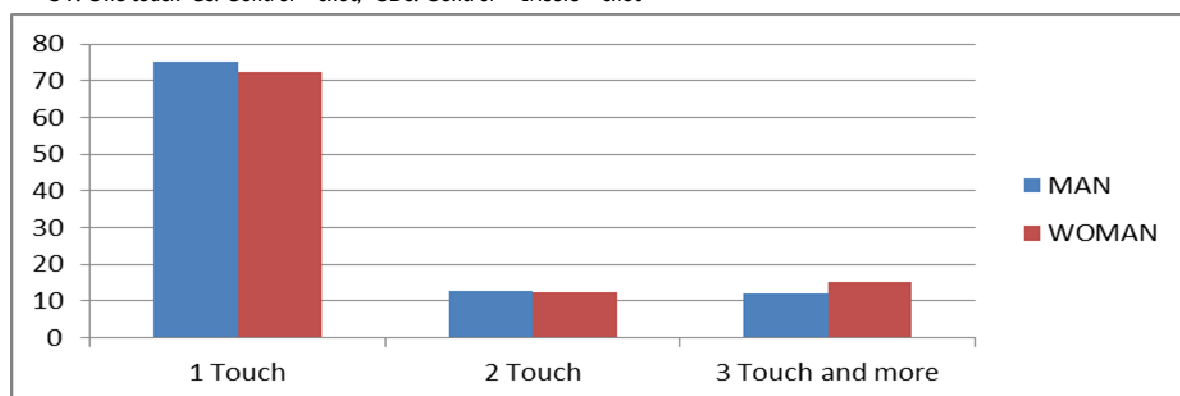


Table 5; 140 goals scored in the 2018 Men's World Cup and 129 goals scored in the 2019 Women's World Cup were scored from inside the penalty area, while 26 goals scored in the men's and 15 goals scored in the women's were scored from outside the penalty area.

Table 6. Number of touches to the ball of the player who scored the goal and figurative representation

		MEN		WOMAN	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Action leading up the goal	one-touch (OT)	128	75.74	103	72.54
	two-touch (CS)	21	12.43	17	11.97
	three-touch (+)	20	11.83	22	15.49
	(CDS)				

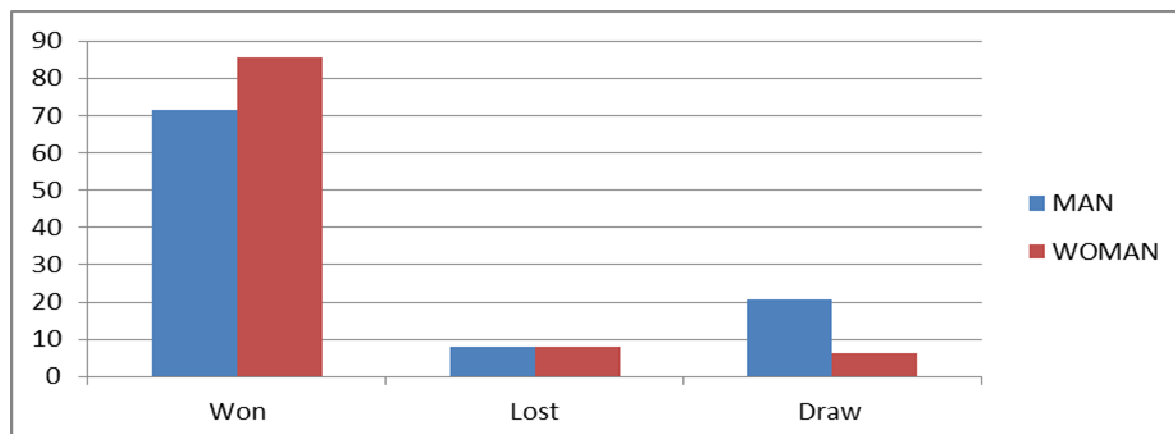
OT: One touch CS: Control + shot, CDS: Control + dribble + shot



In Table 6; Goals scored at the 2018 Men's World Cup included 125 goals scored by single contact before kick-off, and 104 goals scored by single contact at the 2019 Women's World Cup.

Table 7. Result of the match by the team that scored the first goal and figurative representation

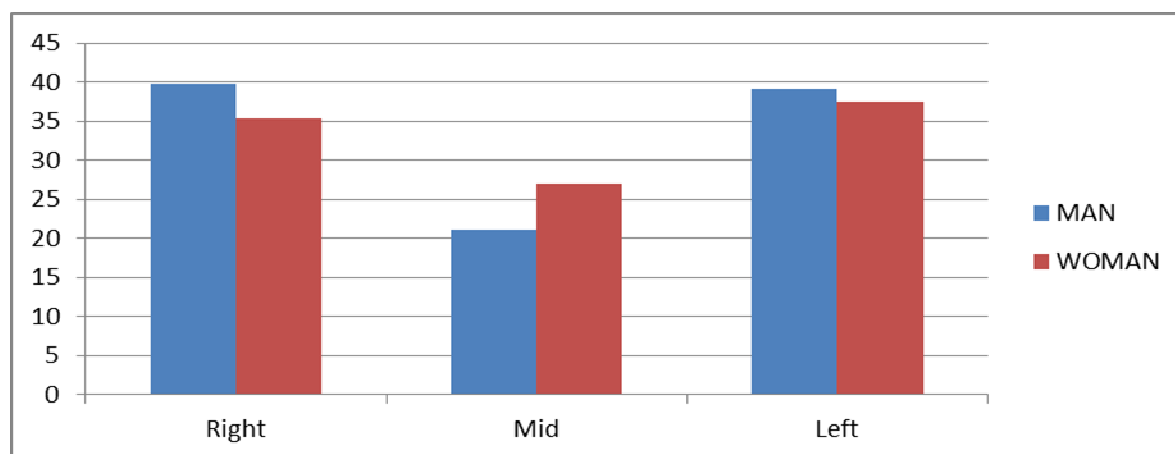
		MEN		WOMAN	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Effect of first goal on outcome	win	46	77.97	42	85.71
	defeat	5	8.47	4	8.16
	draw	8	13.56	3	6.12



In Table 7; In the 2018 Men's World Cup, 45 teams that scored the first goal in 64 matches managed to win the match, while in the 2019 Women's World Cup, 42 teams that scored the first goal in 52 matches played managed to win the match.

Table 8. Final place of goal scored by goalkeeper and figurative representation

		MEN		WOMAN	
	Final place of goal	Frequency	Percentage (%)	Frequency	Percentage (%)
Goalkeeper position	right	67	39.64	51	35.42
	middle	35	20.71	39	27.08
	left	67	39.64	54	37.50



In Table 8; it was observed that goals ended almost evenly on the left side with 66 goals to the right and 65 goals. In the 2019 Women's World Cup, there is still not a big difference between 51 goals from the right side and 54 goals from the left side.

5. DISCUSSION

In our study, 8 different criteria were analyzed to determine the structure of goal-scoring offensive organizations at the 2018 Men's and 2019 Women's world football Cups. The findings on these criteria were discussed in this section by comparing them with similar research.

Times of goals

The study by ² examined the goals scored in the world cups in terms of time and in the light of this; It was stated that the goals scored in 1998, 2002 and 2006 World Cups were mostly between 76 - 90 minutes. In 2016 European Football Championship, a total of 51 matches were played with the participation of 24 teams and 108 goals were scored. 47 (92,16%) of these matches ended with goals, while the remaining 4 (7,84%)

ended without goals. In 2016 European Football Championship, the highest goal average was in quarter finals. There is a significant difference between the rates of numbers of passes before goal ($p < 0.01$). Statistically significant difference was found between the rates of goals scored from within the penalty area and outside the penalty area ($p < 0.01$). There is significant difference between the rates of pre-goal moves ($p < 0.01$). There is significant difference between the rates of goalkeeper mistakes ($p < 0.01$). The rate of goals scored in the first half was 35,2% and 64,8% in the second half. ³ In his study, Armatas et al. ¹ found out that most goals in women's soccer World Cup in 1995, 1999 and 2003, were marked in the 2nd half of games: 53.5%, 57.7% and 58%, respectively. In the study by Armatas et al. ² on goals scored in World Cups of 1998, 2002 and 2006, the results showed that most goals scored so well in the second half of games, and scored 60.8%, 59% and 52.5% of goals, respectively.

The most goals scored according to results is 75-90. the time period between minutes can be attributed to the fact that teams do not break from the game during the competition, the variability of the tries of the attacking game. It can be said that the parameters that will result in position in the opponent area by moving to the region are more important. ¹³

The most important unique technical analysis that affects the team's success, you can go to the match result, an important role in the emergence of the success-failure factor. Consider that coaches, sports scientists, and match analysts will offer this field further in our country. ¹¹ Technical analysis, which is one of the most important factors affecting the success of teams, plays an important role in the emergence of success-failure factor by directly affecting the outcome of the match. It is thought that coaches, sports scientists and match analysts will contribute more to match analysis in our country. ¹²

The shape of goals are scored

It was seen that 49,68% of goals were scored with right foot, 29,29% of goals were scored with left foot and 21,01% of goals were scored with head. ⁶ In the other study it was seen that 42,6% of goals were scored with right foot, 33,3% of goals were scored left foot and 24,1% of goals were scored with head. ¹⁵

Football is a game played mainly with the feet, the game is played from the ground in general, players developed the skills to be the foot of the stroke, the wing is high enough and the ball used in the game, having the ball in the air enough organizations have more knowledge of the defensive players made the lack of air may have the result that of the balls.

The way goals are scored

It was seen that 63,69% of goals were scored after organized attack (open play) and 36,30% of goals were scored after set play. And it was observed that 33,33% of goals were scored from free kick, 26,31% of goals were scored from corner and 38,59% of goals were scored from penalty. ⁶ Mitrotasios & Armatas ¹⁸ in their study emphasized that most goals (72,4%) were scored during open play in Euro 2012. Cerrah, Özer & Bayram ⁴ in their study they examined goals scored in Turkish Super League for five seasons and they emphasized that 2.594 goals (71,78%) were scored after organized attack and 1.020 goals (28,22%) were scored after set play.

These results are similar to our study results. When planning a training model, considering the number of passes can positively affect success in choosing the exercise that is suitable for the competition.

The goal throwing player

It was seen that scorer's playing position were 32,48% striker, 28,02% winger, 19,74% midfielder and 19,74% defender. ⁶ The similarity between the findings of the researchers and the results obtained in our study is observed. Only in the 2018 World Football Cup does the contribution of midfielders to the goal appear to be higher.

Goal scoring zone

It was seen that 84,71% of the goals were scored inside the penalty zone and 15,28% of the goals outside the penalty zone. ⁵ Mitrotasios & Armatas ¹⁸ in their study emphasized that more than 90% of goals were scored from within the penalty area. 2006 World Cup Analysis 83,4% of the goals were scored inside the penalty zone. ²

The number of touches of the player scoring the ball

The high proportion of ground passes can be attributed to the fact that the players are more guaranteed to reach the place of ground passes than the air passes, or that the striker's ability to score goals with his head is less than the ability to score goals with his feet. ¹⁵ It was seen that 72,61% of goals were scored with one touch, 15,28% of goals were scored with control and shot. ⁶

Result of the match by the team that scored the first goal

The data in our study coincides with previous research. Although football is a physics based game, psychological factors influence the outcome. It can be attributed to the fall of the moral motivation of the team's footballers who fall behind when the first goal is scored, and the morale motivation of the team's footballers who take the lead.

Final place of goal scored

In the 2006 World Cup; the most goals are scored from the bottom right. It was followed by the lower left side. The least goals were scored between the legs. The goalkeepers still scored less than the upper right and themselves. ¹⁵ In the 2010 World Cup; the most goals were beaten from the bottom right and top. The least goals were defeated between the legs. ¹⁵

6. CONCLUSION

In training models, it is thought that the regulation of goal kicks from within the penalty area will have a positive effect on success. The percentage of goals scored by head also affects the outcome of the match. In this context, while the work to be done for foot shots in training applications is important, the head shots should be evaluated carefully. Scoring a large portion of the goals in the second half can be a helpful factor in ensuring that the coaches perform the work that guides their planning in the field of technique, tactics and conditioning. The data we have obtained in terms of offense form and the results of other researches show that successful offenses that result in goals occur when football is mostly in play. However, it is seen that the standing ball organizations are also an important factor affecting the outcome of the match. For this reason, it is thought that considering these factors in training and planning the match strategy will affect the success positively. It should not be forgotten that football is a 90-minute game, defense and offensive games should be planned accordingly, it will be useful to carry out tactical practices accordingly by ensuring that players who are out of strikers take part in goal-based tactical missions, and to carry out organized shooting and shooting with remote shots.

7. REFERENCES

1. Armatas, V., Yiannakos, A., Galazoulas, Ch., Hatzimanouil, D. 2007a. Goal scoring patterns over the course of a match: Analysis of Women's high standard soccer matches. *Physical Training*, 1(1), 1-9
2. Armatas, V., Yiannakos, A., Sileloglou, P. 2007b. Relationship between time and goal scoring in soccer games: Analysis of three World Cups. *International Journal of Performance Analysis in Sport*, 7 (2), pp. 48-58.
3. Cebi, M., Eliaz, M., Islamoglu, I.,Yamak, B. 2016. 2016 European Football Championship Goal Analysis. *Journal of Scientific Review*, 10 (31), 2016
4. Cerrah, A. O., Özer, B., & Bayram, İ. 2016. Quantitative Analysis of Goals Scored from Set Pieces: Turkey Super League Application. *Türkiye Klinikleri J. Sports Sci.* 8(2), 37-45. <https://doi.org/10.5336/sportsci.2016-50745>
5. Çobanoğlu, H. O., & Terekli, M. S. 2018. EURO 2016: Analysis of Goals Scored. *Türkiye Klinikleri J. Sports Sci.*, 10(3), 123-9. <https://doi.org/10.5336/sportsci.2018-61913>
6. Çobanoğlu, H.O. 2019. Analysis of Goal Scored on Russia World Cup 2018. *Journal of Education and Training Studies*,7(2)
7. Drust, B., & Green, M. 2013. Science and football: Evaluating the influence of science on performance. *Journal of Sports Sciences*, 31(13), 1377-1382.
8. Giulianotti, R., & Robertson, R. 2004. The globalization of football: A study in the glocalization of the serious life. *British Journal of Sociology*,55(4), 545-568.
9. Göral, K. 2016. FIFA U-20 World Cup 2013: Analysis and Evaluation of Goals Scored. *Revista Brasileira de Futsal e Futebol*, 8(28), 29-38.

10. Gümüşdağ H, Yıldıran İ, Yamaner F and Kartal A. 2011. Aggression and fouls in professional football. *Biomedical Human Kinetics*, 3: 67 – 71, 2011 DOI: 10.2478/v10101-011-0015-4.
11. Gürkan, O., Gümüşdağ, H. 2018a. A Comparative Analysis Of Some Performance Parameters of The Teams That Completed The First 9 and Last 9 Seasons of The Turkish Super League in 2016/2017 Season. *Journal of International Multidisciplinary Academic Researches (JOIMAR)*. 5(1), 14- 21.
12. Gürkan, O., Müniroğlu, S. 2018b. Technical-tactical analysis of competitions in the European football championship. *Spormetre The Journal Of Physical Education And Sport Sciences*, 16 (3), 101-108.
13. Gürkan O, Cihan BB, Yıldırım M, Gümüşdağ H. 2019. "Comparison of Some Performance Parameters of Teams Winning and Losing Competitions in the 2018 World Cup". *Gaziantep University Journal of Sports Sciences*. (4): 426-436 <https://doi.org/10.31680/gaunjss.567109>
14. Higham, D. G., Hopkins, W. G., Pyne, D. B., & Anson, J. M. 2014. Performance indicators related to points scoring and winning in international rugby sevens. *Journal of Sports Science & Medicine*, 13(2), 358–364.
15. İmamoğlu, O., Çebi, M., Kılçigil, E. 2007. Analysis of goals in the World Football Cup according to technical and tactical criteria, *Spormetre The Journal of Physical Education and Sport Sciences*, 5(4), p. 157-165
16. İnan, T. 2018. Analyzing the Home-Field Advantage in Major European Football Leagues. *International Journal Of Environmental & Science Education*, 13(2):113-124
17. McGarry, T., Anderson, D. I., Wallace, S. A., Hughes, M. D., & Franks, I. M. 2002. Sport competition as a dynamical self-organizing system. *Journal of Sports Sciences*, 20(10), 771–781. doi:10.1080/026404102320675620
18. Mitrotasios, M., & Armatas, V. 2014. Analysis of Goal Scoring Patterns in the 2012 European Football Championship. *The Sport Journal*, January 16: 1-11.

THE ADVANTAGE OF HOME MATHES IN DIFFERENT PROFESSIONAL LEAGUES IN FOOTBALL

Halit Egesoy¹, Hayrettin Gümüşdağ², İzzet Kırkaya², Eylem Çelik¹, Murat Çelik¹

¹Pamukkale University, Sports Sciences, Denizli, Turkey; ²Yozgat Bozok University, Faculty of Sport Sciences, Yozgat, Turkey

Abstract

In football, more than one factor influences the outcome of a match. It is stated that one of the important factors affecting the outcome of the match is the playing at home advantage. Although home matches advantage in football is an important factor in determining the results of competitions, the exact reasons for this have still not been determined. The application of statistics in football can strategically help a team to get better results. The purpose of this study is to examine the advantage of playing at home (home matches) in different professional leagues in football. The research sample comprised a total of 4264 matches played during the entire season in the top football leagues in Turkey, Spain, France, Germany, Italy and England during the 2017-2018 and 2018-2019 seasons. The research data was obtained from the official websites of the relevant Federations of the countries and their frequency and percentage values were calculated and interpreted. According to the results, the average percentage of home advantage in all leagues was 53.80%. Furthermore, the highest percentage of the home side advantage was found to be in the Turkish Super League with 55.99% and the lowest percentage was found to be in the Italian Serie A with 51.80%. Research findings show that being a host has an impact on the outcome of the competitions and the league ranking. It is thought that examining the advantage of home matches in football in terms of different variables will contribute to clarifying the exact causes of this advantage.

Keywords: Soccer, analysis, home advantage, European leagues

1. INTRODUCTION

Today, scientific analysis methods specific to football have gained importance. Success in football is in the details and the analysis of the smallest details should be done by making use of the possibilities of technology. Accordingly, it is clearly seen that match analysis is an important performance evaluation method in order to evaluate the performance of the players and to be successful in football.^{6,19} Match analysis in football is carried out with the objective analysis of the movements during the match and to reveal the numerical data about the parameters taken for evaluation.¹⁹

In football, more than one factor influences the outcome of a match. It is stated that one of the important factors affecting the outcome of the match was the home side's advantage.^{3,16} Football teams need the opponent's home performance data to identify strategies that will eliminate the negative effects of playing outside.¹⁷ Home advantage in a league is expressed as a percentage of the total number of points gained by the home teams on the home field to the total points earned in all matches.²¹ In football, the presence of home matches varies from country to country, but the rate of home matches in important leagues in Europe has shown some decreases in the last 20 years.²²

In a comprehensive study by Goumas 2017 on the advantage of home matches playing a football, individual analysis of some teams from different countries was carried out in the UEFA Champions League in the seasons of 2003-2004, 2012-2013. He reported that there are differences in home and away matches matches in terms of the advantage of home matches between countries, and this is a result of different game styles and tactical practices of the country teams.¹⁰ In a similar study, it was reported that while the home matches advantage was over 70% before the 1990s, this rate declined to 60% after 1990 with the rules changing in football.²³ A study by Leite 2017 examined the home side advantage by analyzing and comparing 10 European country leagues for the 2015-2016 season and found that teams playing in all leagues have an internal field advantage with a percentage of over 50% points.¹⁸ Having a home in football can also significantly affect the attitude of footballers, coaches, referees, fans and the media. A soccer team may have some advantages when playing indoors. These; audience, courage, self-confidence, lack of travel, getting to know their own fields better, lack of foreign field atmosphere, and the players and spectators can influence the referee in the competition.

Interestingly, no significant differences in the time distributed numbers of fouls between matches played home or away. Conventionally, the host teams would be expected to behave more aggressively and commit as many fouls as possible at the beginning of a match to get score advantage, as they would be inspired with their hall of fans and their tumultuous ovations. Yet, no such fact could be supported statistically. However, this study

showed that the host teams tended to commit more fouls in the last 15 min of the games than the visitors (20 and 15%, respectively; $p = 0.09$), probably in order to preserve the score or to be advantageous. The fact that the visitor teams tended to commit relatively more fouls in the 1st and 4th 15-min intervals, i.e. at the beginnings of the two halves of matches, they may have tried to cope with the ovations from the stadium and shown that they coveted the trophy.¹²

There are some disadvantageous situations faced by the teams playing outside. These; rival spectator pressure, stress, travel fatigue, unusual atmosphere of competition, the fact that the team playing in his home match is more advantageous by the referee is a common phenomenon.¹⁵ In recent years, the existence of the advantage of hosting in competitive sports branches, which are the subject of many research, has been proven in many sports, including professional football.^{1,2,7,9,18} Although the advantage of having a home in football has been researched many times from past to present, it still continues to be an important subject that attracts the attention of researchers. It is also surprising that despite the research on this issue, the exact reasons for the advantage of being a host have still not been clarified.²²

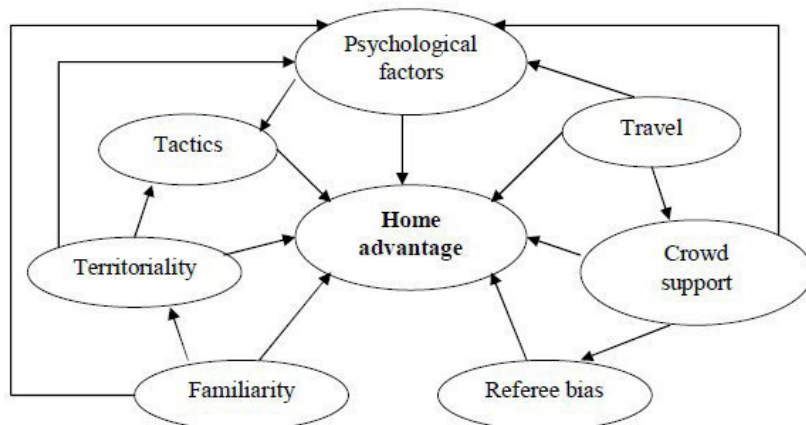


Figure 1. Interrelationship of causes of home advantage (Pollard).

This study was conducted to examine the advantage of playing at home (home matches) in different leagues in football. The aim of this study is to analyse the importance of playing at home for the final outcome of the games, making an analysis and comparison of this variable among the different football leagues

2. MATERIALS AND METHODS

2.1 Participants

Research sample of the 2017-2018 and the 2018-2019 season in Turkey (Super league), Spain (La Liga), France (Ligue 1), Germany (Bundesliga), Italy (Serie A), and England (Premier League) all season in the Football League total of 4264 matches played. Research data was obtained from the website of soccerstats (www.soccerstats.com). In this research, the match winning statistics of the home and away matches in the competitions of the teams in different professional leagues were examined according to the their leagues and the advantage of the home matches was analyzed.

The advantage of playing at home (home matches): In a completed season, the points earned by a team in their home matches are taken as a percentage of the total points collected in the home and away matches.^{24,21}

3. STATISTICAL ANALYSIS

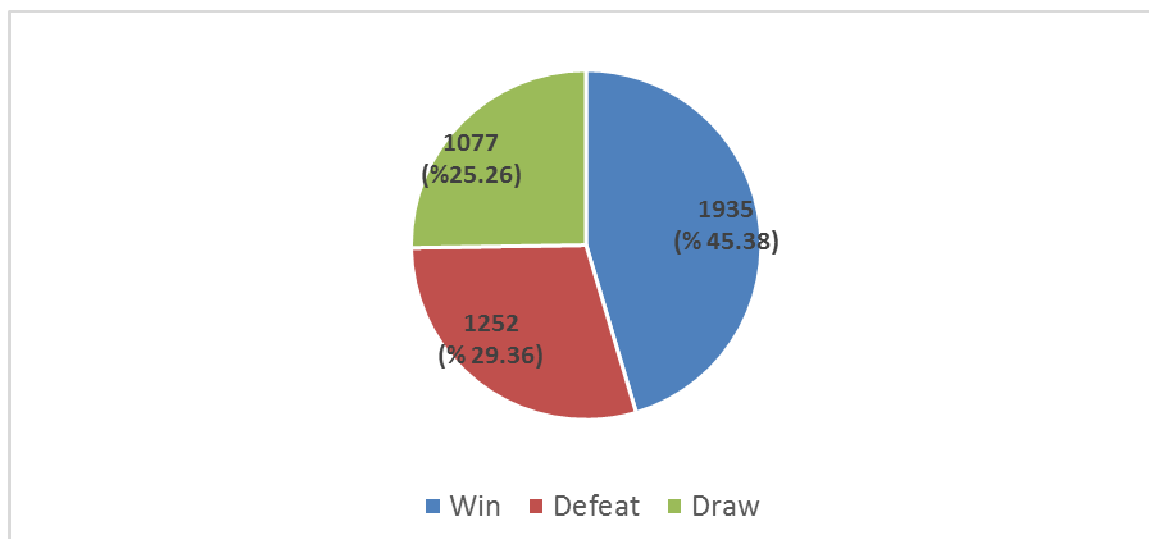
All data obtained in the study were recorded in the IBM-SPSS 16.0 program, and the frequency and percentage values of the data were calculated and interpreted.

4. RESULTS

In this section, the findings of the study are presented in the form of tables and graphs.

Table 1. Frequency and percentage values of the advantage of home matches in different professional leagues

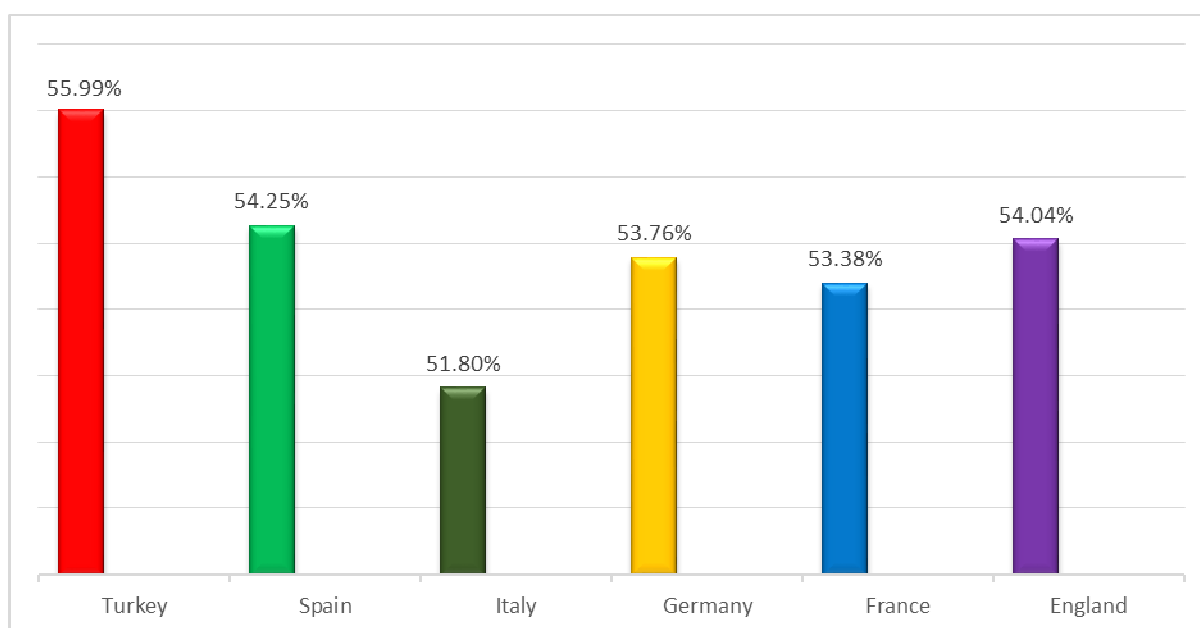
Home matches Results							
Number of matches played	win		Draw		Defeat		Home advantage (%)
	f	%	f	%	f	%	
Total (n=4264)	1935	45.38	1077	25.26	1252	29.36	%53.80



Graphic 1. Number of wins, defeats and draws of the teams home matches in different professional leagues
Looking at Table 1 and Graphic 1, 4264 competitions were played in Europe's major football leagues in the 2017-2018 and 2018-2019 seasons, with the home matches achieving 1935 wins and 1077 draws, while 1252 were relegated with defeats. The average home matches advantage percentage in all leagues was also 53.80%.

Table 2. Home matches advantage values in different football leagues

Home matches Match Results								
Leagues		Win		Draw		Defeat		Home Advantage (%)
		f	%	f	%	f	%	
Turkey	(n=612)	290	(% 47.39)	158	(% 25.82)	164	(% 26.79)	55.99
Spain	(n=760)	347	(% 45.66)	196	(% 25.79)	217	(% 28.55)	54.25
Italy	(n=760)	330	(% 43.42)	191	(% 25.13)	239	(% 31.45)	51.80
Germany	(n=612)	277	(% 45.26)	156	(% 25.49)	179	(% 29.25)	53.76
France	(n=760)	337	(% 44.34)	206	(% 27.11)	217	(% 28.55)	53.38
England	(n=760)	354	(% 46.58)	170	(% 22.37)	236	(% 31.05)	54.04
Total	(n=4264)	1935	(% 45.38)	1077	(% 25.26)	1252	(% 29.36)	$\bar{x}= 53.80$



Graphic 2. Home matches advantage values in different football leagues

Looking at Table 2 and Graphic 2, according to the analysis results of 4264 matches played in the 2017-2018 and 2018-2019 seasons in the major football leagues of European countries, the highest percentage of home matches advantage was found to be in the Turkish Super League with 55.99% and the lowest percentage was in the Italian Serie A with 51.80%.

5. DISCUSSION

This study was conducted with the aim of demonstrating the advantage of home matches in different professional leagues. Many studies have been done about the advantage of being a host in amateur and professional sports branches and the importance of the advantage of being a host has been revealed in these studies. Our research findings are similar to those of research conducted in the literature.

In a study by Courneya and Carron 1992, Games in different sports branches were analyzed to determine the advantage of home matches. Home matches teams' winning percentages were reported to be 53.5% for baseball, 57.3% for American football, 61.1% for hockey, 64.4% for basketball, and 69% for football.⁴

Armatas and Pollard 2014, in their study of a total of 2160 matches in 17 seasons in the Greek Super League, stated that the values of the home teams' crown shots, corner kicks, steals, shots scored and goals scored were higher than those of the away teams. In the same study, they found that teams' home advantage percentages ranged from 60.14% to 74.54%.²

In a different contribution to the literature, Pollard and Gomez 2014 conducted an analysis of the men's and women's football teams in European football leagues. Their studies examined home field advantage for both men's and women's football teams between 2004-2010 and stated that this advantage was 54.18% for women's teams and 59.98% for men's teams.²⁴ In addition, Page and Page 2007 found the home side's advantage to be 54.44% in Champions League group matches and 53.95% in UEFA Cup group matches. In a recent recent study, Leitte 2017 analysed matches played in 10 different countries during the 2015-2016 football season and found that the advantage of hosting in the Premier League was 56%.²⁰

In a similar study, Allen and Jones 2014 analysed a total of 7720 matches played in the English Premier League over 20 football seasons between 1992-2012.¹ The researchers concluded that the home and away teams that wore the red jersey were more successful than the teams that did not wear the red jersey. It was also found that the home advantage percentage of the top-ranked teams on the league points chart was higher than that of the bottom-ranked teams.

Saavedra García et al. in a comprehensive study conducted by 2015, an analysis of the 80 matches of the 22015 season of Spanish La Liga was conducted and the home side's advantage was assessed. The percentage of home advantage for seasons played between 1928-1995 was 70.80%, while this rate declined to 56.7% in seasons between 1995-2001.²⁵ Lago-Penas, Lago-Ballesteros 2011 analyzed a total of 380 competitions played in the Spanish La Liga during the 2008-2009 football season. According to the findings of the study, 38% of the competitions played were won by the away teams and 61.95% by the home teams. They also found that possession rates, hit shots and successful passes were higher than away teams.¹⁶

In their study, Da Silva and Moreira 2008 analyzed all competitions played in different football leagues between 2002 and 2007. The advantage of hosting is 60.5% in Brazil, 58.1% in Argentina, 60.1% in Spain, 63.8% in France, 61.0% in England, 61% in Italy, 3 and reported as 60.8% in Portugal.⁵

In his study, Leitte 2017 examined a total of 3,223 competitions from 10 different football leagues in Europe during the 2015-2016 football season in order to determine the advantage of being a host. According to the findings of the study, it home matches advantage of 61.2% in Spain, 61% in Turkey, 60.7% in Belgium, 59.3% in Italy, 57.5% in the Netherlands, 57% in France, 56.4% in Portugal Was determined as 56.2% in Germany and 55.3% in Russia. Pollard 2006 identified the advantage of European leagues to host in 6 seasons time periods as 65.47% in Ukraine, 64.79% in Portugal, 61.95% in Turkey, 60.76% in Belgium, 62.81% in Germany and 57.82% in Norway.¹⁸

Goumas 2014 determined the home side's advantage in the first 7 seasons of the Australian A-League, Australia's largest Football League, to be 57.7%.⁹ In their study, Pollard and Gomez 2014 examined the home matches advantage in 157 different countries; they found that out of African countries Nigeria (86.82%) had the highest home matches advantage, while in Oceania countries Papua New Guinea had the lowest home matches advantage (48.20%).²⁴ Similar results were found in some studies that examined the advantage of home matches playing in Turkey by examining different time intervals.¹⁴ reported that the home matchess advantage in the Turkish Super League during the 30-season time period (1987-2017) ranged from 55.37% to 67.69%.²⁷ determined that the home advantage in the Turkish Super League was 61.5% in the 12-season period (1994-95/2005-06),¹¹ determined that the home advantage in the Turkish Süper Lig (2004/05-2013/14) was 60.07%.

Considering the studies conducted in the sub-leagues on the subject, the advantage of being a host; 1. league in Turkey was determined to be 61.10%.¹³ In a similar study on this subject, Sanchez et al. 2009 analyzed the advantage of being a host in competitions played in the football seasons between 1980 and 2007 in the 1st and

2nd Leagues of Spain and reported that this advantage was 62.09% in the first league and 59.51% in the second league.²⁶

The results of the studies reviewed clearly show that the teams playing in the domestic field in all leagues have the advantage of the indoor area with the percentage of earning over 50% points. These results clearly state that home matches has an impact on the outcome of competitions and the league ranking. It is thought that examining the advantage of home matches in football in terms of different variables will contribute to clarifying the exact causes of this advantage.

6. CONCLUSION

In professional leagues in football, it can be said that the advantage of home matches significantly affects the outcome of competitions and the league standings, and that coaches must take into account important factors in the scientifically proven advantage of home matches in order to be successful in away matches or competitions as well.

Note: This study was presented verbally at the "4th International Eurasia Sports Education and Society Congress" held in Denizli between 6-8 December 2019.

Conflict of interest: The authors declare no conflict of interest.

7. REFERENCES

1. Allen, M. S., Jones, M. V. 2014. The home advantage over the first 20 seasons of the English Premier League: Effects of shirt colour, team ability and time trends. *International Journal of Sport and Exercise Psychology*, 12(1): 10-18.
2. Armatas, V., Pollard, R. 2014. Home advantage in Greek football. *European Journal of Sport Science*, 14(2): 116-122.
3. Boyko, R. H., Boyko A. R., y Boyko, M. G. 2007 Referee bias contributes to home advantage in English Premiership football. *Journal of Sports Sciences*, 25(11), 1185-1194.
4. Courneya, K.S., Carron, A.V. 1992. The home advantage in sport competitions: A literature review. *Journal of Sport and Exercise Psychology*, 14(1), 13-27.
5. Da Silva, C. D., & Moreira, D. G. 2008. Home advantage in the soccer: Comparison between the Brazilian Championship and the Main National Leagues of the World. *Brazilian Journal of Kinanthropometry and Human Performance*, 10(2), 184-188.
6. Dinçer, Ö., Arı, E., Sözen, H., Erdoğan, E., Cevahirioğlu, B. 2017. Examination of the competency levels of young football players playing in the infrastructure of professional football teams for professional football leagues, *Journal of Sports and Performance Researches*, 8(1):35-46. Retrieved from <https://dergipark.org.tr/tr/pub/omuspd/issue/27059/284747>
7. Garcia, M.S., Aguilar, O.G., Marques, P.S., Tobío, G.T., Romero, J.F. 2013. Calculating home advantage in the first decade of the 21th century UEFA soccer leagues. *Journal of Human Kinetics*, 38, 141-150.
8. Gomez, M.A., Pollard, R. 2014. Calculating the Home Advantage in Soccer Leagues. *Journal of Human Kinetics*, 40, 2014, 5-6.
9. Goumas, C. 2014. Home advantage in Australian soccer. *Journal of Science and Medicine in Sport*, 17 2014, 119-123.
10. Goumas, C. 2017. Modelling home advantage for individual teams in UEFA Champions League football, *Journal of Sport and Health Science*, 6, 321-326.
11. Göral, K. 2015. Home Ownership Advantages of Turkey Football Super League. *International Refereed Academic Journal of Sports Health and Medical Sciences*, 5(14), 72-82.
12. Gümüşdağ H, Yıldıran İ, Yamaner F and Kartal A. 2011. Aggression and fouls in professional football. *Biomedical Human Kinetics*, 3: 67 – 71, 2011 DOI: 10.2478/v10101-011-0015-4.
13. Gürkan, O., Göral, K., Saygın, Ö. 2017. Home advantage in professional soccer: Analysis of Turkey I. League. *Journal of Human Sciences*, 14(4), 3292-3299.
14. İnan, T. 2018a. Home Field Advantage Trend in Turkish Football Super League 1987-2017. *Asian Journal of Education and Training*, 4(1), 45-50.
15. İnan, T. 2018b Analyzing the Home-Field Advantage in Major European Football Leagues, *International Journal of Environmental and Science Education* 13 (2); 113-124.
16. Lago-Peñas, C., Lago-Ballesteros, J. 2011. Game location and team quality effects on performance profiles in professional soccer. *Journal of Sports Science and Medicine*, 10, 465-471.
17. Legaz-Arrese, A., Moliner-Urdiales, D., Munguia-Izquierdo, D. 2013. Home advantage and sports performance: Evidence, causes and psychological implications. *Universitas Psychologica*, 12(3), 933- 943.

18. Leite, W.S.S. 2017. Home advantage: Comparison between the major European football leagues. *Athens Journal of Sports*, 4(1), 65-74.
19. Müniroğlu, S, 2009, The importance of competition analysis and observation in football, 3. National Football Science Congress, Verbal Statement (P: 17), 9-11 January 2009, Antalya.
20. Page, L, y Page, K. 2007 The second leg home advantage: Evidence from European football cup competitions. *Journal of Sports Sciences*, 25(14), 1547-1556.
21. Pollard R. 2006. Home advantage in soccer: variations in its magnitude and a literature review of the inter-related factors associated with its existence. *Journal of Sport Behaviour*; 29:169–89.
22. Pollard R. 2008. Home advantage in soccer: A retrospective analysis. *Journal of Sports Sciences*, 4:3, 237-248.
23. Pollard, R, Gómez, M. A. 2009 Home advantage in football in South-West Europe: Long-term trends, regional variation, and team differences. *Journal of Sports Sciences*, 9(6), 341-352.
24. Pollard, R., Gomez M.A. 2014. Components of home advantage in 157 national soccer leagues worldwide. *International Journal of Sport and Exercise Psychology*, 12(3), 218-233.
25. Saavedra García, M; Gutiérrez Aguilar, O; Fernández Romero, JJ, Sa Marques, P. 2015. Ventaja de jugar en casa en el fútbol español (1928-2011) / Measuring home advantage in spanish football 1928-2011. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte* vol. 15 (57); 181-194.
26. Sanchez PA, García-Calvo T, Leo FM, Pollard R, Gómez M. 2009. An analysis of home advantage in the top two Spanish professional football leagues. *Perceptual and Motor Skills*. 108(3):789–797.
27. Seçkin, A, Pollard, R. 2008. Home advantage in Turkish professional soccer. *Perceptual and Motor Skills*, 107: 51-54.

A FIELD SURVEY ON THE RELATIONSHIP BETWEEN EXPENSE LEVEL OF THE STAFF WORKING IN LIBRARY SERVICES AND JOB SATISFACTION

Assoc. Prof. Aydin YILMAZER

Sakarya University of Applied Sciences, Faculty of Tourism, Sakarya-Turkey

Corresponding author: yilmazer@subu.edu.tr

ORCID: <https://orcid.org/0000-0001-8295-4745>

Abstract

The aim of this study is to examine the relationship between job satisfaction and burnout levels of library staff. In order to achieve this aim, two questionnaires consisting of "Maslach Burnout Inventory" and "Minnesota Job Satisfaction Scale" were used. 475 personnel working in public and university libraries all over the country participated in the research. The data was collected between May and July 2020 by e-mail and face-to-face interviews. Correlation analysis was performed to determine the significance level of demographic variables $p < 0.05$ in the attitudes of the participants on the research data, Kruskal-Wallis Test, Mann-Whitney U Test, and to evaluate the relationship between burnout and job satisfaction. The research results show that the burnout and job satisfaction values of library staff are low.

Keywords: Library; library services; burnout; job satisfaction; library staff.

1. INTRODUCTION

Libraries, which are one of the places where information transfer is most active, and the staff working in libraries have more responsibility. Because the library services are the most important supporters of all professionals, from healthcare professionals to teachers, engineers and doctors to gain professional knowledge. On the other hand, in addition to the responsibilities of society in gaining individual talents and competencies, the increasing workload, lack of personnel, working in environments where individual competencies are questioned, and the problems they experience in developing themselves continuously constitute a source of stress for each employee. This stress source causes employees to fall into despair at the beginning and burnout when the lack of solution continues. The concept of burnout was defined by Herbert Freudenberger in 1974 as "excessive demands on energy, power or resources, starting to be exhausted due to demands" and was considered as a long-term stress response¹.

Job satisfaction, which is another problem related to burnout and is generally evaluated together, has been defined as a derivative of individuals' level of meeting their needs and desires through doing or doing their job². While, Locke (1983) expresses job satisfaction as positive emotions that employees have due to the meaning they attribute to their job, Tiffin and Cormick (1975), a concept related to the values people have and the pleasure they receive from their work, Galbraith (1977), individuals' behaviors and positive or negative emotions they experience in business life; Porter, Lawyer, and Hackman (1975), on the other hand, defined it as a reaction developed by employees against the organization. In the Minnesota job satisfaction scale developed by Weiss, Dawis, England and Lofquist in 1967, job satisfaction; It is stated that it arises from the harmony between the requests of the person and the business processes that he expects to meet these requests^{3,4,5,6,7}. Some of the factors affecting burnout are individual causes, while some are external factors such as institutional environment or environmental factors. Job satisfaction is an important concept that affects the concept of burnout. Job satisfaction is affected by individual characteristics such as age, gender, education level, as well as institutional structure and the content of the job, performance and wage policy, corporate culture and working conditions^{8,9}. Many studies have been conducted investigating the relationship between burnout and job satisfaction. In these studies, it was stated that there was a negative and moderate relationship between job satisfaction and the emotional exhaustion and depersonalization dimensions of burnout, and a positive and weak relationship between personal achievement. Accordingly, as job satisfaction of individuals working in an institution decreases, their burnout levels increase^{10,11,12,13}. Studies have been conducted in the national literature on the relationship between burnout and job satisfaction in banking, education, health, accounting, tourism, some public institutions, private sector enterprises and many sectors, and in these studies, a negative relationship was found between burnout level and job satisfaction¹⁴.

2. METHODS

According to data of 2019 in Turkey, the first national, population 182 thousand, 30 thousand 618 formal and 610 universities and educational institutions libraries shows a total of 32 thousand 411 library activities, including¹⁵. The total staff number of libraries in our country is approximately 9531 people. Approximately 33% of this number is female staff. 214 of them are employed in the national library, 6089 in university libraries and 3228 in public libraries¹⁵. Our research population is 9531 personnel working in library services in every part of our country, based on the 2019 TUIK library statistical report. Questionnaires were applied to staff working in these libraries. In the study, in addition to the "Maslach burnout scale", the "job satisfaction scale" and the "Personal Information Form" with 6 questions were used to determine the demographic characteristics of the people concerned. This research, conducted between May and November 2019. 910 questionnaires, e-mail, and a total of 472 questionnaires were evaluated using the random sampling method. This sample number is at a level to represent the universe¹⁶. The total score of the Maslach Burnout Scale was Cronbach Alpha Value (α) = 0.848 for 22 statements. The scale used in the Minnesota Job Satisfaction questionnaire consists of 20 statements and is a five-point Likert-type job satisfaction scale scored between 1 and 5. In the study, the total score was used to examine the general job satisfaction of the participants. The Cronbach Alpha Value for 20 expressions was = 0.927. This result shows that the scale is very reliable.

3. FINDINGS

Findings Regarding Socio-Demographic Features: 53,6% of the participants in the study are employees of the public library (n = 253), 42% of the state university library (n = 198) and 4,4% of the foundation university library employees. In this context, 67,0% of the participants were male, 33% were female, 49,0% were aged 41 and above, 31,6% were between 31-40 years old, 81,4% It has been determined that the fame is associate and bachelor's degree and 71% is married. Again, in Table 1, 53,1% worked in public libraries and 46,9% worked in university libraries, 58,9% worked in the same institution for more than 10 years, 86,5% was 3000 TL and It was determined that 84,2% of them had higher income and had in-service training.

Findings Regarding Demographic Variables of Participants and Sub-Dimensions of Burnout and Job Satisfaction: Mann Whitney U Test and Kruskal Wallis H Test were analyzed for the demographic variables of the participants, burnout sub-dimensions and findings related to job satisfaction. According to the results of the Mann Whitney U Test, no statistically significant difference was found in the comparison of the scores of the staff working in the library from the emotional exhaustion, depersonalization and sense of personal accomplishment sub-dimensions of burnout in terms of gender, marital and in-service education status and the place of work ($p > 0.05$). According to the results of the Mann Whitney U Test, a statistically significant difference was not found in the comparison of the average scores of the personnel working in the library on the job satisfaction scale according to their gender, marital status, in-service education and place of work ($p > 0.05$).

The Kruskal Wallis H Test Result was found to be statistically significant when comparing the scores of the staff working at the library in the sub-dimensions of emotional exhaustion ($H = 1.634$, $p = 0.682 < 0.05$) and depersonalization ($H = 4.412$, $p = 0.241 < 0.05$). There was no difference, ($H = (p > 0.05)$), but a statistically significant difference was found in the comparison of the scores they got from the personal achievement sub-dimension ($H = 13.417$, $p = 0.004 < 0.05$).

As a result of the Kruskal Wallis H test, a statistically significant difference was not found in the comparison of the burnout sub-dimensions of the staff working in the library according to the education factor. Accordingly, emotional exhaustion ($H = 8.349$, $p = 0.009 < 0.05$), depersonalization ($H = 7.954$, $p = 0.02 < 0.05$) and personal accomplishment dimension ($H = 7.187$, $p = 0.014 < 0.05$) were determined. In this context, personnel with undergraduate education got higher scores than those with high school and associate degrees in burnout dimensions. In the Kruskal Wallis H Test Result, a statistically significant difference was found in the comparison of the burnout sub-dimensions of the staff working in the library according to their income level. Accordingly, emotional exhaustion ($H = 9.496$, $p = 0.027 < 0.05$), depersonalization ($H = 8.549$, $p = 0.063 < 0.05$) and personal accomplishment dimension ($H = 9.723$, $p = 0.007 < 0.05$), was seen as. In this context, looking at the difference found, it can be said that as the income level of the library staff increases, emotional exhaustion and depersonalization decrease, and the sense of personal accomplishment increases. In the Kruskal Wallis H Test Result, a statistically significant difference was found in the comparison of the burnout sub-dimensions of the staff working in the library according to their working time. Accordingly, emotional exhaustion ($H = 18.542$, $p = 0.053 < 0.05$), depersonalization ($H = 16.459$, $p = 0.072 < 0.05$) and personal accomplishment dimension ($H = 14.237$, $p = 0.014 < 0.05$), was seen as. In this context, considering the difference found, it can be said that emotional exhaustion and depersonalization are higher and the sense of personal accomplishment decreases as the working hours of the library staff increase. As a result of the Kruskal Wallis H Test, a statistically significant difference was found in the comparison of the average scores obtained from job satisfaction in terms of ages of the staff working in the library ($H = 13.149$, $P = 0.017 < 0.05$).

As a result of the Kruskal Wallis H Test, a statistically significant difference was found in the comparison of the average scores obtained from job satisfaction in terms of working hours of the library staff ($H = 13.62$, $P = 0.011 < 0.05$). Looking at the difference, it was found that employees with a working period of more than 10 years have higher job satisfaction scores than employees with a working period of 1-4 years. In addition, a statistically significant difference was found in the comparison of the average scores obtained from the job satisfaction scale according to the income variable of the employees ($H = 12.023$, $p = 0.027 < 0.05$). When we look at the group in which the difference is included, it is seen that people with 3000 TL, 4000 TL and 4001 TL income get higher job satisfaction scores compared to people with income less than 3000 TL. Findings Regarding the Relationship Between Participants' Burnout Sub-Dimensions and Job Satisfaction: Correlation analysis results regarding the relationship between the participants' burnout sub-dimensions and job satisfaction are given below.

Table I.

Correlation Analysis for the Relationship Between Burnout and Its Sub-Dimensions and Job Satisfaction

Satisfaction	Burnout	Emotional exhaustion	Desensitization	Personal sense of accomplishment	Job
Burnout	1				
Emotional exhaustion	,749**	1			
Desensitization	,521**	,493**	1		
Personal sense of accomplishment	,537**	,268**	,186**	1	
Job Satisfaction	-,423**	-,483**	-,216**	-,273	1

* Significant correlation at 0.05 level (2-tailed).

When Table I is analyzed, a low and negative relationship was found between burnout and job satisfaction at the level of 0.05 ($r = -, 423 **$). Based on the results of this analysis, it is understood that the level of job satisfaction of the staff working in libraries decreases as the level of burnout increases. In addition, a low and negative relationship at the level of 0.05 ($r = -, 483 **$) was found between emotional exhaustion, the sub-dimension of burnout, and job satisfaction of employees. A very low and negative relationship at the level of 0.05 ($r = -, 216 **$) was found between depersonalization, which is the sub-dimension of burnout, and job satisfaction of the employees. A very low and negative correlation at the level of 0.05 ($r = -, 273 **$) was found between the low personal accomplishment sub-dimension of burnout and the job satisfaction of the employees. Based on these data, it can be said that as the level of emotional exhaustion, depersonalization, low personal accomplishment and general burnout of the personnel working in libraries increases, the job satisfaction level of the employees decreases.

4. DISCUSSION

This study was carried out in order to examine the relationship between job satisfaction and burnout levels of staff working in library services and to reveal whether the burnout sub-dimensions differ according to some variables (gender, age, education, marital status, working year, income level). As a result of the correlation analysis conducted for this purpose, it was determined that there was a low level of negative and significant relationship between the burnout and job satisfaction levels of the library staff. Accordingly, as job satisfaction of individuals working in an institution decreases, their burnout levels increase.

Findings determined according to demographic variables in the study are as follows. No statistically significant difference was found in the comparison of the scores of the staff working in the library in the emotional exhaustion, depersonalization and personal achievement sub-dimension according to gender, marital status, place of work, in-service education status and age. This result of the research differs from the studies conducted abroad. As a result of a study on the effect of gender, which is an important factor affecting burnout, on burnout, it was found that emotional exhaustion in women and personal accomplishment in men are higher^{17,18}. In another study, it was observed that burnout in the direction of depersonalization was higher in men than women¹⁹. On the other hand, a statistically significant difference was found in the comparison of the

burnout sub-dimensions of the staff working in the library according to their education factor, income level and working time. In addition, no statistically significant difference was found in the comparison of the average scores of the library personnel on the job satisfaction scale according to their gender, age, education, working time, marital status, in-service training and work place and income levels. In this context, when these variables are compared with the statistical results obtained from burnout sub-dimensions, the results are thought to overlap.

The findings obtained in this study is an important step toward understanding the employee's personnel burnout and job satisfaction in library services in Turkey and has some limitations. For example, around 9500 people work in libraries across the country and although there are a number of samples to represent the population¹⁶, no data was collected for the entire field study. All of the participants in the research were handled as working personnel, and no separation of positions was made. The analyzes are limited to the variables included in the research. For this reason, it is very difficult to come to a general opinion on the subject. However, this kind of field research will significantly contribute to the process of improving the emotional, cognitive institutional level / intellectual identity of the employees at local and national level / increasing their corporate commitment.

5. CONCLUSION

In addition, it is possible to say that taking into account the suggestions developed in line with the findings and results obtained, making their applicability possible, and increasing the library service quality will make a great contribution to this research, and it is thought that it will shed light on other studies to be carried out in terms of its subject and provide the necessary academic contribution.

5. REFERENCES

1. Freudenberger, H. J. (1974). Staff burnout. *Journal of Social Issues*, 30, 159-165.
2. Niebrugge, K. M. (1994). Burnout and job dissatisfaction among practicing school psychologists in Illinois. Erişim adresi: www.eric.ed.gov/PDFS/ED374378.pdf.
3. Locke, E.A. (1983). Handbook of organizational behavior management (Review), *Contemporary Psychology*, 28, 681-682.
4. Tiffin, J. & McCormick, E.J. (1975). *Industrial psychology*. London: George Allen & Unwin.
5. Galbraith, J. R. (1977). *Organization design*. Addison-Wesley Publication- Co, Business & Economics.
6. Porter, L. W. Lawler, E. E. ve Hackman, J. R. (1975). *Behavior in organizations*. New York: McGraw-Hill, Business & Economics.
7. Weiss, R. Dawis, G. England, G. ve Lofquist, L. (1967). *Minnesota studies in vocational rehabilitation 22: Manual for the Minnesota Satisfaction Questionnaire*. Minneapolis: University of Minnesota.
8. Davis, K. (1988). *Human behavior in business*, (K. Tosun et al. Trans.), İstanbul: Business Faculty.
9. Erigüç, G. (2000). A review on job satisfaction according to the personal characteristics of healthcare professionals, *Hacettepe Journal of Health Administration*, 5(3), 7-39.
10. Sarros, J. C. ve Sarros, A. M. (1992). Social support and teacher burnout. *Journal of Educational Administration*, 30(1), 55-70.
11. Schaufeli, W.B. ve Enzman, D. (1998). *The burnout companion to study and research: A critical analysis*. London: Taylor and Francis
12. Innstrand, S. T. Espnes, G. A. & Mykletun, R. (2004). Job stress, burnout and job satisfaction: An intervention study for staff working with people with intellectual disabilities. *Journal of Applied Research in Intellectual Disabilities*, 17, 119-126
13. Koustelios, A. & Tsigilis, N. (2005) The relationship between burnout and job satisfaction among physical education teachers: a multivariate approach, *European Physical Education Review*, 11(2), 189-203
14. Üngören, E. Doğan, H. Özmen, M. Akgün, Ö. (2010). Hotel staff burnout and work relationship of satisfaction levels. *Journal of Yaşar University*, 17(5), 2922-293.
15. TÜİK, (2019). Library statistical report, Access address: <https://www.brandingturkiye.com>
16. Altunışık, R. Coşkun, R. Bayraktaroğlu, S. Yıldırım, E. (2012). *Research in social Sciences methods*, Sakarya: Sakarya Bookstore.

17. Maslach, C. & Jackson, S. E. (1985). The role of sex and family variables in burnout. *Sex Roles*, 12(7-8), 837-851.
18. Ergin, C. (1992). *Adaptation of Physician and Nurses Burnout and Maslach Burnout Scale*, VII. National Psychology Congress Scientific Studies Handbook, 143-154.
19. Greenglass, E. R. & Burke, R. J. (1988). Work and family precursors of burnout in teachers: Sex differences. *Sex Roles*, 18(3-4), 215-229.

MODERN DON QUIXOTES: SAMPLE OF HORROR THEMED ESCAPE ROOMS AS AN ALTERNATIVE ADVENTURE ACTIVITY

Elvan Deniz YUMUK¹, Hamdi Alper GÜNGÖRMÜŞ²

¹Manisa Celal Bayar University, Manisa, Turkey

²Alanya Alaaddin Keykubat University, Antalya, Turkey

Abstract

The aim of the study is to investigate the correlation between sensation seeking, life satisfaction and perceived freedom in leisure levels of individuals participating in sessions in horror themed escape rooms and to compare these in terms of various variables. The sample group consists of 352 voluntary participants chosen by convenient sampling method. Participants answered demographic information form, "Sensation Seeking Scale Short Form", "Life Satisfaction Scale" and "Perceived Freedom in Leisure Scale". In the analysis of data; frequency, arithmetic mean, standard deviation were used for statistical results whereas t test, ANOVA and Pearson Correlation tests were used for the independent variables. As a result, most of the participants take part in the activity with their friends, all mean scores of the scales are high; and participating in the physical activities is an important aspect in terms of sensation seeking, life satisfaction and perceived freedom. There is medium level and positive correlation between PFLS, LSS and SSS.

Keywords: Horror themed escape rooms, Life satisfaction, Sensation Seeking, Perceived freedom in leisure, Leisure.

INTRODUCTION

Although the concepts of recreation and leisure are as old as human history, its terminological meaning and evaluation with theories is not as old as the concept itself. Leisure and recreational activities can be seen as both the reason and the result. Atchley¹ defines leisure activities as chasing an end and emphasizes that these activities are not planned or obligatory. In the basis, recreation and leisure are for relaxation, enjoyment and personal development. Gürbüz and Henderson² suggested that today several academic studies focus on the importance and meaning attributed to leisure concept which are independent from its definition, and they try to figure out how cultural factors affect the attributed meaning of leisure. Güngörmüş et.al³ similarly emphasized the importance of studies focusing on determining motivational factors that play a role in leisure participation.

The relation between horror theme and leisure stems from the need of fear. According to Lovecraft⁴ horror stories are as old as the thoughts of people. Unavoidably, people tend to see this need in flesh and blood. Therefore, horror themed escape rooms (HTER) have emerged worldwide. These facilities offer an entertainment of solving problems to escape from locked rooms in an hour. By its very nature, the sessions in HTERs include fear, thrill, a perceived risk and problem solution. Thus, these features brought about the question whether the sessions in HTERs can be accepted as an adventure activity or not.

In the literature, sensation seeking is explained through leisure activities involving nature and adventure recreation⁵. This stands out for the individuals seeking new, intense, and complex experiences with a possible risk of legal and financial outcomes⁶. Schrader Wann⁷ stated high-risk recreational activities create a virtual control over the fact of mortality of people and are used as a method to cheat the death. Since the literature does not include much information comparing sensation seeking and HTERs, the limited information leads the researchers to investigate the possible relationship HETR and sensation seeking.

When freedom is considered, today individuals rarely have the chance to do what they want to do in the world which is filled with standardization and stereotyping⁸. However, recreational activities provide them with freedom which can literally be felt by the participants. Furthermore, sociological and psychological structure of perceived freedom concept is accepted as a pillar on which many leisure theories are built⁹. For example, perceived loss of freedom may become detrimental to activity participation¹⁰. Therefore, perceiving a certain level of freedom while doing an activity is necessary in recreation.

Life satisfaction developed through leisure activities has become the sole goal of the individuals since people can express themselves through leisure activities. Cho¹¹ states that individuals with healthy amount of time for leisure generally have a greater life satisfaction level. Furthermore, the literature suggests more investigation on multi-dimensionality of leisure activities to understand their role in life satisfaction¹². Thus, understanding the relation between life satisfaction and factors such as sensation seeking and perceived freedom in leisure which are strong determiners of leisure participation is crucial.

Leisure studies have undergone considerable changes over the past 40 years¹³ and the differentiation of issues studied is inevitable. In the light of provided information, the aim of the current research is to compare the relationships between individuals' sensation seeking, life satisfaction and perceived freedom in leisure in the HTERs and analyzing them according to different demographic variables.

MATERIALS AND METHODS

The study sample consists of individuals participating in HTERs chosen through convenience sampling. There were total of 352 voluntary individuals 197 male ($\text{Mean}_{\text{age}} = 25.89 \pm 7.71$) and 155 females ($\text{Mean}_{\text{age}} = 25.56 \pm 7.11$). In the study, demographic information form, Perceived Freedom in Leisure Scale (PFLS) developed by Witt & Ellis¹⁴ and adapted in Turkish by Yerlisu Lapa & Ağyar¹⁵, Sensation Seeking Scale (SSS) developed by Hoyle et.al¹⁶ and adapted in Turkish by Çelik & Turan¹⁷, and Life Satisfaction Scale (LSS) developed by Diener et.al¹⁸ and adapted in Turkish by Durak, Şenol-Durak & Gençöz¹⁹ were used.

In the data analysis, frequencies, arithmetic mean, standard deviation; as well as t test, ANOVA and Pearson Correlation tests were used for independent samples. Skewness and Kurtosis values and Levene test results were also evaluated²⁰. In order to determine the reliability of the scales, the Cronbach Alpha coefficient was calculated.

RESULTS

Table 1. Distribution of Scale Scores

Scales	No. Item	N	Mean / SD	Skewness	Kurtosis	C. Alpha
PFLS	25	352	3.71 / 0.60	-0.324	0.337	0.940
LSS	5	352	4.38 / 1.20	-0.103	-0.265	0.827
SSS	8	352	3.57 / 0.79	-0.372	-0.077	0.787

Table 1 shows that the total mean score of PFLS of the individuals included in the study was 3.71, the total mean score of LSS was 4.38 and the total mean score of SSS was 3.57. In addition, the Cronbach Alpha coefficients of the scales were calculated as 0.940, 0.827 and 0.787, respectively. Therefore, it can be said that data collection tools make reliable measurements for the study. Since the skewness and kurtosis values were within the range of ± 1 , the variables were assumed to have a normal distribution. Thus, parametric test techniques were used.

Table 2. T-test and ANOVA Results of the Participants' Demographics

Demographics		PFLS Mean / SD	LSS Mean / SD	SSS Mean / SD
Gender	Female (n=155)	3.65 / 0.58	4.37 / 1.18	3.41 / 0.80
	Male (n=197)	3.75 / 0.62	4.39 / 1.23	3.70 / 0.77***
Marital Status	Married (n= 85)	3.52 / 0.54	4.71 / 0.93***	3.13 / 0.73
	Single (n= 267)	3.77 / 0.61***	4.28 / 1.26	3.71 / 0.77***
Physical Activity (PA) Participation	Yes (n= 202)	3.82 / 0.60***	4.56 / 1.27***	3.67 / 0.76***
	No (n= 150)	3.56 / 0.58	4.14 / 1.06	3.44 / 0.83
Participation Partners	Alone (n=103)	3.51 / 0.68	3.63 / 1.15	3.06 / 1.13
	With Friends (n=329)	3.72 / 0.60	4.40 / 1.19	3.60 / 0.78**
	With Family (n=10)	3.56 / 0.47	4.72 / 1.46	3.29 / 0.80
	Total (n=352)	3.71 / 0.60	4.38 / 1.21	3.57 / 0.80

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table 2 shows that the total mean score obtained from SSS [$t_{(350)} = 3.365$; $p = 0.001$] differed significantly in terms of "gender" in favor of males. The total mean scores obtained from PFLS [$t_{(350)} = 1.558$; $p = 0.120$] and LSS [$t_{(350)} = 0.143$; $p = 0.887$] did not show a significant difference for "gender". The total mean scores obtained from PFLS [$t_{(350)} = -3.374$; $p = 0.001$], LSS [$t_{(350)} = 3.369$; $p = 0.001$] and SSS [$t_{(350)} = -6.318$; $p = 0.000$] display significant differences for "marital status". PFLS and SSS total mean scores of single participants were higher than married participants, and LSS total mean scores of married participants were higher than single participants. In terms of "PA participation", it is found that the total mean scores obtained from PFLS [$t_{(350)} = 4.030$; $p = 0.000$], LSS [$t_{(350)} = 3.417$; $p = 0.001$] and SSS [$t_{(350)} = 2.646$; $p = 0.009$] display significant differences in favor of those who participated in PAs. In terms of "participation partners", it is determined that the total mean score obtained from SSS [$F_{(2-349)} = 3.584$; $p = 0.029$] differed significantly. The participants

attending to the activity with "friends" ($M= 3.60$) had higher scores than the participants attending to the activity "alone" ($M= 3.06$).

Table 3. Correlation Results of PFLS, LSS and SSS

Scales	PFLS	LSS	SSS
PFLS	1		
LSS	0.227**	1	
SSS	0.422**	0.060	1

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

According to the analysis results, there is a low and positive correlation between PFLS and LSS ($r= 0.227$; $p = 0.001$) and a medium and positive correlation between PFLS and SSS ($r= 0.422$; $p = 0.001$). No significant correlation between LSS and SSS was found ($r= 0.060$; $p = 0.259$).

DISCUSSION

In this study, we considered a new way of adventure activity which is cheaper and more accessible than adventure recreation activities. In HTERs, people can satisfy their need for excitement and fulfill their leisure preferences without prior training. In HTERs, there is an auditable and fictional base in which participants seek the sensation and risk-taking that are the basis of adventure recreation.

In terms of "gender", the only significant difference was found in SSS in favor of the male participants. According to social role theory, physical differences between genders will cause a possible increase in women and men in acquiring certain roles and behavioral characteristics²¹. It is also known that these physical differences which can be integrated into social norms push males into a social thought and sanction which is more challenge-based and females into a more restricting place where they refrain from risky behaviors²². Also, it is obvious that the sensation seeking behavior of males is generally higher than females.²³

According to the study results, gender does not reveal a statistically significant difference in terms of PFLS and LSS. In the literature, many studies also do not present a statistically significant difference in terms of PFLS.^{24,25} However, there are studies that have refuted the results of the current study^{26,27}. When LSS is considered, there are studies supporting the results of the current study.^{28,29}

In terms of marital status, significant differences were found in all scales. In SSS and PFLS, significant differences were in favor of single participants. On the contrary, married participants had higher level of mean scores in LSS. Zuckerman and Neeb³⁰ revealed that single and divorced female participants' sensation seeking scores were higher. However, the total mean scores of male participants who were divorced were higher than single and married male participants. In terms of PFLS, Janke et al.³¹ showed that married adults have perceived freedom at a lower level than single adults. When the studies related to LSS are considered, it is generally seen that the current study shows parallelism with the findings regarding the marital status variable.^{32,33}

In terms of participation in PAs, a statistically significant difference was obtained in terms of all scales. It was found that the total mean scores of the individuals who participated in PAs were higher than the individuals who did not participate in PAs. Similarly, Mahoney et al.³⁴ concluded that the individuals who do exercise in order to increase their muscle mass had a higher level of sensation seeking scores in their study. De Moor et al.³⁵ revealed that individuals who exercise regularly exhibit a higher level of sensation seeking behavior in their study. In terms of PFLS, Guinn et al.³⁶ found that there was a strong positive correlation between PA and PFLS. Kleiber et al.³⁷ and Akdeniz et al.²⁵ also obtained similar results in their studies. In terms of LSS, Stubbe et al.³⁸ revealed that individuals of all ages and genders who do exercise exhibit higher levels of life satisfaction than those who do not do exercise.

For "participation partner", PFLS and LSS did not show any statistically significant difference. Nevertheless, the scores of SSS revealed a statistically significant. The participants who attended activities with their "friends" had higher scores than the ones attending "alone". In the literature, similar³⁹ and different⁴⁰ results from other studies can be seen for SSS.

The correlation analysis showed that there is a low and positive correlation between PFLS and LSS. Poulsen et al.⁴¹ found a strong and positive correlation between PFLS and LSS. Additionally, there is a medium and positive correlation between PFLS and SSS. Kara⁴² found out that there is a negative correlation between PFLS and SSS. Finally, no significant correlation between LSS and SSS was found. While some studies in the literature supports the results related to LSS and SSS⁴³, some studies found out that there is a positive correlation between LSS and SSS⁴⁴.

CONCLUSION

In conclusion, in the sample of HTER participants, it was thought that there would be similarities between traditional adventure recreation activities and HTER sessions. It is obvious from the results that all

total mean scores of the scales are very high. Also, doing regular physical exercise is an important highlight of the study in terms of perceived freedom in leisure, sensation seeking and life satisfaction.

REFERENCES

1. Atchley RC. Retirement and leisure participation: Continuity or crisis?. *The Gerontologist*. 1971; 11(1):13-17.
2. Gürbüz B, Henderson K. Exploring the meanings of leisure among Turkish university students. *Croatian Journal of Education*. 2013; 15(4):927-957.
3. Güngörmüş HA, Yenel F, Gürbüz B. Examination of recreational motives of individuals: Demographic differences. *International Journal of Human Sciences*. 2014; 11(1):373-386.
4. Lovecraft HP. Supernatural horror in literature. Abergele: The Palingenesis Project (Wermod and Wermod Publishing Group); 2013.
5. Norbury A, Husain M. Sensation-seeking: dopaminergic modulation and risk for psychopathology. *Behavioural brain research* 2015; 288:79-93.
6. Craig JM, & Piquero NL. Sensational offending: An application of sensation seeking to white-collar and conventional crimes. *Crime & Delinquency*. 2017; 63(11):1363-1382.
7. Schrader MP, Wann DL. High-risk recreation: The relationship between participant characteristics and degree of involvement. *Journal of Sport Behavior*. 1999; 22(3):426-440.
8. Bregha FJ. In: Recreation and leisure: Issues in an era of change. Goodale TL, Witt PA, editors. Leisure and freedom re-examined. Pennsylvania. Venture Publishing; 1980.
9. Mannell RC, Zuzanek J, Larson R. Leisure states and "flow" experiences: Testing perceived freedom and intrinsic motivation hypotheses. *Journal of Leisure Research*. 1998; 20(4):289-304.
10. Iso-Ahola SE. Exercise: Why it is a challenge for both the nonconscious and conscious mind. *Review of General Psychology*. 2013; 17(1):93-110.
11. Cho H. Importance of leisure nostalgia on life satisfaction and leisure participation. *The Service Industries Journal*. 2019; 40(1-2):90-109.
12. Hawkins B, Foote AK, Binkley AL. Contribution of leisure to the life satisfaction of older adults in Australia and the United States. *World Leisure Journal*, 2004; 46(2):4-12.
13. Johnson CW, Parry DC, Wagler FA. Introduction to the special issue looking back, looking forward: 40 years of leisure sciences. *Leisure Sciences*. 2018; 40(1-2):1-8.
14. Witt PA, Ellis GD. Development of a short form to assess perceived freedom in leisure. *Journal of Leisure Research*. 1985; 17(3):225-233.
15. Yerlisu Lapa T, Ağyar, E. Cross-cultural adaptation of perceived freedom in leisure scale. *World Applied Sciences Journal*. 2011; 14(7):980-986.
16. Hoyle RH, Stephenson MT, Palmgreen P, Lorch EP, Donohew RL. Reliability and validity of a brief measure of sensation seeking. *Personality and individual differences*. 2002; 32(3):401-414.
17. Çelik E, Turan ME. A study on the psychometric features of the Turkish version of the brief sensation seeking scale (BSSS-8) for young adults and the relation between sensation seeking and life satisfaction. *International Journal of Educational Research Review*. 2016; 1:29-38.
18. Diener E, Emmons RA, Larsen RJ, Griffin S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*. 1985; 49:71-75.
19. Durak M, Senol-Durak E, Gencoz T. Psychometric properties of the Satisfaction with Life Scale among Turkish university students, correctional officers, and elderly adults. *Social Indicators Research*. 2010; 99(3):413-429. doi: 10.1007/s11205-010-9589-4
20. Büyükoztürk Ş. Sosyal bilimler için veri analizi el kitabı istatistik, araştırma deseni spss uygulamaları ve yorum. Ankara: 25th ed. Pegem Akademi Yayıncılık, 2019.
21. Wood W, Eagly AH. A cross-cultural analysis of the behavior of women and men: implications for the origins of sex differences. *Psych. Bull.* 2002; 128:699-727.
22. Cross CP, Cyrenne DLM, Brown GR. Sex differences in sensation-seeking: a meta-analysis. *Scientific Reports*. 2013; 3(1):1-5.
23. Ewert A, Gilbertson K, Luo YC. "Because it is there": Examining motivations within the context of adventure. Paper presented at the Leisure Research Symposium; 2012; Anaheim, CA.
24. Wu HC, Liu A, Wang CH. Taiwanese university students' perceived freedom and participation in leisure. *Annals of Leisure Research*. 2010; 13(4):679-700.
25. Akdeniz H, Körmükçü Y, Sekban G, Bostan İ. Reviewing sports sciences students' perceived freedom levels in leisure in terms of any variables (Kocaeli university case). Paper presented at: SHS Web of Conferences; 2018. P. 1068.

26. Yerlisu Lapa T. Life satisfaction, leisure satisfaction and perceived freedom of park recreation participants. *Procedia-Social and Behavioral Sciences*. 2013; 93:1985-1993.
27. Memili H, Akar T, Öztürk E, Durmaz H, Güngörmüş HA. Relationship between freedom perceived with free perception and level of awareness: Samples of university students. Paper presented at: 2nd International Recreation and Sports Management Congress; 11-14 April, Bodrum/Muğla, Turkey; 2019. P. 255-6.
28. Stubbe JH, Posthuma D, Boomsma DI, De Geus, EJC. Heritability of life satisfaction in adults: A twin-family study. *Psychological Medicine*. 2005; 35(11):1581-1588.
29. Özgür G, Gümüş AB, Durdu B. Life satisfaction of university students living at home or in the dormitory. *Journal of Psychiatric Nurses*. 2010; 1(1):25-32.
30. Zuckerman M, Neeb M. Demographic influences in sensation seeking and expressions of sensation seeking in religion, smoking and driving habits. *Personality and Individual Differences*. 1980; 1(3):197-206.
31. Janke M, Carpenter G, Payne L, Stockard J. The role of life experiences on perceptions of leisure during adulthood: a longitudinal analysis. *Leisure Sci*. 2010; 33(1):52-69.
32. Ardahan F, Yerlisu Lapa T. Outdoor recreation: the reasons and carried benefits for attending outdoor sports of the participants of cycling and/or trekking activities. *Journal of Human Sciences*. 2011. 8(1):1327-1341.
33. Park J, Joshanloo M, Scheffinger H. Predictors of life satisfaction in a large nationally representative Japanese sample. *Social Science Research*. 2019; 82:45-58
34. Mahoney CR, Giles GE, Williams CS, Brunye TT, Taylor HA, Kanarek RB, Lieberman HR. Relationships between use of dietary supplements, caffeine and sensation seeking among college students. *Journal of American College Health*. 2019; 67(7):688-697.
35. De Moor MHM., Beem AL, Stubbe JH, Boomsma DI, De Geus EJC. Regular exercise, anxiety, depression and personality: A population-based study. *Preventive Medicine*. 2006; 42(4):273-279.
36. Guinn B, Semper T, Jorgensen L. Perceived leisure freedom and activity involvement among Mexican American adolescents. *Hispanic Journal of Behavioral Sciences*. 1996; 18:356-366.
37. Kleiber D, Larson R, Csikszentmihalyi M. The experience of leisure in adolescence. *Journal of Leisure Research*. 1986; 18:165-176.
38. Stubbe JH, de Moor MHM, Boomsma DI, de Geus, EJC. The association between exercise participation and well-being: A co-twin study. *Preventive Medicine*. 2007; 44(2):148-152.
39. Hardiman N, Burgin S. Canyoning adventure recreation in the Blue Mountains World Heritage Area (Australia): The canyoning and canyoning trends over the last decade. *Tourism Management*. 2011; 32(6):1324-1331.
40. Schuett M. Predictors of social group participation in whitewater kayaking. *Journal of Park and Recreation Administration*. 1995; 13(2):42-54.
41. Poulsen, A. A., Ziviani, J. M., & Cuskelly, M. (2007). Perceived freedom in leisure and physical coordination ability: Impact on out-of-school activity participation and life satisfaction. *Child: Care, Health and Development*, 33, 432-440.
42. Kara, F. M. (2019). Internet addiction: Relationship with perceived freedom in leisure, perception of boredom and sensation seeking. *Higher Education Studies*, 9.
43. Çelik, E., & Koçak, L. (2018). Suppression effect of sensation seeking on the relationship between general self-efficacy and life satisfaction among emerging adults. *International Journal of Instruction*, 11(4), 337-352.
44. Çelik, E. (2015). Mediating and moderating role of sensation seeking in the relation between self-concealment and life satisfaction in adolescents. *Education and Science*, 40(181), 349-361.

EXAMINATION OF VIEWS OF SPORTS SCIENCES STUDENTS STUDYING IN BORDER PROVINCES REGARDING SUSTAINABILITY IN SPORTS

Ahmet Dinç¹, Eşref Demirci², Orhan Çam³, Dilan Sünbül⁴

¹ Iğdır University, School of Physical Education and Sports,

^{2,3,4} Iğdır University, Department of Physical Education and Sports, Post Graduate,

²ORCID: 0000-0002-9139-1750, ³ORCID: 0000-0002-1724-6598, ⁴ORCID: 0000-0002-0215-1342

Correspondence author: ahmet.dinc@igdir.edu.tr, ORCID: 0000-0003-0441-3673

ABSTRACT

The aim of this study is to determine the views of sports sciences students studying in border provinces (Kars, Iğdır, Ağrı) regarding sustainability in sports. Descriptive method was used in the research. The research population was comprised of sports sciences students studying in border provinces (Kars, Iğdır, Ağrı), and the sampling included a total of 769 (396 males - 373 females) sports sciences students from the provinces of Kars (256), Ağrı (250), and Iğdır (263). The sustainability in sports scale developed by Koçak, Tuncel and Tuncel²⁰ was used to collect the data of the research. The sustainability in sports scale is a 5-point Likert type scale. It was found that the data had a normal distribution. Independent samples t test, one-way analysis of variance (ANOVA) and descriptive statistical analysis were conducted to analyze the data. The significance level was accepted as $p < 0.05$ in the evaluation of the data. When the research findings are reviewed, the scores of sustainability in sports ($X=4.02$) of sports sciences students were found to be high. As a result of the research, significant differences were observed between sustainability in sports sub-dimensions and sports sciences students' variables of doing sports, age, province of study and department ($p < 0.05$).

Keywords: Sports, Sustainability in Sports, Sports Sciences Students.

INTRODUCTION

Sport is crucial in supporting physical, emotional, social and mental development in people's lives. Due to these aspects, it has important effects on health as well as facilitating people's lives. In people's lives, sports first appeared for reasons such as playing, reducing stress and getting away from work. However, it has developed since its emergence and is now considered a professional field today. In this sense, sports is involved in political, economic, peace and cultural processes. Thus, sports and sports activities need to be sustainable in terms of the benefits it provides to the lives of individuals. The concept of sustainability was first used in the report 'Our Common Future' prepared by the United Nations in 1987, and it is defined as the ability of individuals to fulfil their needs in life without compromise.¹ Afterwards, in 1992, the concept of Sustainability development was set forth at the world summit in Rio. Following these developments, the concept of sustainability was defined by the United Nations in a three-dimensional model. In this scope, sustainability is expressed as improvement in social, economic and environmental dimensions.²

Sports adds value to the lives of people to protect their health, to support their social, emotional and mental development and to help them maintain a healthy life. The understanding of sports within the concept of sustainability is one of the important fields of study aiming to develop the understanding of using these resources in a balanced way today to fulfil the needs of future generations.¹ When the studies conducted in the field of sports are examined, it is seen that the number of studies on sustainability is limited. Again, in these studies, topics such as recreation, sports and sports tourism are among the subjects studied extensively. In some studies on sustainability, the interaction of sports with the environment is discussed. There are many studies supporting the studies on the determination of the sub-dimensions of sustainability in sports and implementation of programs to ensure sustainability in sports, and increasing participation in sports.^{3,4,5,6,7,8,9,10,11} However, a significant part of the studies conducted on sustainability in Turkey have been designed as reviews, and there are no studies carried out for research and application.^{12,13,14} Accordingly, it can be said that the domestic literature is inadequate to explain the concept of sustainability in sports. In some studies conducted to ensure sustainability in sports, it is possible to encounter studies on human development.¹⁵ Sustainable use of resources¹⁶ and participation in sports.¹⁷

The main purpose of the concept of sustainability is to fulfil the social, emotional and physical requirements of a healthy life. Like the concept of sports, the concept of sustainability can be approached in multiple aspects. In this respect, sports and sustainability have many overlapping aspects. Owing to its nature, it is possible to do sports in organized facilities and in natural areas. The concept of sustainability in sports, on the other hand, is

defined as the qualified and functional use of the facilities so that individuals can lead a qualified and happy life. Sustainability can be achieved through the effective use of all the sub-fields of sports.¹⁸ In this scope, the aim of our study is to determine the views of sports sciences students studying in border provinces (Kars, Iğdır, Ağrı) regarding sustainability in sports.

METHOD

The qualitative research method was used in this study. In quantitative research, the "reality" is the concrete phenomena we perceive with sense organs. According to the positive science understanding which quantitative research is based on, knowledge is obtained via experiment and observation.¹⁹

Population and Sampling

The research population was comprised of sports sciences students studying in border provinces (Kars, Iğdır, Ağrı), and the sampling included a total of 769 (396 males - 373 females) sports sciences students from the provinces of Kars (256), Ağrı (250), and Iğdır (263).

Data Collection Tool

Sustainability in Sports Scale

The scale was developed by Koçak, Tuncel, and Tuncel 2015.²⁰ Cronbach's Alpha value of the sustainability in sports scale was obtained as .915. The internal consistency coefficients of the scale sub-dimensions are as follows: Social .859, Individual.803, Participation.803, Economic.701, Organizational.736, Environmental.713. The sustainability in sports scale is a 5-point Likert type scale.

Data Analysis

For the evaluation of research data, IBM SPSS 23 packaged software was used. The skewness and kurtosis values were examined to determine whether the data were normally distributed. For the analysis of the data, descriptive statistical analysis, one-way analysis of variance to reveal the difference between more than two groups, and independent samples t-test to reveal the difference between two groups were used. The Tukey multiple comparison test was used to specify the groups from which the differences that were revealed as a result of ANOVA originated. The significance level was accepted as $p < 0.05$ in the evaluation of the data.

RESULTS

Table 1. Descriptive Statistics Regarding Sampling

Gender	f	%
Male	396	51.5
Female	373	48.5
Age	f	%
21 Years and Below	279	36.3
22-23 years	265	34.5
24 years and above	225	29.3
Departments	f	%
Teaching	348	45.3
Sports Management	133	17.3
Coaching	288	37.5
Province of Study	f	%
Kars	256	33.3
Ağrı	250	32.5
Iğdır	263	34.2
Doing Sports Actively	f	%
Yes	138	17.9
No	631	82.1
Income Status	f	%
0-750	626	81.4
751-1500	90	11.7
1501 and above	53	6.9
Total	769	100.0

When Table 1 is examined, it is seen that 48.5% of the participants are women, 51.5% are men; 36.3% are 21 years old and younger, 43.70% are between the ages of 21-23, 34.5% are between the ages of 22-23, and 29.3%

are 24 years old and older. 45.3% of them studied Teaching, 17.3% Sports Management, 37.5% Coaching. 33.3% of them studied in Kars, 32.5% in Ağrı, and 34.2% in Iğdır. 17.9% of them did sports actively, and 82.1% did not do it actively. 81.4% had an income of 0-750, 11.7% between 751-1500, and 6.9% 1501 and above.

Table 2. T-Test Results According to the Gender Variable

Sub-Dimensions	Gender	N	Average/5	sd	t	P*
Social	Male	396	3.9554	.59778	1.091	.276
	Female	373	3.9065	.64613		
Individual	Male	396	4.0877	.71900	-.073	.942
	Female	373	4.0915	.74834		
Participation	Male	396	4.0535	.67277	.496	.620
	Female	373	4.0295	.67193		
Economic	Male	396	4.0758	.75558	.862	.389
	Female	373	4.0277	.78942		
Organizational	Male	396	3.9318	.73997	.560	.576
	Female	373	3.9021	.72851		
Environmental	Male	396	4.2001	.75297	.536	.592
	Female	373	4.1709	.75810		

*P<0.05

According to the findings in Table 2, no significant difference was detected between the scores of sustainability in sports sub-dimensions and the students' gender ($p < 0.05$).

Table 3. T-Test Results according to the status of doing sports

Sub-Dimensions	S.D.S.	N	Average/5	sd	t	P*
Social	Yes	138	3.6473	.67110	-5.605	.000
	No	631	3.9938	.59311		
Individual	Yes	138	3.7153	.74311	-6.815	.000
	No	631	4.1714	.70522		
Participation	Yes	138	3.9957	.85452	-.733	.465
	No	631	4.0520	.62546		
Economic	Yes	138	3.6703	.74548	-6.594	.000
	No	631	4.1360	.75285		
Organizational	Yes	138	3.7283	.76564	-3.364	.001
	No	631	3.9588	.72106		
Environmental	Male	396	4.2001	.75297	-5.828	.000
	Female	373	4.1709	.75810		

*P<0.05

According to the t-test results in Table 3, significant difference was observed in the social, individual, economic and organizational sub-dimensions of the sustainability in sports scale with respect to the students' status of doing sports ($p < 0.05$), and no significant difference was found in the participation and environmental sub-dimensions ($p > 0.05$).

Table 4. ANOVA Results According to Age and Province of Study

Sub-Dimensions	Age						Province of Study					
	Variance Source	Squ. Tot.	Sd	Squ. avr.	F	p	Variance Source	Squ. Tot.	Sd	Squ. avr.	F	p
Social	Inter group	.993	2	.497	1.286	.277	Inter group	63.781	2	31.891	104.783	.001
	Intra group	295.921	766	.386			Intra group	233.133	766	.304		
	Total	296.914	768				Total	296.914	768			
Individual	Inter group	1.777	2	.889	1.657	.191	Inter group	95.606	2	47.803	115.539	.001
	Intra group	410.751	766	.536			Intra group	316.923	766	.414		
	Total	412.528	768				Total	412.528	768			
Participation	Inter group	4.023	2	2.011	4.494	.011	Inter group	20.377	2	10.188	23.905	.001
	Intra group	342.829	766	.448			Intra group	326.475	766	.426		
	Total	346.852	768				Total	346.852	768			

Economic	Intergroup Intragroup Total	.183 457.590 457.773	2 766 768	.092 .597	.153	.858	Intergroup Intragroup Total	95.606 316.923 412.528	2 766 768	47.803 .414	81.533	.001
Organizational	Intergroup Intragroup Total	.155 413.726 413.882	2 766 768	.078 .540	.144	.866	Intergroup Intragroup Total	80.346 377.427 457.773	2 766 768	17.575 .494	35.546	.001
Environmental	Intergroup Intragroup Total	.323 437.585 437.908	2 766 768	.162 .571	.283	.754	Intergroup Intragroup Total	81.373 356.535 437.908	2 766 768	40.687 .465	87.414	.001

*P<0.05

According to the ANOVA findings in Table 4, significant difference was only observed in the participation dimension of the sustainability in sports sub-dimensions with respect to the age status of the students ($F=4.494$; $p<0.05$). As a result of the Tukey multiple comparison test conducted to determine which groups the difference originated from, it was revealed that the participation scores of the students aged 21 and below were higher than those aged 24 and above.

Again, according to the ANOVA findings in Table 4, significant difference was found in all the sub-dimensions of sustainability in sports with respect to the students' provinces of study ($p<0.05$). However, as a result of the Tukey multiple comparison test, it was observed that the social, individual, participation, economic, organizational, and environmental scores of the students studying in the province of Iğdır were higher than those of the students studying in the province of Kars.

Table 5. ANOVA Results According to Department and Income Status

Sub-Dimensions	Department						Income					
	Variance Source	Squ. Tot.	Sd	Squ. avr.	F	p	Variance Source	Squ. Tot.	Sd	Squ. avr.	F	p
Social	Intergroup	3.844	2	1.922	5.023	.007	Intergroup	.380	2	.190	.491	.612
	Intragroup	293.071	766	.383			Intragroup	296.534	766	.387		
	Total	296.914	768				Total	296.914	768			
Individual	Intergroup	7.069	2	3.534	6.677	.001	Intergroup	.030	2	.015	.027	.973
	Intragroup	405.460	766	.529			Intragroup	412.499	766	.539		
	Total	412.528	768				Total	412.528	768			
Participation	Intergroup	2.211	2	1.106	2.457	.086	Intergroup	1.383	2	.692	1.534	.216
	Intragroup	344.641	766	.450			Intragroup	345.468	766	.451		
	Total	346.852	768				Total	346.852	768			
Economic	Intergroup	5.513	2	2.756	4.669	.010	Intergroup	.092	2	.046	.077	.926
	Intragroup	452.261	766	.590			Intragroup	457.681	766	.597		
	Total	457.773	768				Total	457.773	768			
Organizational	Intergroup	5.098	2	2.549	4.776	.009	Intergroup	.237	2	.118	.219	.803
	Intragroup	408.784	766	.534			Intragroup	413.645	766	.540		
	Total	413.882	768				Total	413.882	768			
Environmental	Intergroup	3.923	2	1.961	3.462	.032	Intergroup	.508	2	.254	.444	.641
	Intragroup	433.985	766	.567			Intragroup	437.401	766	.571		
	Total	437.908	768				Total	437.908	768			

*P<0.05

According to the ANOVA findings in Table 5, significant difference was detected in the social, individual, economic, organizational, environmental dimensions of the sustainability in sports sub-dimensions with respect to the students' departments ($p < 0.05$). Again, according to the ANOVA findings in Table 5, no significant difference was detected in the sub-dimensions of sustainability in sports with respect to the students' variables ($p > 0.05$).

DISCUSSION

Considering the findings of the research, it was discovered that sports science students had high scores in the social, individual, participation, economic, organizational, and environmental sub-dimensions of sustainability in sports. When the literature was reviewed, in the study conducted by Koçak et al.²⁰ it was seen that the scores of sustainability in sports were high.

In our research, no difference was observed between male and female students in social, individual, environmental, participation, economic and organizational dimensions. Even though the students' scores of attitude towards sports did not differ significantly as per gender in the study conducted by Dinç et al, Daniş and Genç and Frans-son and Garling^{11,21,22} found the environmental sub-dimension scores of women higher than those of men in their study. Moreover, when the licensed athletes in our country in 2018, 3,261,853 male athletes and 1,646,102 female athletes are seen.²³ The number of licensed male athletes higher than female licensed athletes in our country does not support our research findings. Significant difference was observed in the social, individual, economic and organizational sub-dimensions of the sustainability in sports scale with respect to the students' status of doing sports actively. In the study by Yıldız et al and Koçak et al.^{24,20} significant differences were found in the economic dimension, which supported our research findings.

Significant difference was observed in the social, individual, participation, economic, organizational and environmental sub-dimensions with respect to the students' provinces of study. As a result of the Tukey multiple comparison test conducted to determine which groups the difference originated from, it was revealed that the average scores of the students studying in Iğdır were higher than those of the students in Ağrı and Kars. Considering the annual average temperatures between the border provinces, Iğdır had (12.2 °C), Ağrı (6.2 °C) and Kars (4.7°C)²⁵ In the light of this information, average temperatures of the provinces can be said to have an effect on sustainability in sports. In the analysis of variance, significant difference was detected in the social, individual, economic, organizational and environmental sub-dimensions of sustainability in sports with respect to the students' departments. As a result of the Tukey multiple comparison test, the average scores of the students studying Teaching were found higher than those of the students studying Sports Management and Coaching. Score and ranking requirement in order to apply to Teaching programs which will accept students with the talent examination of the Council of Higher Education (CHE), can be said to have an effect on the fact that the awareness of students studying Teaching is higher compared to other departments.²⁶

No significant difference was found between the sub-dimensions when the analysis of variance was checked for students' incomes. In the study of Demirdöken et al.²⁷ it was concluded that the income status of the students affected their attitudes towards sports.

CONCLUSION

It has been revealed that the university students studying sports sciences had positive attitudes towards sustainability in sports. It can be recommended to increase sportive organizations in universities and to cooperate with shareholders in sports more often in order to raise awareness on sustainability in sports.

REFERENCES

1. WCED. *World Commission on Environment and Development, Report of the World Commission On Environment and Development: Our Common Future, Annex to document.* Development.1987; 42-427.
2. KBSKP 1992 Obtained on 10 9, 2020 from <http://www.surdurulebilirlikkalkinma.gov.tr/>: <http://www.surdurulebilirlikkalkinma.gov.tr/>.
3. Hans, J. *Economic Commission for Europe. Towards Sustainable Consumption Patterns: Leisure And Sports Workshop on Encouraging Local Initiatives Towards Sustainable Consumption Patterns Report prepared.* Vienna.1998
4. Carvalho, G. O. Sustainable development: is it achievable within the existing International political economy context? *Sustainable Development*.2001; 9, 61-73.
doi:10.1002/sd.159
5. Tainter, J. A framework for sustainability. *World Futures: The Journal of General Evolution*.2003;59(3-4), 213-223.
doi: 10.1080/02604020310132
6. Heck, D. Institutionalizing sustainability: the case of sustainability at Griffith University Australia. *Applied Environmental Education and Communication*.2005; 4(1), 55-64.
doi: 10.1080/15330150590905248
7. Lindsey, L. Conceptualising sustainability in sports development. *Leisure studies*.2008;27(3), 279-294.
doi: 10.1080/02614360802048886
8. Girginov, V., & Hills, L. The political process of constructing a sustainable London Olympics sports development legacy. *International Journal of Sport Policy*.2009;1(2), 161-181.
doi: 10.1080/19406940902950713

9. Reis, A. C., & Higram, J. E. Recreation conflict and sport hunting: moving beyond goal interference towards social sustainability. *Journal of Sport and Tourism*.2009; 14(2-3), 83-107.
[doi: 10.1080/14775080902965025](https://doi.org/10.1080/14775080902965025)
10. Smith, A. Theorising the relationship between major sport events and social sustainability. *Journal of Sport and Tourism*.2009;14(2-3), 109-120.
[doi: 10.1080/14775080902965033](https://doi.org/10.1080/14775080902965033)
11. Dinç, A., Başgöl, Ö., Kalem, M., Aksaray, Ş., & Tenik, F. The Determination of the Attitudes of Students in Iğdır University towards Sports. *Iğdır University, Journal of Sports Sciences*.2020; 3(1), 30-36.
12. Demir, C. The analysis of the concept of sustainability in national parks in terms of tourism and recreational activities: An implementation for national parks in Turkey. *Balıkesir University, Journal of Institute of Social Sciences*.2002;5(8), 87-105.
13. Balci, V., & Koçak, F. Environmental Sustainability in Design and Use of Sports and Recreational Areas, *Journal of Sports and Performance Research*.2014; 5(2), 46-58.
[doi: 10.17155/spd.53129](https://doi.org/10.17155/spd.53129)
14. Doralp, B., & Barkul, Ö. Sustainability in the design of Olympics premises as an Input. *Megaron*.2011;6(2), 123-137.
15. Lawson, H. A. International changes and challenges: Their import for new models of practice. *Quest*.1995;47(4), 411-426.
[doi: 10.1080/00336297.1995.10484167](https://doi.org/10.1080/00336297.1995.10484167)
16. Dowda, M., Sallis, J. F., McKenzie, T. L., Rosengard, P., & Kohl, H. W. Evaluating the sustainability of SPARK physical education: A case study of translating research into practice. *Research Quarterly for Exercise and Sport*.2005;76(1), 11-19.
[doi: 10.1080/02701367.2005.10599257](https://doi.org/10.1080/02701367.2005.10599257)
17. Kirk, D. Sport and Early Learning Experiences. In *Driving up Participation: The Challenge for Sport*. *Sport England*.2004;69.
18. Bossel, H. Indicators for Sustainable Development: Theory, Method, Applications: A Report to the Balaton Group, Winnipeg. *International Institute for Sustainable Development (IISD)*.1999;2.
19. Sönmez, V., & Alacapınar, F. *Exemplified Scientific Research Methods*. Ankara: Anı Publications.2013
20. Koçak, F., Tuncel, S., & Tuncel, F. Validity and reliability of the Sustainability in Sport Scale. *Turkish University Students. Journal of Physical Education and Sport Sciences*.2015;9(2), , 220-234.
[doi: 10.1501/Csaum_0000000037](https://doi.org/10.1501/Csaum_0000000037)
21. Daniş, H., & Genç, H. The comparison of the Attitudes of Students Studying Classroom Teaching and Receiving/Not Receiving the Course of Environmental Science towards the Environment and Their Success in the Course of Environmental Science. *Mehmet Akif Ersoy University, Journal of Faculty of Education*.2007;13(2), 20-26.
22. Fransson, N., & Garling, T. (1999). Environmental concern: Conceptual definitions measurement methods and research finding. *Journal of Environmental Psychology*.1999;19,369-382.
[doi: 10.1006/jevp.1999.0141](https://doi.org/10.1006/jevp.1999.0141)
23. www.shgm.gsb.gov.tr. (2020, 11 10).
24. Yıldız, A., Arı, Ç., & Yılmaz, B. The examination of the attitudes of university students towards sports (Example of Ankara Yıldırım Beyazıt University). *Muş Alparslan University, International Sports Sciences Journal*.2017;1,1,35-45.
[doi: 10.33689/spormetre.467670](https://doi.org/10.33689/spormetre.467670)
25. www.mgm.gov.tr. (2020, 11 15).
26. www.yok.gov.tr. (2020, 11 16).
27. Demirdöken, Ç., Deryahanoğlu, G., Demirdöken, S., & Ünlü, E. The Examination of University Students' Competitive Attitudes According to Their Participation in Sports. *CBU, Journal of Physical Education and Sports Sciences*.2019;14(1), 14-22. [doi:10.33459/cbubesbd.398496](https://doi.org/10.33459/cbubesbd.398496)

OPINIONS OF STUDENTS IN PERFORMANCE SPORTS ON THE DURATIONS OF OFFICIAL LEAVE PERMISSION

Zeki Taş

Bartın University, Faculty of Sports Sciences

Corresponding author: ztas@bartin.edu.tr

ABSTRACT

This study aims to examine the opinions of formal education students performing performance sports in Turkey regarding the duration of official leave permission in the legislation and to make possible suggestions regarding the results. A phenomenological pattern was adopted in the study where qualitative research methods and techniques were used. The research group consists of 20 athlete students studying at different levels of formal education and performing performance sports under license in different sports clubs in Turkey according to maximum diversity sampling. A semi-structured interview form consisting of 6 questions developed by the researcher in light of the conceptual framework was used in order to collect the data. A voice recorder was used to prevent data loss during the interviews. The data were analyzed using the MAXQDA 2020 qualitative data analysis software. It is one of the prominent results in line with the findings that the regulatory rules regarding the duration of official leave permission in the legislation should be updated to provide a solution to the duration of leave permission use of students performing performance sports.

Keywords: Performance athlete, Formal education, Leave permission problem

1. INTRODUCTION

Actions and experiences that shape the mind, character or physical abilities of the individual are considered within the broad meaning of education. In this sense, all kinds of experiences are educational and education is continuous. Considering the technical meaning of education, the formal side of education appears, that is, the process of transferring the cultural heritage, accumulated knowledge, values, and skills of the society from generation to generation through schools, colleges, universities, and other institutions.¹ Formal education is the education provided within the framework of a certain curriculum and plan in an environment with certain rules and in accordance with certain methods. Examples of this are the education provided in schools. One of the types of formal education, education in schools is actually a formal education. Formal education is regular education for individuals in a certain age group who participate in education and training activities in primary, secondary, and higher education under education programs prepared according to the purposes of the Ministry of National Education.²

Schools are vital, indispensable, and irreplaceable institutions for education. Schools are described as formal education institutions and play an active role in the academic success of the new generation under education thanks to its being compulsory. However, concepts such as physical activities, honesty, being respectful, complying with moral values, comfortable communication, paying attention to human relations, complying with the rules of courtesy, taking initiative, business discipline, cleanliness, order, etc. come to the forefront as well as academic success in at the present time. The individual is considered as a whole and efforts are made to develop the characteristics that make people human.³

It is emphasized that the individual should be considered as a whole and that education is not only about mental processes when the general objectives of the Ministry of National Education are examined. The statement "Raising all members of the Turkish nation in a balanced and healthy way in terms of body, mind, morality, soul, and emotion, having a free and scientific thought ability, having a broad world view, respecting human rights, valuing personality and enterprise, being responsible to society; being constructive and productive" shows that the Ministry of National Education in Turkey sets objectives for many areas, and one of these objectives is physical activities.⁴

The demands of athlete students who want to be a performance athlete in a sports club while continuing the education life through formal education do not comply with the duration of official leave permission allowed by the relevant legislation. For primary school students, the following provisions are included in formal education: upon the valid excuse and the application of the parent, the school administration may allow up to 15 days of leave in a school year, secondary school students have the right to leave for 10 days for an unexcused absence, 45 days for an excused absence, and students studying in higher education institutions have the right to not attend lessons up to 30% of the total lesson hours in an academic year.^{5,6} Given the fact that the age of starting sports in order to perform sports is 7 and even earlier in some sports branches, this leave duration or method arises as a problem for these students who need to train regularly from primary school to the end of compulsory education, and even during their higher education. Formal education of athlete students who do not attend school more than

the leave period stated by the legislation is terminated just because they participate in regular training for professional sports purposes. Başaran (2013) theoretical and practical deficiencies are clearly observed even though the issue seems to have been resolved in the context of legislation regulations.⁷

This study aims to examine the formal leave permission problems faced by formal education students performing performance sports and to make possible solution suggestions in light of the results. Answers to the following questions were sought within the framework of this main purpose:

1. Is the duration of official leave permission in formal education an obstacle to performing performance sports?
2. Can students who want to receive formal education and perform performance sports do these simultaneously?
3. What experiences do formal education students performing performance sports experience due to the duration of leave permission?
4. Are there solutions for the duration of official leave permission for those performing performance sports in formal education?

3. MATERIALS AND METHODS

3.1. Model of Research

This research is a qualitative study in terms of data collection and analysis. One of the qualitative research patterns, the phenomenological method was chosen as the sampling method of the research in order to reach the experiences of the participants, and maximum diversity sampling was chosen as the sampling method of the research since the participants were in the primary, secondary, and high school categories of formal education. The maximum diversity sampling method was chosen while selecting the participants of the research.

3.2. Study Group

The participant group of this research consists of 20 students in primary, secondary, high school, and higher education levels of formal education that perform sports in different sports branches in Turkey. The demographic information of the participants is shown in Table I.

Table I. Demographic information of the participants

Participants	Education Level	Age	Gender		Category				Sports Branches
			F	M	A Team	Yout h Setu p	Natio nal	Olym pic	
Between P1 and P5	Primary School	9-16.	2	3	0	3	2	0	Football, Volleyball, Wrestling, Athletics, Taekwondo, Karate, Swimming, Bocce
Between P6 and P12	Secondary Education (High School)	15-21.	3	4	0	5	2	0	
Between P13 and P20	Higher Education	21-29	3	5	6	2	3	1	

3.3. Data Collection Tools

Qualitative methods were used to collect the data and the data were obtained through interviews in this study. A semi-structured interview form prepared in accordance with the literature was used in the interviews.⁸ Considering the principles of question development the form is shaped like a son.⁹ The interviews were conducted on a voluntary basis and each interview lasted 30-50 minutes. Parent information form was prepared for participants under the age of 18 and parental consent was obtained.

3.4. Data collection

Three different tools were used in the study. These are the interview form prepared by the researcher, the voice recorder with which the interview was recorded with the permission of the participant, and the observation logbook used throughout the observation. Advanced voice recognition technology program was used to convert the voice recordings obtained from the interviews into text.

3.5. Data Analysis

Audio recordings converted to text via the transcription program were transferred to MAXQDA 2020 software. In line with the responses of the participant opinions, content analysis was performed in order to analyze the data adapted to the codes, categories, and themes in-depth, to reach the concepts and relationships that can explain the collected data, and to reveal the non-specific themes in detail.

3.6. Ensuring Validity and Reliability

Directing the participants to any idea in the interviews during the data collection process was avoided since the validity of qualitative research will be possible with the researcher being as neutral as possible.¹⁰ The data were presented to an expert opinion in order to ensure compatibility between encoders and 95% compatibility was observed. Possible data losses that may occur in the analysis and reporting process were prevented using the voice recorder, transcription software, and qualitative data analysis software.

3.7. The role of the researcher

Topic selection, literature review, obtaining expert opinions, creating interview questions and forms, conducting interviews, obtaining voice recordings and converting them into text, analyzing interview texts, applying for compatibility between encoders were actually conducted by the researcher during this research and the research was concluded under the authority of the researcher.

4. RESULTS

Content analysis was performed on the results obtained from the questions asked to the participants through the semi-structured interview form in this section. 7 different themes were identified as trust problems, career problems, academic problems, sports problems, family problems, economic problems, and physical problems as a result of the analysis. Under these 7 themes, 19 codes were reached. The word cloud of the model and codes showing the themes reached as a result of the analysis is given below.



Figure 1: Word cloud of the codes that the collected data focuses on

It is seen in Figure 1 that the problems focus on the code of "absenteeism from training" when the codes created from the data obtained from the opinions of formal education students regarding official leave permission problems are examined. "Inability to understand the content of lessons", "demand for continuous management", "insistent pressure of the family to reject sports" were also identified as prominent problems.

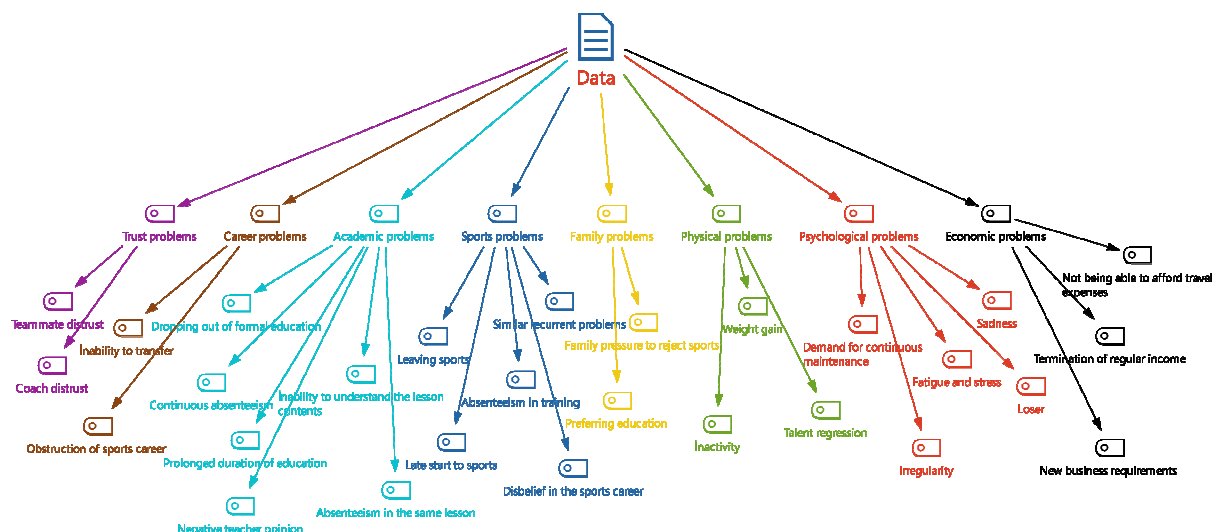


Figure 2: Themes and codes created regarding the opinions of formal education students performing performance sports.

The data obtained from the participant opinions are visualized in themes and codes and shown in Figure 2. Accordingly, "trust problems", "career problems", "academic problems", "sports problems", "family problems", "economic problems", "psychological problems", and "physical problems" are the themes created in line with the data obtained. Considering the themes, it is seen that the codes are mostly concentrated under the themes of "academic problems" and "sports problems". Following these themes, it was determined that the participants reported opinions that drew attention to the problems related to the themes of "Psychological problems", "family problems", "trust problems", "economic problems", and "career problems", respectively.

In line with the opinions of the participants, codes were created as follows; dropping out of formal education, negative teacher opinion, continuous absenteeism, absenteeism in the same lesson, prolonged duration of education, and inability to understand the lesson contents under the theme of "academic problems"; leaving sports, late start to sports, absenteeism in training, similar recurrent problems, disbelief in the sports career, under the theme of "sports problems"; talent regression, performance degradation, weight gain, and inactivity, under the theme of "physical problems"; family pressure to reject sports and preferring education under the theme of "family problems"; club distrust, teammate distrust, and coach distrust, under the theme of "trust problems"; termination of regular income, not being able to afford travel expenses, and new business requirements under the theme of "economic problems"; and inability to transfer and obstruction of sports career under the theme of "career problems"; demand for continuous maintenance, irregularity, fatigue and stress, loser and sadness under the theme of "psychological problems".

5.DISCUSSION

The issues that gained intensity in the interviews are; being in school at the times corresponding to the training hours of the students performing performance sports, double-shift school students' having to be present in the school especially in the afternoon and receiving additional education in institutions such as private teaching institutions and science and art centers. Among participants, P10 stated, "... our school starts at 09:00 in the morning. It ends at 15:00. I go to the Science and Art Center at 16:30, and it ends at 19:00. In this case, I am not able to participate in any sports activities. All my sports acquisitions so far have regressed. " and tried to reveal the problem.

The research focused on the limitation of the duration of official leave permission determined in the legislation to different numbers of days in primary, secondary, and higher education, the inability of students to participate in training regularly, the inability to provide talent development, disorganized daily life, disruption of the education received, problems with school administration and teachers, academic failure, quitting formal education, and quitting sports. A similar result was reached in the

study conducted by Kılıç (2006). According to Kılıç (2006), 67% of athlete students do not receive sufficient support from the school administration regarding permission. Although it is a legal requirement for school administrations to apply the basic laws and regulations of the Ministry of National Education, it reveals that it poses a great problem for students who are in the process of choosing sports as a profession. Athlete students can only benefit from this duration, which covers school sports activities at most, only for a few days.

Participants reported that their families developed a negative attitude towards performance sports due to the inadequacy of the duration of official leave permission given to them to perform performance sports. It can be said that this is due to the fact that families prioritize the education of their children and that performance sports are considered as an obstacle to receiving a good education. Families' concern arises from failures that may occur in their children's school lessons, high school entrance exams, university exams, public employment exams, and other academic exams. A concern in this direction was mentioned in the study conducted by Pehlivan (2009). Pehlivan reported that families put pressure on their children due to difficulties in the exam system and that they had a negative attitude that this pressure might increase gradually. In a study with similar results conducted by Canal (2008), athlete students reported that their families did not see sports as a profession and therefore, they had an attitude towards leaving sports and prioritizing education due to their beliefs that performance sports and education could not go well together. Formal education students stated that the duration of official leave permission during the performance sports process caused some negative effects on themselves. Participants reported that since they could not provide regular and continuous participation in training, their sports skills were dulled, the body volume required for the sports branch got out of control due to gaining weight, they had psychological burden due to all these negative effects and they got used to living with inevitable disorganization. Athlete students stated that they experienced stress and mental fatigue because they continued their school education in order to ensure their academic development and continued their training at the same time in order to be successful in the sports branch they loved. Similar results were obtained in a study conducted by Özcanoglu (1993). Özcanoglu (1993) reported that athlete students could not participate in sports activities because their academic success was adversely affected. It can be said that both sports and academic careers of athlete students are adversely affected due to the overlapping lesson schedule with training.

Another problem is that formal education students make insufficient use of education and training activities at school. Athlete students use the official leave permission given to them to participate in the training sessions held 3-4 days a week; in addition, they apply to procedures such as health reports, excused absence upon application of their parents, and other ways to increase the duration as much as possible. It can be said that absenteeism in educational activities triggers academic failure considering that this situation reduces the duration of participation in educational activities in the school. The generally recognized 30% right of absence of higher education students regarding the obligation to attend classes raises the demand for students performing performance sports to be constantly flexible in attending classes. The situation of managing absenteeism in the lessons, which can be called abuse of the relevant legislation shows that it has become a solution that higher education students mostly resort to. Meanwhile, students' constant begging behavior may cause them to develop negative personalities. Sarı's (2002) research is in parallel with the judgment in this section of our study. Sarı (2002) reported that the most important problem encountered by athlete students in their sports career had adversely affected their academic success. Canal's (2008) research is also similar to these results. Canal (2008) found that athlete students could not spend enough time studying and had to take a break from sports due to absenteeism. It can be said that this is due to intense training schedules and competitions of athlete students. The problem of the duration of official leave permission reveals that athlete students performing performance sports also have some problems with their clubs. The fact that athletes who cannot participate in training sessions regularly causes the students not to be preferred for the competition prevents them from making new contracts with their club and reveals sports career problems such as the transfer of athletes to an upper league. Another point where the data obtained from the participant opinions are concentrated is that the duration of official leave permission causes some confusion in the parents of athlete students, which can sometimes cause the athlete to start performing sports late. Among the participants, P15 stated, *"My family let me start performing sports late because I had to attend school for fear of failing the class. My competitors in Europe started performing sports 7-10 years before me."* in order to reveal the effects of the duration of official leave permission on their families. It is seen that some of the athlete students who could not produce a solution in this regard quit formal education and some quit the performance sport. In a study yielding similar results, Nemutlu (1998) reported that athlete students may exhibit attitudes such as inability to start performing sports and therefore, quitting sports because they are anxious about difficulties in admissions to universities and obtaining a profession due to the risk of academic failure.

6. CONCLUSION AND RECOMMENDATION

The duration of official leave permission within the scope of the legislation on formal education leads to the following problems according to the opinions of the students performing performance sports; quitting formal education, continuous absenteeism, receiving negative opinions from teachers, not understanding the content of the lesson and prolonging the duration of education under the theme of "academic problems"; quitting performance sports, starting sports late, absenteeism due to training and lack of faith in the sports career under the theme of "sports problems"; skills regression, weight gain, and inactivity under the theme of "family problems"; termination of regular income, not being able to afford travel expenses, and the need for a new job under the theme of "economic problems"; not being able to transfer and obstruction of sports career under the "sports career problems".

This study suggests that the legislation related to the duration of official leave permission in formal education, which causes problems, should be rearranged to allow performance athletes in formal education to perform. In addition, the appropriate model can be put forward by examining the official leave permission applications in different countries for formal education students performing performance sports.

REFERENCES

1. Ergunes Y. (Ed.), Saylan N. Introduction to Educational Science. Anı Publishing House (Balıkesir). 1998; ed.10: 50.
2. Fidan, N, Erden M. Introduction to Education. Alkim Publishing House (Ankara). 1998; b.1: 222.
3. Aydın M.Z. Values Education at School. Education Overview (Ankara). 2010; 6 (1): 16-19.
4. Official Newspaper. Turkey's National Education Basic Law (Ankara). 1973; 14574, Law No.: 1739.
5. Official Gazette. Ministry of National Education Pre-School Education and Primary Education Institutions Regulation. 26 July 2014; 29072.
6. Official Gazette. Ministry of National Education Regulation on Secondary Education Institutions. 7 September 2013; 28758.
7. Basaran M. The Situation of Athletes and Other Persons (Wage Earners) Working in Sports Activities vis-à-vis Labor Law and Social Security Law. 2013. Available from: <http://www.futbolekonomi.com/index.php/haberler-makaleler/hukuk/172-murat-baaran/2665-sporcular-ve-spor-faalyetnde-goerev-alan-der-klern-uecretlern-hukuku-ve-sosyal-guevenlk-hukuku-karisindak-durumu-.html>.
8. Glesne C. Çev. (Ed.) Ersoy A. Yalcınoğlu P. Introduction to Qualitative Research. Memoir Publishing (Ankara). 2020; ed.6: 49.
9. Bogdan R.C, Biklen SK. Qualitative research for education. Pearson Education (Boston);5/34.
10. Kirk J, Miller ML. Reliability and validity in qualitative research. Beverly Hills: Sage Publications (USA). 1986: P19.
11. Kılıç M. Sports Students in School Teams' Rates of Doing Sports on Club Basis and Factors Affecting This (Van City Example), (Master's Thesis). Gazi University Institute of Educational Sciences Department of Physical Education and Sports (Ankara). 2006: 72-73.
12. Pehlivan Z. Expectations of Families for Children Participating in Sports, Behavior Changes Observed in Children and Barriers to Sports Participation. Spormeter, Journal of Physical Education and Sport Sciences. 2009; 6(2): 69-74.
13. Canal E. Determining the Problems and Expectations of Students in Sports High Schools (Master's Thesis). Gazi University Institute of Educational Sciences, Department of Physical Education and Sports (Ankara). 2008: 142-143.
14. Özcanoglu A.B. The Effects of Participation in School Sports Activities on the Academic Achievement of Students in Secondary Education (Master's Thesis). Gazi University Institute of Health Sciences (Ankara). 1993: 37-45.
15. Sarı, F. Situation Analysis Regarding the Determination of Participation Purposes of Students Participating in Sports Activities in Secondary Education Institutions and the Problems They Face (Master's Thesis). Gazi University Institute of Health Sciences (Ankara). 2002: 75-82.
16. Nemutlu, D. Education Problems of Youth. Çukurova University Journal of Education Faculty. 1998; 2(17): 165-175.

PSYCHOLOGICAL RESILIENCE IN INDIVIDUALS WHO DO ACTIVE SPORTS*²**DİLEK AMCAOĞLU GÖKTUNA*², RAHİLE GÜRAN³, AHMET HAMDI ÇAKMAK⁴**

² Izmir Kavram Vocational School, Department of Management and Organization, Sports Management Program, E mail: dilek.amcaoglu@kavram.edu.tr, Orcid: <https://orcid.org/0000-0002-1641-5441>

³ Izmir Kavram Vocational School, Department of Management and Organization, Human Resources Management Program, E-mail: rahile.guran@kavram.edu.tr, Orcid: <https://orcid.org/0000-0002-9130-3482>

⁴ Izmir Kavram Vocational School, Department of Management and Organization, Human Resources Management Program, E-mail: ahmet.cakmak@kavram.edu.tr, Orcid: <https://orcid.org/0000-0003-4139-5056>

Corresponding author: dilek.amcaoglu@kavram.edu.tr**ABSTRACT**

Psychological resilience defines struggling against the negativities experienced by the individual, continuing to exist and overcoming the negativities encountered. The aim of this study is to perceive the meaning attributed to psychological resilience by individuals who do sports. The structured interview technique was used in this study which was handled with qualitative data collection technique. The structured interview form developed by the researchers was used as the data collection tool in the study. A total of 12 people, 7 women (60%) and 5 men (40%), who regularly exercise at least 3 days a week for at least 1 hour a day in a gym, participated in the study. The ages of the participants in the research vary between 20 and 40 and the average age is 28. Participants stated that they exercised at least 3 days a week, at least 1 hour a day. According to the findings, doing sports positively affects the psychological resilience of individuals in terms of coping with stress, self-confidence, self-efficacy, socialization and optimism.

Keywords: Psychological Resilience, Flexibility, Self-efficacy, Socialization, Self-confidence**INTRODUCTION**

The study on psychological resilience started in 1950 with the curiosity of the researchers on how the children managed to save themselves from serious disadvantageous positions without getting hurt. The researches on psychological resilience with its altering resistance construct is seen in literature especially in traumatology and development psychology.²⁰ The researches on resilience is also analyzed in traumatology (focusing on adult behaviour that causes trauma), developmental psychopathology (focusing on the reactions of children towards difficulties), positive psychology (focusing on upgrowth of individual, focusing on positive emotions and positive relationships), and humanist psychology (focusing on individual producing a meaning in life and his growth).

Especially humanist psychology is philosophically the basis of both the positive psychology and the researches on resilience. Psychological resilience derives from the word "resilens" in Latin and at the same time is a concept which is the subject of many researches and of which many descriptions are made. Ramirez (2007), describes the psychological resilience as such: the ability of fast recovery from illness, depression, changes or bad situations; pulling yourself together; going back to normal again after being hurt; elasticity.²⁵ Jacelon (1997), describes the psychological resilience as the ability to adapt when one encounters the negative events of life and the ability to cope with these situations.¹⁶ At the same time, the concept of resistance or resilience which is the basis of psychological endurance has meanings such as matter being elastic or the matter taking its original state easily again.⁹

Sport is a cultural phenomenon that improves the abilities of the individual when changing its personal environment to human environment, a phenomenon which is made under certain rules, with or without equipment, which is made alone or with a group of people in leisure time or taking his/her full time as a profession, socializing, creating bonds with society, improving body and the mind, competitive, cooperative.¹¹ According to Dönmez, sport is the whole of the body activities which is realised personally or with a group of people, which generally results in competition and is made according to a series of rules.¹⁰ In the dictionary of Turkish Language Association "Sport" is defined as the whole of actions made personally or with a group of people, with the aim of improving the body or the mind and is realised according to a set of rules.³¹ Sport helps personality to develop

² This study was presented as a poster presentation at ICHES International Humanities and Educational Sciences Congress on 08.11.2019.

by strengthening the will, thus boosting self-confidence. Sport is an important factor for discovering individual's uncharted abilities and it triggers his/her creativity.³⁰ At the same time sport prevents illness disorders such as high blood pressure, diabetes, obesity, cholesterol and inactivity. It relaxes the mind and increases the energy. It prevents stress, heart disorders and cancer. It contributes to bone and muscle health. It decreases the blood pressure and cleans toxin in the body.⁷

The main purpose of our research is to make a study for the psychological resilience of the healthy individuals who make sport.

I. LITERATURE REVIEW

William James (1910) defines psychology as "a science that examines mental life".² Hökekeli describes as such: Psychology discusses "the direction of the human mental life and behaviour".¹⁴ The goals of psychology are to define various patterns of behaviour of the organisms, explain the reason of the behaviour, guess how the organisms will react under certain conditions and control the behaviour of the organisms.²⁴

The scientific study of subjective wellbeing, is a reaction developed partly to overwhelming emphasis on negative situations in psychology. Scientific articles that analyze negative situations outdistance the ones that analyze positive situations 17 to 1. Humans give different reactions to the same conditions and they evaluate these conditions according to their unique expectations, values and past experiences. Even though crime statistics and income rates are related to the discussions of the quality of life, subjective elements are also of great importance. Moreover, happy people compared to unhappy ones, have a more desirable life, they are better people and they are assumed to have a greater chance to be accepted to heavens.⁸

After Post traumatic stress disorder (PTSD) is accepted as a diagnosis in the handbook of diagnostic and statistical manual of mental disorders (SDM-III, American Psychiatric Association), the importance of analyzing risk/resilience factors became even more evident. Childhood experiences create a risk or resilience in adulthood and (PTSD) predictors are indicated to have a great effect on the psychological resilience.⁶ Masten vd. (1990) defines psychological resilience as such: "The process, quality or result which helps getting positive outcomes in the face of difficulties; getting positive outcomes in the face of high risk situations and letting out social competence from trauma".²¹

Psychological resilience is a complex phenomenon that involve psychosocial, experimental, behavioral and physiological elements. For determining, measuring and scanning resilience, a clear and useful understanding must be developed that explains why some individuals are more resilient than the others to certain kinds of stress and why the very same person can be resilient less or more to differentness.¹⁹ The term Psychological resilience includes adapting to the changes occurring in the life of the individual through the interacting dynamical process of risk and protection factors, when confronted with negative situations.²³ Because the ability to perform under stress in extreme or dangerous situations is critical to surviving psychologically and physically.¹⁹

Psychologically intact people are defined as individuals who don't suffer emotional or physical disorder when confronted with significant events that are stressful.²⁸

It is stated that physical health has an important role to be able to cope with and overcome stressful experiences and that being unhealthy is an important risk factor.⁵ Considering that the individual can cope with and overcome stressful experiences while doing sports, various training styles and feelings occur when psychologically and physically healthy individuals are under stress. The role of sports and physical activity in the protection and development of physical health has been revealed by many research findings. The results of this study show that regular exercises function as a protective factor against diseases such as coronary heart disease, high blood pressure, cancer types, diabetes and osteoporosis.²⁷ Sport; It can be defined as "all body movements performed in the form of personal or collective games, usually leading to competition, and applied according to a set of rules".¹⁰

The aim of this study is to understand and examine the psychological endurance perception of individuals who are not professional athletes but actively benefit from a sports facility and do sports.

2. MATERIALS AND METHODS

2.1. Purpose and Importance of the Research

The purpose of this research; To learn the psychological endurance perceptions of individuals who do sports. Lack of research on psychological endurance in healthy individuals who do sports in the literature review makes this study important. Work; It can provide useful ideas to individuals doing sports, academics, social workers and those working at international level.

2.2. Research Model

The research was conducted separately in the structured interview experiments, one of the qualitative research experts.

2.3. Sampling

A total of 12 people, 7 women (60%) and 5 men (40%), participated in the study in a gym. The ages of the participants vary between 20 and 40 and the average age is 28.

2.4. Collection of Data

The data of this study were collected through a demographic information form created by the researchers and six open-ended questions. The data collection took place between 2 July and 14 July 2019.

2.5. Analysis of Data

Content analysis was used for data analysis. Themes and categories were determined by coding for the collected data. Resilience category is grouped under the themes of coping with stress, self-esteem, self-efficacy, socialization and optimism.

3. FINDINGS

3.1. Findings Regarding the Socio-Demographic Characteristics of the Shared

A total of 12 people, 7 women (60%) and 5 men (40%), participated in the study in a gym. The ages of the participants vary between 20 and 40 and the average age is 28. Educational status is high school graduate (n = 3), associate degree (n = 4), bachelor's degree (n = 3), master's degree (n = 2).

3.2. Findings Regarding Thematic Analysis

3.2.1. Psychological Resilience Category

Tables on the codes created from the themes of the psychological resilience category and the frequently repeated statements are given in Table 1.

Table 1: Themes and Codes of the Psychological Resilience Category of Individuals Doing Sports

Category	Theme	Code
Psychological Resilience	Coping With Stress	Physical Relaxation
		Emotional Flexibility
		Avoid Worries
	Self esteem	Feeling Important
		Motivated
		Confidence
	Self-efficacy	Feeling Self-Sufficient
		Self Awareness
		Increasing Self Value
	Socializing	Becoming a Member of a Group
		Motivation
		Coordination
	Optimism	Feeling Peaceful
		Calmness
		Increased Endurance

3.2.1.1. Coping With Stress

"Exercising during tense periods relaxes me mentally and relaxes physically.", "I was suffering from chronic insomnia. Sport has been a good remedy for my fatigue and insomnia and I think it increases my fitness. ", "I think I relieve my stress better and relax by wearing my headphones. " In this way, I put my life in order by eliminating the problems related to making quick decisions and finding solutions by thinking positively. This makes me happier. ", "Exercising in stressful times makes me forget the factor that causes stress. It makes me feel happy to fully focus on my sport and see my progress. ", "Since mental fatigue is heavier for me than physical fatigue, exercising gives me an opportunity to get away from negativity. ", "Whatever I'm in at that moment makes me forget for a while. I try to stretch it out and relax. "

3.2.1.2. Self Esteem

"I feel confident, more vigorous and durable, happy and more energetic.", "I feel fitter, more peaceful and more self-confident.", "I confront myself during sports and make my energy flow more comfortable. I would motivate myself better individually and go above everything. ", "Exercising increases the value I give to myself. "

3.2.1.3. Socializing

"I like attending group lessons more. Exercising in the same environment with other people and doing the same movements in a coordinated way makes me feel good ", "Exercising in a group is more motivating for me. "

3.2.1.4. Self-Efficacy

"Exercising increases the value I give to myself.", "I feel more competent.", "We can say that I am back to myself.", "Exercising gives me strength by moving away from the problems in my private life." people are buried. I can say for myself that exercising makes me feel like I am self-sufficient. "

3.2.1.5. Optimism

"I feel peaceful, I am aware that exercising calms me. ", "I feel happy, as if my perspective on events and situations has changed. ", "I gained awareness. I feel calmer towards other people. ", "I'm discharging officially. My tolerance is increasing. ", "I feel better. It's like I get less angry when I play sports. "

4. DISCUSSION

Active sports activities are not only a source of physical development, but also a factor that has psychological and psychological effects and causes positive developments in the mental state and socialization level of individuals.¹⁵ Although sports physically cause changes in individuals, it also causes emotional changes that psychologically relax individuals and make them feel happier and more peaceful.

In this study, we found that individuals who do sports can cope with stress, which is an intrinsic factor of psychological resilience. When we look at the literature on this finding, it is supported by the study findings that the sports performed by Tazegül (2012) with the sample of individuals who do sports creates a sense of self-confidence in individuals, and depending on the sense of self-confidence, the individual can evaluate the problems more logically and effectively cope with problems and stress.²⁹ In addition, in a study conducted by Canan and Ataoğlu (2010), 69 athletes (35 team athletes, 34 individual athletes) who regularly do sports (at least 5 hours a week) and 26 controls who do not regularly do sports, It has a positive effect on anxiety. It can be said that regularly doing team sports has a positive effect on depression and problem solving skills.⁴

In this study, regarding the theme of self-esteem, they mentioned that sports make individuals feel important by increasing their self-esteem. Considering the studies conducted on this result, Korkmaz and Uslu's (2020) conclusion that high self levels of 279 fitness participants decrease social appearance anxiety and the socialization levels of these participants in sports will increase their self-esteem levels.¹⁷ According to Sarkar and Fletcher (2015), psychological endurance is important in achieving and maintaining high performance in sports.²⁶ Supporting this study, in a study conducted by Altıntaş (2017) with a sample of 271 trainers, it was found that the high psychological endurance of athletes who do sports professionally both themselves and trainers is important for both trainers and athletes. In order to provide resilience, it has been stated that the power of stretching and supportive speeches plays a positive role in success.¹

In this study, it was concluded that doing sports increases self-efficacy along with psychological endurance. Self-efficacy, on the other hand, helps individuals determine their behavior and behavioral preferences, their level of persistence when they encounter obstacles, cognitive strategies and emotional situations.¹³ Supporting this result, they found that the self-efficacy of adolescents aged 12-14 who do sports is higher than those who do not do sports.¹²

In our study, it was found that doing sports increases psychological endurance along with socialization. Sport has an important place in the psycho-social development of individuals. Sport enables people to be socially and psychologically active. Individuals engaged in sports can socialize and express themselves more comfortably by interacting with different people through sports.¹⁸

Optimism; Positive feelings towards life, high morale, ability to solve problems effectively, academic and professional success, the secret of a healthy and long life have been defined as an important way to avoid depression.²² In our study, it was concluded that individuals who do sports increase psychological resilience with optimism. Contrary to this finding in the literature, Bostancı et al. (2017), with a sample of 486 students who do not do sports and 262 do a total of 486 students, it has not been observed that doing sports has an effect on optimism and aggression.³

One of the most striking findings of this study is that healthy individuals can cope with stress more comfortably in terms of psychological resilience.

5. RESULT

In our study, the theme of coping with stress was reached as individuals feel calmer as they do sports, and their problem-solving skills improve and their endurance increases. Since they state that their self-confidence increases with the change of their physical appearance, it increases the self-esteem of individuals.

The self-esteem theme was reached by feeling that their self-confidence increased. Self-esteem is a very important phenomenon in terms of psychological resilience. The theme of self-efficacy was reached by making sports feel more useful. They also mentioned that they felt more optimistic while doing sports.

Self-efficacy is thought to increase the perception of emotional flexibility in an individual's life. An important aspect of sports is socialization. When individuals' socialization levels increase, the experience of social learning manifests as spiritual and psychological resilience.

The theme of socialization that emerged in our study is important in this respect. Research results are important in terms of increasing the psychological strength of individuals who do sports. Sport causes an increase in individuals' resilience levels.

In our age where the emotional flexibility of people is so high and stress and anxiety are an increasingly current problem, doing sports is an important activity that increases psychological strength, which has psychological and psychological contributions beyond physical development.

This research has some limitations. First of all, the psychological resilience perceptions of the participants in the study and the difference in their perspectives on sports presented us with quite different themes, but the limited theme was focused on. In this context, it should be suggested to work on the same subject again for future studies.

6. CONCLUSION

More detailed research is recommended, especially on the relationship between sports and optimism. In addition, in this study, the perception of psychological resilience in individuals who do sports was tried to be understood with open-ended questions. Therefore, the themes in the resilience category have not been examined

which ones are more related or their effect on each other. In this context, it is thought that using objective measurement tools in future studies that will examine these elements may be effective.

REFERENCES

- Altıntaş, A. (2017). The Role of Basketball Coaches' Psychological Resilience in Determining Their Leadership Style. Başkent University Faculty of Health Sciences Journal-BÜSBİD, 2 (1). Available from: <http://busbid.baskent.edu.tr/index.php/busbid/article/view/69>
- Balkış Baymur, F. (2017). General Psychology. Revolution Bookstore. (26th Edition).
- Bostancı, O., Oda, B., Şebin, K., & Erail, S. (2017). Investigation of the Level of Optimism and Aggression of 11-13 Years Old Students According to Their Sports Activity. Journal of Physical Education and Sport Sciences, 19 (4), 205-217. Available from: https://dergipark.org.tr/tr/pub/ataunibesyo/issue/33246/373878#article_cite
- Canan, F., & Ataoğlu, A. (2010). The effect of regular sports on perception of anxiety, depression and problem solving skills. Anatolian Journal of Psychiatry, 11 (38), 38-43. Available from: <https://app.trdizin.gov.tr/publication/paper/detail/TIRrNU9UVTE=>
- Coleman, J. & Hagell, A. (2007). The Nature of Risk and Resilience. in: Coleman J. & Hagell A. (Eds.), Adolescence, risk and resilience: Against the odds (pp. 1-17), West Sussex: John Wiley & Sons
a. Doi: [10.1007/s10964-011-9666-2](https://doi.org/10.1007/s10964-011-9666-2)
- Delahanty, D. L. (2008). *The psychobiology of trauma and resilience across the lifespan*. Jason Aronson.
- Demir, M., & Filiz, K. (2004). Effects of sports exercises on human organism. Gazi University Journal of Kirsehir Education Faculty, 5, 109-114. Available from: <https://dergipark.org.tr/tr/pub/kefad/issue/57226/808287>
- Diener, E., Suh, E.M., Lucas, R. E., and Smith, H.L. (1999). Subjective well-being: Thirty years of progress. Psychological bulletin, 125 (2), 276.
a. Doi: [10.1037/0033-2909.125.2.276](https://doi.org/10.1037/0033-2909.125.2.276)
- Doğan, T. (2015). Turkish adaptation of the Brief Psychological Resilience Scale: Validity and Reliability Study. The Journal of Happiness & Well-Being, 3 (1), 93-102. Available from: <https://www.journalofhappiness.net/frontend/articles/pdf/v03i01/77.pdf>
- Dönmez, K. Y. (2012). Ankara Bar Association Sports Law Board Lawyer Atilla Elmas Gift: Whether the coaches can be considered athletes and their situation against the labor law (First Edition). Ankara: Koza Printing.
- Erkal, M.E., Güven Ö. and Ayan D. (1998). Sports in Sociological Perspective. Istanbul: Turkish World Research Foundation Publications. Available from: <https://dergipark.org.tr/tr/pub/mjss/issue/40477/484902>
- Eyuboğlu, E. (2012). Comparison of Self-Efficacy Levels of Adolescents Between 12-14 Years Doing Sports and Not Doing Sports (Doctoral Dissertation, Institute of Social Sciences). Available from: <https://www.ulusaltezmerkezi.net/spor-yapan-ve-yapmayan-12-14-yas-arasi-ergenlerin-oz-yeterlik-duzeylerinin-karsilastirilmasi/>
- Guran, R., & Guler, B. K. (2019). The effect of workload and time pressure on burnout in thermal power plant workers: the mediating effect of self-efficacy in managing work – family conflict, Journal of Research in Economics, 3 (2).
a. Available from: https://dergipark.org.tr/tr/pub/jore/issue/49804/638801#article_cite
- Hokelekli, H., (2008). Introduction to Psychology, Bursa: Thought Bookstore.
- Imamoğlu, O., (1992), Sport-Health Relationship, Journal of Ondokuzmayıs University Faculty of Education, 7 (1), 63-66. Available from: <https://dergipark.org.tr/tr/pub/omuefd/issue/20257/215115>
- Jacelon, C. S. (1997). The Trait and Process of Resilience. Journal of Advanced Nursing, 25, 123-129.
a. Doi: [10.1046/j.1365-2648.1997.1997025123.x](https://doi.org/10.1046/j.1365-2648.1997.1997025123.x)
- Korkmaz, M., & Tuna, U. (2020). Investigation of the Relationships Between Self-Esteem, Social Appearance Anxiety and Socialization Levels of Fitness Exercises. Sports Education Journal, 4 (3), 1-18. Available from: <https://dergipark.org.tr/tr/pub/seder/issue/56756/740252>
- Küçük, V., & Koç H. (2004). Relationship between people and sports in psycho-social development process. Dumlupınar University Journal of Social Sciences, (9). Available from: <https://dergipark.org.tr/tr/pub/dpusbe/issue/4752/65286>
- Lukey, B. J., & Tepe, V. (Eds.). (2008). *Biobehavioral resilience to stress*. CRC Press.
- Luthar, S. S., Cicchetti, D., and Becker, B. (2000) 'The construct of resilience: A critical evaluation and guidelines for future work', Child Development, 71(3): 543–562 . Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1885202/>
- Masten, A.S., Best, K. M., & Garmezy, N. (1990). Resilience and Development: Contributions from the study of children who overcome adversity. Development and Psychopathology, 2, 425-444.
a. Doi: [10.1017/S0954579400005812](https://doi.org/10.1017/S0954579400005812)
- Oda, B. (2014). Investigation of optimism and aggression levels of 11-13 age group students who do sports and those who do not. (Unpublished Master Thesis). Ondokuz Mayıs University Institute of Health Sciences, Samsun. Available from: <https://dergipark.org.tr/tr/pub/ataunibesyo/issue/33246/373878>
- Onder A. & Gülay, H. (2008). Psychological Resilience of Primary School 8th Grade Students in terms of Various Variables. 9 Eylül University, Journal of Buca Education Faculty, 23: 192-197. Available from: <https://dergipark.org.tr/tr/pub/deubefd/issue/25428/268260>
- Plotnik, R., (2009). Introduction to Psychology, (Trans. Tamer Broad), Istanbul: Kaknüs
- Ramirez E. (2007). Resilience: A Concept Analysis Nursing Form, 73-82. Doi: [10.1111/j.1744-6198.2007.00070.x](https://doi.org/10.1111/j.1744-6198.2007.00070.x)

26. Sarkar, M., & Fletcher, D. (2013). How should we measure psychological resilience in sport performers?. *Measurement in Physical Education and Exercise Science*, 17(4), 264-280.
a. Doi: [10.1080/1091367X.2013.805141](https://doi.org/10.1080/1091367X.2013.805141)
27. Scully, D., Kremer, J., Meade, M. M., Graham, R., & Dudgeon, K. (1998). Physical exercise and psychological well being: a critical review. *British journal of sports medicine*, 32(2), 111-120.
a. Doi: [10.1136 / bjsm.32.2.111](https://doi.org/10.1136/bjsm.32.2.111)
28. Sipahioğlu, O. (2008). Psychological Resilience of Adolescents in Different Risk Groups. Master Thesis. Selçuk University Institute of Social Sciences, Konya. Available from: <http://acikerisimarsiv.selcuk.edu.tr:8080/xmlui/handle/123456789/391>
29. Tazegül, U. (2012). Comparison of Individual Athletes' Coping Styles with Stress. *Journal of Sports and Performance Research*, 3 (2), 13-22. Available from: <https://dergipark.org.tr/tr/pub/omuspd/issue/20454/217801>
30. Yetim, A. (2000). Social View of Sports. *Gazi Physical Education and Sport Sciences Journal-Gazi BESBD*, 5 (1), 63-72. Available from: <https://dergipark.org.tr/tr/pub/gbesbd/issue/27963/298406>
31. <https://sozluk.gov.tr/> Accessed on December 1, 2020.

WHICH TYPE OF EXERCISE IS MORE EFFECTIVE ON BODY COMPOSITION OF SEDENTARY WOMEN?

ESIN GULLU*

*Associate Professor, Usak University, Faculty of Sport Sciences, Turkey

Corresponding author: gullu.esn@gmail.com

ABSTRACT

This study aimed to examine which type of exercise was more effective on body composition of sedentary women. A total of 54 healthy sedentary women voluntarily participated in our study. Participants were randomly divided into three groups; pilates group (PG; n:19), step aerobics group (SG; n:18), and jogging group (JG; n:17). The 12-week exercise programs were applied for 1 hour a day, 3 days a week. Body compositions were measured before and after 12-week exercise. Normality of the data was determined by Shapiro-Wilk's tests. Dependent Student's t-Test, One-Way ANOVA and multiple comparison tests were used, and $p < 0.05$ level was considered significant. According to intra-group comparisons, there was a significant improvement in all mean values of body composition ($p < 0.05$). As a result of the multiple comparisons, PG was more effective than SG and JG in decreasing BMI, fat percent and fat mass values ($p < 0.05$), however, SG was more effective than the others in decreasing hip circumference ($p < 0.05$). Compared to three type of exercises; it can be said that PG was more effective in decreasing BMI, fat percentage and fat mass values, and SG was more effective in decreasing hip circumference.

KEYWORDS: Pilates, step aerobics, jogging, body composition

INTRODUCTION

In developed countries, many people seek physical activity programs to improve their health.¹ Further, recent findings have suggested a relationship between healths and both body composition and anthropometry parameters, including body mass, skinfold thickness sum, body mass index, or waist-hip ratio.² The sedentary life, which is against the nature of people, causes obesity, hypertension and coronary artery risk factors to increase as the age progresses, and many other health problems.³ Such negativities are among the more common complaints in women compared to men.⁴ In a study examining the relationship between the level of physical activity in adults and gender, it was found that 50% of women aged 20-29 had very low physical activity levels.⁵ The positive effects of regular physical activity on health have been studied for years. In addition to the positive effect of regular exercise on physical and functional capacity, the positive effect on human health has increased the interest of many women in sports.⁶ A healthy life with exercise is only possible if exercise programs are done in accordance with the purpose. In this sense, exercise protocols should be planned for different age groups and gender.⁷ For this reason, many studies have examined the effects of different exercise protocols.

Pilates is a method of body conditioning, and it offers a core musculature workout, with the aim of conditioning the entire body and mind.⁸ Pilates is more popular with women⁹, and the movements in the pilates program are close to 500, but it is more important to choose the ones that are suitable for the purpose and focus on them.¹⁰ It reduces the risk of heart diseases, prevents osteoporosis, and makes the body fit¹¹, and decreases BMI and waist and hip measurements¹², and also it provides control over all joint movements, especially the spine.¹³

Step aerobics is a type of aerobic exercise in which many combinations of movements are performed in front, above, diagonally or behind the step platform, adapting to music. Step aerobics exercise is recommended as a type of exercise suitable for 15-50 age groups, as heartbeats remain at the desired level during exercise and returns to normal. Also step, combined with aerobic training, has an effect on body composition and helps to reduce fat content.¹⁴

Jogging is one among popular health promotion tools worldwide for all ages and genders, and in fact, several studies have proven that jogging among men and women increase life expectancy.¹⁵ Jogging contributes to the regulation of cardiorespiratory endurance, muscle strength and endurance, flexibility and body composition, which are among the health-related physical fitness components.¹⁶

Many middle-aged women who want to improve their body composition values apply different aerobic exercise protocols under the leadership of sports trainers. In this context, it is important to make clear which type of aerobic exercise is more effective on the body composition. Thus, studies of sedentary subjects are included here to assess the relationship between exercise type and body composition using mediator variables. Therefore, this study aimed to examine which of the exercises that 12-week pilates, step aerobics and running exercises are more effective on body composition values of sedentary women.

METHODOLOGY

Participants

Before starting the study, the informed consent form prepared according to the Helsinki Declaration was signed by all participants. A total of 54 healthy sedentary women from the middle age group voluntarily participated in our study with a mean age of 32.59 ± 4.20 years, height 162.20 ± 3.93 cm, and weight 77.28 ± 6.60 kg. All the subjects were randomly divided into three groups: those 19 participants as pilates group (PG), 18 participants as step aerobics group (SG), and 17 participants as jogging group (JG). Situations where participants were excluded from the study: (1) having any illness; (2) taking medication regularly during exercise program; (3) using another exercise method in addition to the exercise program; or (4) unable to complete at least 80% of training session.

Exercise Interventions

The 12-week exercise programs were applied for 60-minute a day, 3 days a week (Monday, Wednesday and Friday). Exercise trainers had nearly 3 years of experience. The intensity of the exercise programs was gradually adjusted for each participant¹⁷, and heart rate (HR) values were recorded in beats per minute with a portable heart rate monitor (Polar S810i, Oy, Kempele, Finland). Karvonen Method was used to determine target heart rate (THR) for each participant during the exercises¹⁸, and the intensity level of exercise was adjusted between 60% and 75% of the THR for each subject according to week.

Exercise unit

Firstly, the participants were warmed up with calisthenic and stretching applications for 10 minutes. Then, each group exercised for 40 minutes according to the specified activity content in the main phase. Finally, static stretching exercises were applied for 10 minutes especially for the working muscles in the cooling-down period. During the exercise applications, water breaks were given in every 20-minute.

Exercise protocols

Some of the exercises for pilates were: bridge, tail wag, corkscrew, seated spine twist, leg circle, jack knife, side kick, hip twist, criss cross, hundred, prone back and hip extension, cat stretch, rolling like a ball, spinal cross extension on ball, side crunch with ball, and push up with ball, respectively. Some of the exercises for step aerobics were: march, basic step, step touch, toe and heel touch, step touches front and back, double step touch, leg opening side and back, kick side and front, lunge side and back, jumping jacks, side to side, grapevine, V step, kick, knee lift and leg curl, respectively. Each of 16-movement was applied 20 repetitions at a ratio of 1:1, and 2 sets with a 4-minute rest period in between. The intensity of the exercise was increased by adding 4 repetitions to the pilates and step aerobics movements every three weeks. The total jogging distance by weeks were: 4 km for week 1-3, 5 km for week 4-7, 6 km for week 8-10, and 7 km for week 10-12, respectively. The intensity of the exercise was increased by adding 1 km to the jogging exercise every three weeks, and thus, the total jogging distance was gradually increased.

Body composition measurement

The intervention group were measured twice, before (pre-test) and after (post-test) 12-week exercises. The height was taken by a stadiometer (Harpender, Holtain Ltd., UK), and bioelectrical impedance analyzer (BIA) (Tanita BC- 418 MA Professional, Japan) was used to determine the body composition of women.¹⁹ Body weight, BMI, basal metabolic rate (BMR), body fat percentage (Fat %), body fat mass and lean body mass (LBM) were measured by the BIA device. The circumferences were measured from narrowest part of waist and largest protrusion of hip by a tape in centimeter.²⁰ Subjects were warned not to consume beverages (alcohol, coffee, etc.) that are effective on body water until 24 hours before the measurements.

Statistical analysis

The mean and standard deviation values of the data were determined by descriptive statistical method. Normality of the data obtained from the participants' pre- and post-test measurements was determined by Shapiro-Wilk's test, and the homogeneity of variances was determined by Levene test. Since the variances in statistical tests showed normal and homogeneous distribution ($p > 0.05$), parametric analyses were performed. Variances between the pre- and post-test means of the groups were determined by Dependent Student's t-Test for intra-group, and One-Way ANOVA and Tukey multiple comparisons (post-hoc) tests for inter-group differences. In all statistical calculations, $p < 0.05$ level was considered significant. Data analyses were performed using the Statistical Package for Social Sciences (IBM SPSS Inc., version 25.0, Chicago, IL, USA).

RESULTS

The body composition values obtained from the intervention group were given between Tables 1 and 3 as below.

Table 1: Descriptive and intra group comparison values of the intervention groups for pre- and post-test

Variables	Test	PG (n:19)				SG (n:18)				JG (n:17)			
		Mean	SD	t	p	Mean	SD	t	p	Mean	SD	t	p
Age (yrs)	pre	32,26	4,15			31,78	4,54			33,82	3,81		
Height (cm)	pre	162,26	3,71			162,44	3,48			161,88	4,74		
Weight (kg)	pre	76,21	7,15	14,384	0,000*	77,22	6,10	18,898	0,000*	78,53	6,65	11,345	0,000*

	post	70,58	6,47			71,67	5,93			74,06	5,91		
BMI (kg/m ²)	pre	29,67	2,48			29,23	1,55			29,92	2,15		
	post	25,52	1,93	24,573	0,000*	27,13	1,56	19,483	0,000*	28,26	2,01	11,326	0,000*
BMR (kcal)	pre	1532,87	66,80			1545,15	60,60			1545,90	73,44		
	post	1479,03	60,00	11,093	0,000*	1492,04	59,82	18,898	0,000*	1504,29	66,97	10,837	0,000*
HR (bpm)	pre	83,11	5,37	15,788		84,11	7,84			82,76	9,60		
	post	78,42	4,60		0,000*	79,06	7,46	7,295	0,000*	79,06	8,17	7,668	0,000*
Fat (%)	pre	29,39	2,46			30,17	2,66			30,54	1,73		
	post	25,07	1,61	16,197	0,000*	24,85	2,26	30,362	0,000*	27,24	1,70	22,517	0,000*
Fat mass (kg)	pre	21,88	3,89			23,40	3,50			24,03	3,24		
	post	17,77	2,93	13,263	0,000*	18,98	2,77	18,762	0,000*	20,22	2,54	16,421	0,000*
LBM (kg)	pre	54,33	4,21	-		53,82	3,34			54,50	3,65		
	post	58,44	4,82	13,259	0,000*	58,25	3,77	5,761	0,000*	58,31	4,43	2,065	0,055
Waist (cm)	pre	98,42	8,13			94,39	7,55			98,00	9,75		
	post	87,53	5,75	10,179	0,000*	85,61	7,29	17,486	0,000*	90,47	8,54	11,232	0,000*
Hip (cm)	pre	115,26	7,32			112,94	5,93			117,35	7,12		
	post	108,68	6,62	6,948	0,000*	105,22	6,46	10,079	0,000*	112,06	7,17	12,406	0,000*
W/H ratio (cm)	pre	0,85	0,05			0,84	0,05			0,83	0,05		
	post	0,81	0,05	6,603	0,000*	0,81	0,05	3,320	0,004*	0,81	0,05	4,400	0,000*

*p<0.05

Table 2: ANOVA and multiple comparison values of the intervention groups for pre-test

Variables	Grup	N	Mean	SD	%95 CI		F	p	Post-hoc test
					LB	UB			
Weight (kg)	PG	19	76,21	7,15	72,77	79,65	0,545	0,583	JG≥SG≥PG
	SG	18	77,22	6,10	74,19	80,26			
	JG	17	78,53	6,65	75,11	81,95			
	Total	54	77,28	6,60	75,48	79,08			
BMI (kg/m ²)	PG	19	29,67	2,48	28,48	30,87	0,489	0,616	JG≥PG≥SG
	SG	18	29,23	1,55	28,46	30,00			
	JG	17	29,92	2,15	28,82	31,03			
	Total	54	29,60	2,08	29,04	30,17			
BMR (kcal)	PG	19	1532,87	66,80	1500,67	1565,06	0,220	0,803	JG≥SG≥PG
	SG	18	1545,15	60,60	1515,01	1575,28			
	JG	17	1545,90	73,44	1508,14	1583,67			
	Total	54	1541,07	66,02	1523,04	1559,09			
HR (bpm)	PG	19	83,11	5,37	80,52	85,70	0,146	0,865	SG≥PG≥JG
	SG	18	84,11	7,84	80,21	88,01			
	JG	17	82,76	9,60	77,83	87,70			
	Total	54	83,33	7,59	81,26	85,41			
Fat (%)	PG	19	29,39	2,46	28,21	30,58	1,154	0,323	JG≥SG≥PG
	SG	18	30,17	2,66	28,85	31,50			
	JG	17	30,54	1,73	29,65	31,43			
	Total	54	30,01	2,34	29,38	30,65			
Fat mass (kg)	PG	19	21,88	3,89	20,01	23,76	1,742	0,186	JG≥SG≥PG
	SG	18	23,40	3,50	21,66	25,14			
	JG	17	24,03	3,24	22,36	25,69			
	Total	54	23,06	3,62	22,08	24,05			
LBM (kg)	PG	19	54,33	4,21	52,30	56,36	0,156	0,856	JG≥PG≥SG
	SG	18	53,82	3,34	52,16	55,48			
	JG	17	54,50	3,65	52,62	56,38			
	Total	54	54,21	3,70	53,20	55,22			
Waist (cm)	PG	19	98,42	8,13	94,50	102,34	1,233	0,300	PG≥JG≥SG
	SG	18	94,39	7,55	90,64	98,14			

Hip (cm)	JG	17	98,00	9,75	92,99	103,01	1,830	0,171	JG $\geq$ PG $\geq$ SG
	Total	54	96,94	8,53	94,62	99,27			
	PG	19	115,26	7,32	111,74	118,79			
	SG	18	112,94	5,93	110,00	115,89			
	JG	17	117,35	7,12	113,69	121,02			
W/H ratio (cm)	Total	54	115,15	6,93	113,26	117,04	0,882	0,420	PG $\geq$ SG $\geq$ JG
	PG	19	0,85	0,05	0,83	0,88			
	SG	18	0,84	0,05	0,81	0,86			
	JG	17	0,83	0,05	0,81	0,86			
	Total	54	0,84	0,05	0,83	0,86			

*p<0.05; CI: confidence interval for mean; LB: lower bound; UB: upper bound; >: significant difference in favor; $\geq$: insignificant difference in favor

Table 3: ANOVA and multiple comparison values of the intervention groups for post-test

Variables	Grup	N	Mean	SD	%95 CI		F	p	Post-hoc test
					LB	UB			
Weight (kg)	PG	19	70,58	6,47	67,46	73,70	1,499	0,233	PG $\geq$ SG $\geq$ JG
	SG	18	71,67	5,93	68,72	74,62			
	JG	17	74,06	5,91	71,02	77,10			
	Total	54	72,04	6,18	70,35	73,72			
	PG	19	25,52	1,93	24,59	26,45	10,138	0,000*	PG>SG>JG
BMI (kg/m ²)	SG	18	27,13	1,56	26,35	27,90			
	JG	17	28,26	2,01	27,23	29,30			
	Total	54	26,92	2,14	26,34	27,50			
	PG	19	1479,03	60,00	1450,11	1507,95	0,741	0,482	SG $\geq$ PG $\geq$ JG
BMR (kcal)	SG	18	1492,04	59,82	1462,29	1521,78			
	JG	17	1504,29	66,97	1469,86	1538,72			
	Total	54	1491,32	61,91	1474,42	1508,22			
	PG	19	78,42	4,60	76,20	80,64	0,053	0,948	JG $\geq$ SG $\geq$ PG
HR (bpm)	SG	18	79,06	7,46	75,34	82,77			
	JG	17	79,06	8,17	74,86	83,26			
	Total	54	78,83	6,73	77,00	80,67			
	PG	19	25,07	1,61	24,29	25,84	8,601	0,001*	PG>JG PG>SG SG $\geq$ JG
Fat (%)	SG	18	24,85	2,26	23,72	25,98			
	JG	17	27,24	1,70	26,36	28,12			
	Total	54	25,68	2,13	25,10	26,26			
	PG	19	17,77	2,93	16,36	19,19	3,534	0,037*	PG>JG PG $\geq$ SG SG $\geq$ JG
Fat mass (kg)	SG	18	18,98	2,77	17,60	20,36			
	JG	17	20,22	2,54	18,91	21,53			
	Total	54	18,94	2,89	18,16	19,73			
	PG	19	58,44	4,82	56,12	60,76	0,009	0,991	PG $\geq$ JG $\geq$ SG
LBM (kg)	SG	18	58,25	3,77	56,37	60,12			
	JG	17	58,31	4,43	56,03	60,59			
	Total	54	58,33	4,28	57,16	59,50			
	PG	19	87,53	5,75	84,76	90,30	2,000	0,146	PG $\geq$ JG $\geq$ SG
Waist (cm)	SG	18	85,61	7,29	81,99	89,23			
	JG	17	90,47	8,54	86,08	94,86			
	Total	54	87,81	7,36	85,81	89,82			
	PG	19	108,68	6,62	105,49	111,87	4,494	0,016*	SG>JG SG $\geq$ PG PG $\geq$ JG
Hip (cm)	SG	18	105,22	6,46	102,01	108,43			
	JG	17	112,06	7,17	108,37	115,75			
	Total	54	108,59	7,18	106,63	110,55			
	PG	19	0,81	0,05	0,78	0,83	0,101	0,905	SG $\geq$ PG $\geq$ JG
W/H ratio (cm)	SG	18	0,81	0,05	0,79	0,84			
	JG	17	0,81	0,05	0,78	0,84			
	Total	54	0,81	0,05	0,80	0,82			

*p<0.05; CI: confidence interval for mean; LB: lower bound; UB: upper bound; >: significant difference in favor; $\geq$: insignificant difference in favor

DISCUSSION

In this study, exercises were applied for 1 hour, 3 days a week, for 12 weeks to determine which type of exercise was more effective on body composition in middle-aged sedentary women. For this reason, the participants were assigned to three different groups as PG, SG and JG, and then the body composition values of the groups were examined.

As a result of the pre-and post-test intra-group comparisons of our study group at 95% confidence interval, it was observed that there was a significant improvement in all mean values of body composition ($p < 0.05$; Table 1). This is not surprising, as this study and other carefully conducted research show that pilates¹², step aerobics^{14,21}, and jogging¹⁶ exercise have positive effects on body composition. It has been proven that are regularly applied aerobic exercises for a long time cause positive decreases on body composition components such as body weight, BMI, body fat ratio and fat mass.²² Sedentary people have been advised to perform moderate to vigorous physical activity for at least 60 minutes per day²³, and also, many studies have shown that body composition changes positively in the long-term moderate intensity aerobic exercise programs applied by sedentary women²⁴. In addition, regular aerobic and strength exercises have been recommended that provide significant positive changes in waist and hip circumference measurements, and waist-hip ratio.²⁵ Studies showed that the jogging program caused significant decreases in the resting heart rates of middle-aged women²⁶, and regular exercises are associated with a suitable body composition, as it decreases body fat percentage and fat mass^{27,28}, and increases lean body weight.²⁹ As it is known that long-term and regular aerobic exercises are effective in burning fat, hence, it can be thought that this kind of exercise caused a decrease in body weight, BMI, BMR, the percentage of body fat and fatty mass.³⁰ Thus these exercises, which are applied regularly for 3 days a week throughout 12-week, may explain the positive developments in body composition values of the intervention group due to the fact that muscle mass and HR work, and fat tissues burn for the energy.

As a result of ANOVA and multiple comparisons inter-groups in the 95% confidence interval of our study group, it was observed that there was a significant improvement between some of the pre- and post-test mean values of body composition ($p < 0.05$; Tables 2 and 3). When the pre-test BMI values of our intervention group are examined, it is seen that they are in the overweight or slightly obese category; however, it was observed that the post-test BMI value was in favor of PG, according to BMI classification. Because regular exercises provide a decrease in BMI values, fat mass and increase in lean body mass.³¹ More active sedentary women have lower weight, lower BMI, body fat ratio and waist-hip circumference³², and decrease in the BMI values of the pilates group.³³ Therefore, it can be thought that the activity type of PG is more effective than the other groups in decreasing BMI value ($PG > SG > JG$; $p < 0.05$; Table 3).

Regular physical activities that applied moderate intensity improve cardiovascular function, increase energy needs of the body^{34,35} and provide in cardiovascular capacity and autonomic control³⁶, and improve muscular and cardiac functions.^{37,38} People who practice step aerobics feel better psychologically as a result of rhythm and tempo accompanying the music and they perform high efforts.³⁹ Therefore, although not statistically significant, it can be thought that regularly applied step aerobics exercises caused significant reductions in heart rate⁴⁰, and the contraction strength of the heart was caused by increases in the pulse volume⁴¹ in SG ($SG \geq PG \geq JG$; Table 3).

Regular exercises promote a decrease in fat mass and fat-free mass loss⁴², and provide a decrease in fat percentage and increase in LBM.⁴³ Therefore, anthropometric parameters⁴⁴ such as LBM, fat mass and muscle mass are very closely related to health development in sedentary women.⁴⁵ According to explanations, it can be thought that the activity type of PG contributes significantly to the decrease of fat percentage and fat mass values compared to other groups³³ ($PG > SG \geq JG$; $p < 0.05$; Table 3). After exercises, there was a decrease in waist circumference and waist-hip ratio parameters^{46,47}, and also more activity in step aerobics may lower waist-hip circumference³² of SG. Thus, it can be thought that the activity type of SG contributes significantly to the decrease of hip circumference values compared to other groups ($SG > JG$; $SG \geq PG$; $PG \geq JG$; $p < 0.05$; Table 3). For this reason, pilates, step aerobics and jogging exercises can be considered as high-level physical fitness activities, and these findings also suggested that women with high levels of body composition were more likely to benefit from exercise protocols.

CONCLUSION

As a consequence of pre- and post-test comparisons, regularly applied pilates, step aerobics and jogging exercise protocols provided positive improvements on body composition parameters of middle-aged sedentary women. As a consequence of exercise protocol comparisons, it can be said that pilates exercise had a positive effect on BMI, fat percentage and fat mass values compared to step aerobics and jogging exercises, and step aerobics exercise had a positive effect on hip circumference values compared to other exercises.

Acknowledgement

The author also thanks to the volunteers and the exercise trainers for their participation in the study.

REFERENCES

1. Raquel V.C., Fernando A., Francisco E.R., Daniel L.P., José M. M. & Pedro A. L.M. 2016. The effects of a reformer Pilates program on body composition and morphological characteristics in active women after a detraining period, *Women & Health*, 56:7, 784-806.

2. Rosety-Rodríguez M., Fornieles G., Rosety I., Diaz A. J., Rosety M. A., Camacho-Molina A., Rodriguez-Pareja A., Tejerina A., Alvero-Cruz J. R. and Ordonez F. J. 2013. Central obesity measurements predict metabolic syndrome in a retrospective cohort study of postmenopausal women. *Nutricion Hospitalaria* 28 (6):1912–17.
3. Biçer Y.S., Peker İ. ve Savucu Y. 2005. Kalp dammar tıkanıklığı olan kadın hastalarda planlanmış düzenli yürüyüşün vücut kompozisyon değerleri üzerine etkisi. *Fırat Üniversitesi Sağlık Bilimleri Dergisi*, 19(4), 241-248.
4. Öruş M. 2015. Aqua Fitness Çalışmalarının Sedanter Bayanlarda Fiziksel ve Motor Parametreler Üzerinde Etkilerinin İncelenmesi, *Yüksek İsanstezi*. İstanbul: Haliç Üniversitesi
5. Ersoy G. 2016. Fiziksel Uygunluk Spor ve Beslenme ile İlgili Temel Öğretiler, 2. Baskı, *Nobel Tıp Kitabevleri*, s.55.
6. Ateş B., Saygın Ö., Zorba E. 2009. Ev Hanımlarının Fiziksel Kapasitelerinin ve Yaşam Kalitelerinin Belirlenmesi. *Uluslararası İnsan Bilimleri Dergisi*, 6(2), 357-367.
7. Çolakoğlu FF. 2003. 8 Haftalık Koş-Yürü Egzersizinin Sedanter Orta Yaşlı Obez Bayanlarda Fizyolojik, Motorik ve Somatotip Değerleri Üzerine Etkisi. *Gazi Eğitim Fakültesi Dergisi*, 23 (3), 275-290.
8. Latey P. 2001. The Pilates method: History and philosophy. *Journal of Bodywork and Movement Therapies* 5 (4):275–82.
9. Siler B. The Pilates Body, Broadway Books, New York, 2000.
10. Isacowitz R. Pilates. First edition, Human Kinetics, 2006;13-293.
11. Robinson L, Hunter F. Pilates Plus Diet, First Edition, London, Pan Books, 2003.
12. Russell Jago R., Jonker M.L., Missaghian M., Baranowski T. 2005. Effect of 4 weeks of pilates on the body composition of young girls. *Prevent Med.* 42:177-80.
13. Karter K. Pilates Lite: Easy Exercises to Lose Weight and Tone Up. 1nd editions, USA, Fair Winds Press, 2004; 25,30-32.
14. Hoeger WK, Hoeger SA. Lifetime Physical Fitness and Wellness. 11th edition, USA, 2010; 289.
15. Ma. Carlota B. D., Pamela Julieth R. A., Angela D. R. E. and Daniella Nicole C. H. 2019. A proposed framework in assessing health risks associated with jogging using the dynamics of vital signs. *AIP Conference Proceedings* 2138, 020002; <https://doi.org/10.1063/1.5121033>.
16. Frank R. Walking and jogging for Health & Welness, sixth edition, Wadsworth Cengage Learning, Belmont, CA94002-3098 USA. 2011, Page 9-11.
17. Hiscock D.J., Dawson B. and Peeling P. 2015. Perceived exertion responses to changing resistance training programming variables. *Journal of Strength and Conditioning Research* 29 (6):1564–9.
18. Brouwer A.M., Van Dam E., Van Erp J.B.F., Spangler D.P., Brooks J.R.. 2018. Improving real-life estimates of emotion based on heart rate: a perspective on taking metabolic heart rate into account. *Front Hum Neurosci*, 12: 284. e-article.
19. Gullu E., Gullu A., Düzova H., Özgör B., Kilinç E., Akçınar F. 2020. The relationship between serum leptin and VO2max levels in pre-puberty swimmer girls: effect of acute exercise. *Progress in Nutrition*; Vol. 22, N. 1: 177-184.
20. Zorba E. Vücut Yapısı ÖlçümYöntemleri ve Şişmanlıkla Başa Çıkma. İstanbul, Morpa Kültür Yayınları, 2006; 83-130.
21. Duzova H., Gullu E., Cicek G., Koksall B.K., Kayhan B., Gullu A., Sahin I. 2016. [The effect of exercise induced weight-loss on myokines and adipokines in overweight sedentary females: steps-aerobics vs. jogging-walking exercises.](#) *The Journal of Sports Medicine and Physical Fitness*, 58(3): 295-308.
22. Morencos E., Romero B., Peinado A.B., et al. 2012. Effects of dietary restriction combined with different exercise programs or physical activity recommendations on blood lipids in overweight adults. *Nutr Hosp.* 27(6):1916-1927.
23. World Health Organization (WHO)., 2010. Global Recommendations on Physical Activity for Health. <https://www.who.int/dietphysicalactivity/global-PA-recs-2010.pdf>. Access: October 27, 2020.
24. Restrepo-Calle M.T., Monroy de Pena A., Giraldo J.P. and Velasquez-Echeverri M.C. 2003. The effect of controlled physical activity on the body composition of postmenopausal sedentary women. *Rev. Panam. Salud.Publica.* 14: 229-234.
25. Martins R.A., Verissimo M.T., Coelho e Silva M.J., et al. 2010. Effects of aerobic and strength-based training on metabolic health indicators in older adults. *Lipids Health Dis.*9(1):76.
26. White G.M., Young R.J. 1978. Effect of a twelve week exercise programme on cardiorespiratory and body composition variables in nonobese young and middle-aged females. *Br J Sports Med.* 12:27-32.
27. Arslan C, Ceviz D. 2007. Ev hanımı ve çalışan kadınların obezite prevalansı ve sağlıklı yaşam biçimi davranışlarının değerlendirilmesi. *Fırat Üniversitesi Sağlık Bilimleri Tıp Der.* 21:211-20.
28. Karacan S., Günay M. 2003. Aerobik antrenman programının menopoiz dönemindeki kadınların kardiyovasküler risk faktörlerine etkisi. *Gazi Eğitim Fakültesi Der.* 23:257-73.
29. Fenkci S., Sarsan A., Rota S., Ardic F. 2006. Effects of resistance or aerobic exercises on metabolic parameters in obese women who are not on a diet. *Adv Ther.* 23:404-13.
30. Çolakoğlu F.F. ve Şenel O. 2004. Sekiz haftalık aerobik egzersiz programının sedanter orta yaşlı bayanların vücut kompozisyonu ve kan lipitleri üzerindeki etkileri. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, 57-61.
31. Karvonen-Gutierrez C., Kim C. 2016. Association of Mid-Life Changes in Body Size, Body Composition and Obesity Status with the Menopausal Transition. *Healthcare (Basel)*. 13;4(3).
32. Thompson D.L., Rakow J., Perdue S.M. 2004. Relationship between accumulated walking and body composition in middle-aged women. *Med Sci Sports Exerc.* 36(5):911-4.
33. Jago R., Jonker M.L., Missaghian M., Baranowski T. 2006. Effect of 4 weeks of Pilates on the body composition of young girls. *Preventive Medicine* 42: 177-180.
34. Lee I.M., Shirom E.J., Lobelo F., et al. 2012. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *The Lancet*. 380 (9838):219-229.

35. Whipp B.J. 1994. The bioenergetic and gas exchange basis of exercise testing. *Clin Chest Med* 15: 173- 191.
36. Şekir U., Akova B., Saltan Y. 2004. Miyokard İnfarktüsü Sonrası Aerobik Egzersizin Rolü – Derleme; *Anadolu Kardiyoloji Dergisi*. 4: 153-60.
37. Howden E.J., Perhonen M., Peshock R.M., et al. 2015. Females have a blunted cardiovascular response to one year of intensive supervised endurance training. *J Appl Physiol* (1985). 119(1):37-46.
38. Lollgen H. and Lollgen D. 2012. Risk reduction in cardiovascular diseases by physical activity. *Internist (Berl)*. 53(1):20-9.
39. Gullu E., Gullu A., Cicek G., et al. 2013. The effects of aerobic exercises on cardiovascular risk factors of sedentary women. *Int J Acad Res*. 5(3):160-167.
40. Chaudhary S., Kang M.K., Sandhu J.S. 2010. The effects of aerobic versus resistance training on cardiovascular fitness in obese sedentary females. *Asian J Sports Med*. 1(4):177-184.
41. Molmen H.E., Wisloff U., Aamot I.L., et al. 2012. Aerobic interval training compensates age related decline in cardiac function. *Scand Cardiovasc J*. 46(3): 163-171.
42. Ross R., Janssen I. 1999. Is abdominal fat preferentially reduced in response to exercise-induced weight loss? *Medicine and Science in Sports and Exercise* 31:568–572.
43. Fourie M., Gildenhuis G.M., Shaw I., Shaw B.S., Toriola A.L., Goon D.T. 2013. Effects of a Mat Pilates Programme on Body Composition in Elderly Women. *West Indian Med J*. 62(6):524-8.
44. Pavlovic R., Mihajlovic I., Idrizovic K., Vrcic M., Stankovic D., Joksimovic M. 2018. Differences in anthropometric traits and trend of changes in high school students. *Int J Sport Stud Hlth*, 1(1):e68101.
45. Lopes V.P., Malina R.M., Gomez-Campos R., Cossio-Bolanos M., Arruda M., Hobold E., 2018. Body mass index and physical fitness in Brazilian adolescents. *J Pediatr (Rio J)*, 662:1-8.
46. Rogers K., Gibson A.L. 2009. Eight-week traditional mat pilates training program effects on adult fitness characteristics. *Res Q Exerc Sport*, 80:569-74.
47. Arslan F., Çakmaç E., Taşkın H., Çakmacı O., İsmet C.G. 2012. Evaluation of the effects of pilates mat exercise program on some fitness parameters and weight loss of middle aged perimenopausal sedentary women. *Niğde Üniversitesi Beden Eğitimi ve Spor Bilimleri Der.* 6:24-33.

EFFECT OF 12-WEEK VOLLEYBALL TRAINING ON SOME CONDITIONAL PARAMETERS OF YOUNG FEMALE VOLLEYBALL PLAYERS

Serdar Uslu^{*1}, Barak Riza², Indira Mahmutović³, Denis Čaušević⁴, Ensar Abazović⁴, Ifet Mahmutović⁴

¹ Physical Education and Sport Teacher Department, Sport Science Faculty, Gazi University, Turkey

² Spor Toto SC Ankara, Turkey

³ Faculty of Educational Sciences, University of Sarajevo, BiH

⁴ Faculty of Sport and Physical Education, University of Sarajevo, BiH

Corresponding author: usluserdar77@gmail.com

ABSTRACT

The aim of the study is to examine the effects of 12-week volleyball training on some conditional parameters in young female volleyball players. A total of 56 volleyball players with an average age of 16.94 ± 1.16 years participated in this study, which was designed as a pretest-posttest, experimental-control group experimental design. The experimental group ($n = 28$) was included in volleyball training with an average intensity of 60-90% 4 days a week for 12 weeks, while the control group ($n = 28$) did not exercise and continued their daily life. Before and after the 12-week training program of the participants, flexibility, dynamic balance, active jump, squat jump, pro agility, 20 m sprint, standing long jump, 60 sec push-up and 60 sec shuttle measurements were taken. The data obtained from the study were analyzed using the Independent samples T test with the help of the SPSS 23 package program, and the T test for the comparison of dependent groups (Paired Samples). When the pre-test and post-test results of the athletes in the experimental and control groups were compared; It was determined that there was a statistically positive significant increase ($p < 0.05$) in the experimental group's flexibility, right-left foot balance, standing long jump, 60-second shuttle, 60-second push-up, free jump and squat jump tests; In the control group, it was determined that there was a negative significant decrease ($p < 0.05$). In addition, a negative significant decrease was found in the pro agility and 20 m Sprint tests of the experimental group ($p < 0.05$), while a positive significant increase was found in the control group ($p < 0.05$). As a result, it was determined that 12-week branch-specific technical and tactical volleyball training played a positive role in the improvement of the fitness performance of young female volleyball players.

Keywords: Volleyball, Training, Conditioning Parameters

INTRODUCTION

Participating in sports provides many benefits for youth, including developing lifelong physical activity skills, socializing with peers, building teamwork and leadership skills, improving self-esteem, and having fun. ¹ Therefore, it is necessary to direct children to sports and physical activities at an early age. Early age physical activity in childhood and adolescence is a prerequisite for physically active lifestyle in adulthood. ² Adolescent participation in the moderate- to vigorous-intensity physical activity, and some sports that require and encourage diversified sports skills, appeared to be most beneficial with respect to the enhancement of adult physical activity.

For this reason, the importance of moderate-to vigorous-intensity sports and physical activity is emphasized in the well-being of young people or their motor skills. ³

Volleyball sport as a moderate to severe physical activity can be defined as an interval sport where rest and loading are applied alternately. ⁴

The need for basic motor characteristics such as playing time, the need to play quickly and accurately, strength, speed, endurance, mobility, skill and coordination during the game arise. Besides physical parameters, mental characteristics, technical-tactical and experience parameters of the athletes are also important criteria in achieving success (Koyomo and Kazion, 1994). Based on these situations, it is known that volleyball training not only strengthens the upper body, arms, shoulders, thigh and lower leg muscles of athletes. ⁵ It also improves motor skills such as volleyball-specific flexibility, explosive power and endurance. ⁶ However, there are limited studies examining the effects on other fitness characteristics specific to volleyball. In this direction, the aim of the study is to determine the effects of 12-week branch-specific technical and tactical volleyball training

on selected fitness parameters of young male volleyball players, taking into account the planning and implementation principles of volleyball training.

MATERIALS AND METHODS

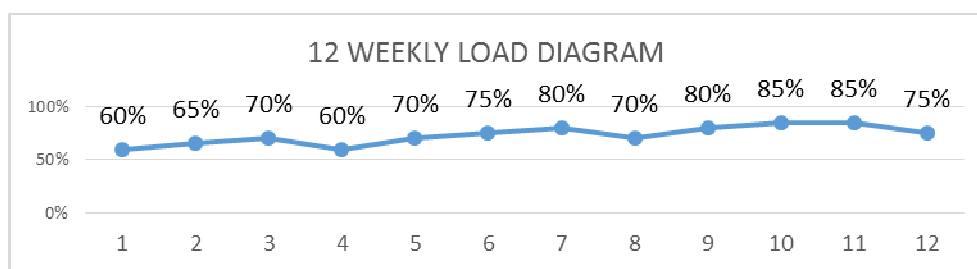
A total of 56 young male volleyball players have volunteered for our study which was conducted by utilizing an experimental research model including pretest-posttest, experimental and control groups. During the study, the volleyball players were randomly assigned to two different groups: experimental and control. While the athletes in the experimental group were included in an exercise program that constituted 120 minutes of daily exercises four days a week and for 12 weeks, the athletes in the control group were not included in any kind of exercises and were told to continue their daily lives as before. The contents of the 120-minute training program that was applied to the experimental group included: stretching for the first 10 minutes, balance exercises for 10 minutes, strength training with bodyweight for 15 minutes, training of the technical (overarm pass, bump pass, spike, block, etc.) and tactical (attack, defense, etc.) abilities specific to volleyball for 75 minutes and 10 minutes of cool-down, and the intensity of each training was designed to be 60-90%. In order not to exceed the targeted training intensity, the athletes were monitored with the help of the Polar H10 (Finland) heart pulse sensor compatible with the iPad application. After the families of the athletes read and signed a form that included the testing procedure (Consent Form), the following tests were applied within the 12-week training program: height, weight, sit and lay down flexibility, dynamic balance, free jump, squat jump, pro agility, 20 m sprint, standing long jump, 60-second push-up, and 60-second sit-up. It was ensured that the athletes were well rested the day before and on the day of the measurement.

Training Protocol:

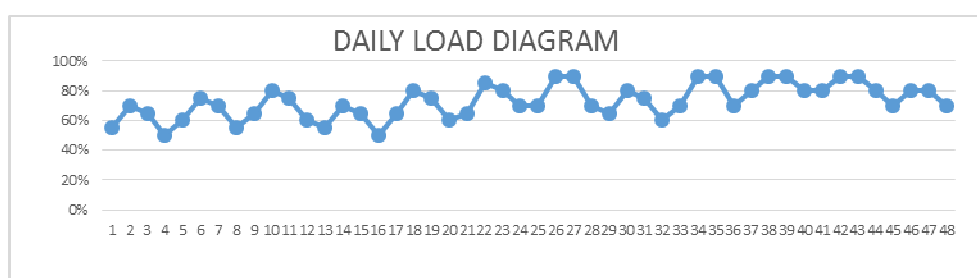
Volleyball Training Plan and Program

1	PERIOD	I PERIOD				II PERIOD				III PERIOD				TOTAL
2	MONTHS	JULY				AUGUST				SEPTEMBER				3
3	WEEKS	I	2	3	4	I	2	3	4	I	2	3	4	12
4	TEST	I	-	-	-	-	-	-	-	-	-	-	I	2

5
WEEKLY LOAD ON
TRAINING



6
DAILY LOAD ON
TRAINING



7
WEEKLY TRAINING PLAN

MONDAY														12
WEDNESDAY														12
FRIDAY														12
SATURDAY														12
NUMBER OF TRAINING DAYS	4	4	4	4	4	4	4	4	4	4	4	4	4	48
NUMBER OF REST DAYS	3	3	3	3	3	3	3	3	3	3	3	3	3	36
TRAINING TIME [HOUR]	8	8	8	8	8	8	8	8	8	8	8	8	8	96

8	CONTENT OF THE TRAINING (120 Min)	STRETCHING (%)	8	8	8	8	8	8	8	8	8	8	8	8
		BALANCE (%)	8	8	8	8	8	8	8	8	8	8	8	8
		STRENGTH (%)	12	12	12	12	12	12	12	12	12	12	12	12
		INSTRUCTIONAL DRILLS FOR TECHNIQUE	12	12	12	12	12	12	12	12	12	12	12	12
		15 Min 2 drills with low density												
		TECHNICAL AND TACTICAL (%)	52	52	52	52	52	52	52	52	52	52	52	52
		3 vs 3, 4 vs 4 and 6 vs 6 Game Based Drills 60 Min												
		COOLING INTERVENTIONS (%)	8	8	8	8	8	8	8	8	8	8	8	8

Age, Height and Bodyweight Measurements

The height measurements of the volleyball players were carried out while they were standing barefoot in the standard anatomical position with the help of a height measurement device (SECA, Germany) that had a sensitivity of 0.01m. The weight measurements of the volleyball players were carried out while they were barefoot in shorts with the help of an electronic scale (SECA, Germany) that had a sensitivity of 0.01kg.

Sit-And-Reach (cm) Flexibility

The flexibility of the waist and hip flexors were tested with the sit-lay down rack. While sitting barefoot on the floor, the subjects were asked to rest their feet against the Stand and Reach test rack of 35 cm length, 45 cm width and 32 cm height, and on the board, and to reach forward with their two hands without bending their arms and knees. The distance reached by their middle fingers were recorded. The measurement was repeated three times, and the best scores were recorded in cm.^{7,8}

Pro Agility

According to the protocol present in the software of the Test Fusion Sport make photocell (Fusion Sport, Australia), a single photocell gate performed both as the start and the finish. When the light on the photocell turned off, the test subject, who was waiting at a neutral stance between the photocells, launched at his preferred direction on a parallel line of 10 yards (9.2 m) that was divided into two equal parts of 5 yards (4.6 m), touched the cone at 4.6 m distance in his preferred direction, then touched the other cone at 9.2 m distance in the other direction, finally moved towards the finish point at maximum speed, and therefore completed the test. The score was transmitted to the computer through the software. Two tests were conducted with a 10-minute break in between, and the best score was recorded in seconds.^{9,10}

20 m Sprint Test

Photocells on the Newtest 300 (Finland) test battery with a sensitivity of 0.01 sec were placed at the start and the finish of the 20 m track located in the indoor sports facility. The subjects exited the start location that was 50 cm behind the start photocell with high speed and started their sprint, and when the run was completed, the run values were transmitted to the computer via the Newtest software. Two tests were conducted with a 10-minute break, and the best score was recorded in seconds.^{11,12}

Free and Squat Jumps:

In order to test the free and squat jump performances of the test subjects, the "Optojump Next" device produced by the company "Micro Gate" was used. In order to isolate the lower extremity when applying the test, to remove the contribution of the technique and to prevent the swinging of the arms. 13 the subjects were asked to vertically jump upwards with maximum force by squatting with speed through the knees while their hands were on their hips, knees were at full extension and in upright position, and for the squat jumps, the athletes were asked to jump upwards with maximum force from a 90° fixed squatting position on the floor while their hands were on their hips. The free and squad jumps were tested three times with 5-minute resting breaks in between, and the highest value was recorded in cm.¹⁴

Lower Extremity Y Balance Test

To test the dynamical balance performance of the test subjects, "Y Balance Test" platform was installed in a way that the angle between the posteromedial-posterolateral directions was 90°, and the angle between the anterior and posterior

directions was 135°. Each participant's leg length was recorded in centimeters, at supine position, in a bipartite manner, by measuring it from the anterior superior iliac point to the distal part of the malleolar.¹⁵ The athlete, who was standing in a balanced manner on his right foot on the mat, was asked to reach in three directions (anterior, posteromedial and posterolateral) with his left foot's toe tip and after reaching as far as possible, to return to his starting position without losing his balance. Afterwards, the subject was also asked to perform the same with his right toe tip while standing in balance on the starting point on the mat with his left foot. The subjects reached six times towards every direction (anterior, posteromedial and posterolateral), and 30-second resting breaks were taken between each application. The left and right lower leg balance performances of the subjects were calculated via the following formula.¹⁶⁻¹⁸

$$\text{Lower Leg Y Balance: } \left(\frac{\text{Anterior} + \text{Posteromedial} + \text{Posterolateral}}{3 \times \text{Lower Leg Length}} \right) \times 100$$

Standing Long Jump

The standing long jump test was used to measure the level of explosive strength of the lower extremity leg extensor muscles of the athletes. While their legs were on a bilateral plane behind the start line on the long jump mat that had a "cm" sign written on it and that was placed on a nonslip surface, the subject was asked to make a hands free jump forwards on a horizontal plane and to stand at the point where he fell without losing his balance. The distance between the start line and the heels of the athletes were recorded in cm. The athletes were asked to complete two jumps and the best score was recorded in meter.^{19, 20}

Sit-up Test

The 60-second sit-up test was used in order to evaluate the muscular endurance of the athletes.^{21, 22} A sit-up was considered as completed by a test subject when the subject, upon hearing the start command while they were laying on their backs on the mat with their hands tied on their chests and their knees bent approximately 90 degrees, lifted his body 90 degrees upwards from the floor, touched with his elbows to his knees and returned to his original position. The repeated amount of correct positions reached within 60 seconds were recorded as the maximum sit-up score.^{24, 25}

Push-up Test

The 60-second push-up test was used to evaluate all the body muscle and the upper limb endurance of the athletes. A push-up was considered as completed by a test subject when the subject, upon hearing the start command while his arms were at shoulder width, elbows were stiffened, and while he was in a position where his knees would not touch the floor and the hip area would not slouch downwards, bent his elbows 90° until his chest reached approximately 12 cm from the floor and returned to his original position. The repeated amount of correct positions reached (without resting) within 60 seconds were recorded as the maximum sit-up score.^{24, 25}

Analysis of the Data

SPSS 21.0 software package was used for the statistical analysis and calculations. Whether the data had normal distribution or not was tested with the Shapiro-Wilk test, and whether the data displayed homogeneous distribution or not was tested with the Levene's test. Since the data in the inter-group tests displayed normal distribution, T-test was used for the comparison of the independent samples and the comparison of the paired samples. Accepted significance level for this study was $p < 0.05$.

RESULTS

Table I. Measurement Values for the Descriptive Features of the Groups

Descriptive Findings of Volleyball Players	Groups	n	X	ss
Age (year)	Experiment	28	16,70	1,20
	Control	28	17,18	1,12
Height Measurement (cm)	Experiment	28	191,45	6,26
	Control	28	190,27	7,40
Weight Measurement (kg)	Experiment	28	80	7,64

Control	28	75,55	7,46

Y; Year, Cm: Centimeter, Kg; Kilogram

From Table 1, for the control group athletes that participated in the research, it can be seen that their average age was 17.18 ± 1.12 years, average height was 190.27 ± 7.40 cm, average bodyweight was 75.55 ± 7.46 kg, and for the experimental group athletes that participated in the research, it can be seen that their average age was 16.70 ± 1.20 years, average height was 191.45 ± 6.26 cm, average bodyweight was 80 ± 7.64 kg.

Table 2. Pretest Measurement Values for the Inter-Group Conditional Features of the Subjects

Conditional Features	Groups	n	X	ss	t	p
Flexibility (cm)	Experiment	28	14,42	4,70	1,54	,12
	Control	28	12,26	5,60		
Right Foot Balance (cm)	Experiment	28	101,95	7,17	-,78	,43
	Control	28	104,01	11,69		
Left Foot Balance (cm)	Experiment	28	102,38	7,89	-,73	,46
	Control	28	104,35	11,59		
Standing Long Jump Test (cm)	Experiment	28	2,38	,26	-1,78	,07
	Control	28	2,49	,19		
60-second sit-up (piece)	Experiment	28	39,74	8,30	-2,93	,08
	Control	28	41,82	7,07		
60-second push-up (piece)	Experiment	28	31,11	8,37	-3,90	,42
	Control	28	32,00	8,52		
Free Jump (cm)	Experiment	28	41,59	5,38	,57	,56
	Control	28	40,64	6,78		
Squat Jump (cm)	Experiment	28	34,22	4,96	1,76	,08
	Control	28	31,81	5,17		
Pro Agility ²⁶	Experiment	28	5,15	,32	-1,29	,20
	Control	28	5,25	,25		
20 mt Sprint ²⁶	Experiment	28	3,37	,17	1,64	,06
	Control	28	3,27	,19		

$p < 0,05^*$

mt; Meter cm: Centimeter sn: Second

When the pretest results for the inter-group conditional features of the experimental and control group athletes that participated in the research from Table 2 are compared, no statistically significant difference ($p>0.05$) was recorded between the groups for the pretest scores of flexibility, right-left feet balance, standing long jump, 60-second sit-up, 60-second push-up, free jump, squat jump, 20 m sprint and pro agility average values.

Table 3. Pretest and Posttest Measurement Values for the Conditional Features of the Control Group Subjects

Conditional Features	Control Group (n)	Tests	X	Ss	Intra-Group Change (%)	t	p
Flexibility (cm)	28	Pre Test	12,26	5,60	-8,56	-2,17	,03*
	28	Post Test	11,21	6,19			
Right Foot Balance (cm)	28	Pre Test	104,01	11,69	-4,31	6,40	,00*
	28	Post Test	99,53	10,97			
Left Foot Balance (cm)	28	Pre Test	104,35	11,59	-4,88	4,75	,00*
	28	Post Test	99,25	9,89			
Standing Long Jump Test (cm)	28	Pre Test	2,49	,19	-6,02	4,33	,00*
	28	Post Test	2,34	,21			
60-second sit-up (piece)	28	Pre Test	41,82	7,07	-4,18	-1,40	,04*
	28	Post Test	40,07	6,75			
60-second push-up (piece)	28	Pre Test	32,00	8,52	-4,03	11,57	,00*
	28	Post Test	30,71	8,54			
Free Jump (cm)	28	Pre Test	40,64	6,78	-5,29	2,86	,00*
	28	Post Test	38,49	5,98			
Squat Jump (cm)	28	Pre Test	31,81	5,1	-6,22	2,65	,01*

7							
	28	Post Test	29,83	4,9 2	6,67	-9,06	,00*
	28	Pre Test	5,25	,25			
Pro Agility ²⁶	28 <td>Post Test<td>5,60<td>,34<td rowspan="2">9,48</td><td rowspan="2">-9,38</td><td rowspan="2">,00*</td></td></td></td>	Post Test <td>5,60<td>,34<td rowspan="2">9,48</td><td rowspan="2">-9,38</td><td rowspan="2">,00*</td></td></td>	5,60 <td>,34<td rowspan="2">9,48</td><td rowspan="2">-9,38</td><td rowspan="2">,00*</td></td>	,34 <td rowspan="2">9,48</td> <td rowspan="2">-9,38</td> <td rowspan="2">,00*</td>	9,48	-9,38	,00*
	28 <td>Pre Test<td>3,27<td>,19</td></td></td>	Pre Test <td>3,27<td>,19</td></td>	3,27 <td>,19</td>	,19			
20 mt Sprint ²⁶	28 <td>Post Test<td>3,58<td>,31<td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></td></td></td>	Post Test <td>3,58<td>,31<td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></td></td>	3,58 <td>,31<td rowspan="2"></td><td rowspan="2"></td><td rowspan="2"></td></td>	,31 <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td>			
	28 <td>Pre Test<td>3,27<td>,19</td></td></td>	Pre Test <td>3,27<td>,19</td></td>	3,27 <td>,19</td>	,19			
<i>p<0,05*</i>							
<i>mt; Meter cm: Centimeter sn: Second</i>							

In Table 3, for the control group athletes that participated in the research, while there was significant negative change in flexibility (-%8.56), right foot balance (%-4.31), left foot balance (%-4.88), standing long jump (%-6.02), 60-second sit-up (%-4.18), 60-second push-up (%-4.03), free jump (%-5.29) and squat jump (%-6.22) tests ($p < 0.05$), there was significant positive change in pro agility (%6.67) and 20 m Sprint (%9.48) tests ($p < 0.05$).

Table 4. Pretest and Posttest Measurement Values for the Conditional Features of the Experimental Group Subjects

Conditional Features	Experimen tal Group (n)	Tests	X	Ss	Intra- Group Change (%)	t	p
Flexibility (cm)	28	Pre Test	14,42	4,70	18,24	7,30	,00*
	28	Post Test	17,05	5,14			
Right Foot Balance (cm)	28	Pre Test	101,95	7,17	25,44	-15,50	,00*
	28	Post Test	127,89	9,64			
Left Foot Balance (cm)	28	Pre Test	102,38	7,89	24,29	-12,24	,00*
	28	Post Test	127,25	11,18			
Standing Long Jump Test (cm)	28	Pre Test	2,38	,26	17,23	-23,19	,00*
	28	Post Test	2,79	,27			
60-second sit-up (piece)	28	Pre Test	39,74	8,30	19,75	-11,98	,00*
	28	Post Test	47,59	9,96			
60-second push-up	28	Pre Test	31,11	8,37	33,81	-9,21	,00*

(piece)	28	Post Test	41,63	9,09			
	28	Pre Test	41,59	5,38			
Free Jump (cm)	28	Post Test	47,44	5,77	14,06	-15,44	,00*
	28	Pre Test	34,22	4,96			
Squat Jump (cm)	28	Post Test	39,82	4,96	16,36	-12,03	,00*
	28	Pre Test	5,15	,32			
Pro Agility ²⁶	28	Post Test	4,80	,31	-6,80	17,28	,00*
	28	Pre Test	3,37	,17			
20 mt Sprint ²⁶	28	Post Test	3,10	,13	-8,01	20,28	,00*
	28	Pre Test					

$p < 0,05^*$

mt; Meter cm: Centimeter sn: Second

In Table 4, for the experimental group athletes that participated in the research, while there was significant positive change in flexibility (%18,24), right foot balance (%25,44), left foot balance (%24,29), standing long jump (%17,23), 60-second sit-up (%19,75), 60-second push-up (%33,81), free jump (%14,06) and squat jump (%16,36) tests ($p < 0.05$), there was significant negative change in pro agility (%-6,80) and 20m Sprint (%-8,01) tests ($p < 0.05$).

Table 5. Posttest Measurement Values for the Inter-Group Conditional Features of the Subjects

Conditional Features	Groups	n	X	ss	t	p
Flexibility (cm)	Experiment	28	17,05	5,14	2,49	,01*
	Control	28	11,21	6,19		
Right Foot Balance (cm)	Experiment	28	127,89	9,64	10,16	,00*
	Control	28	99,53	10,97		
Left Foot Balance (cm)	Experiment	28	127,25	11,18	9,85	,00*
	Control	28	99,25	9,89		
Standing Long Jump Test (cm)	Experiment	28	2,79	,27	6,99	,00*
	Control	28	2,34	,21		
60-second sit-up (piece)	Experiment	28	47,59	9,96	2,83	,00*

	Control	28	40,07	6,75		
60-second push-up (piece)	Experiment	28	41,63	9,09	2,48	,01*
	Control	28	30,71	8,54		
Free Jump (cm)	Experiment	28	47,44	5,77	5,64	,00*
	Control	28	38,49	5,98		
Squat Jump (cm)	Experiment	28	39,82	4,96	7,49	,00*
	Control	28	29,83	4,92		
Pro Agility (26)	Experiment	28	4,80	,31	-9,13	,00*
	Control	28	5,60	,34		
20 mt Sprint (26)	Experiment	28	3,10	,13	-7,42	,00*
	Control	28	3,58	,31		
p<0,05*						

mt; Meter cm: Centimeter sn: Second

In Table 5, when the posttest results for the inter-group conditional features of the experimental and control group athletes that participated in the research are compared, a statistically significant difference ($p < 0.05$) was recorded between the groups for the pretest scores of flexibility, right-left feet balance, standing long jump, 60-second sit-up, 60-second push-up, free jump, squat jump, 20m sprint and pro agility average values.

DISCUSSION

The study aimed to investigate the impact of the 12-week volleyball training, which has predominantly included techniques and tactics specific to the branch, on the select motor skills of the young male volleyball players. Our anthropometric findings were comparable to those in the literature that examine the volleyball players and other athletes of the same age.²⁷⁻³¹ In addition, our findings were also comparable to flexibility³² right-left foot balance,^{10, 33} standing long jump,³⁴⁻³⁶ 60-second sit-up and push-up,^{10, 37, 38} free jump, squat jump,³⁹⁻⁴¹ pro agility,^{10, 36, 42, 43} an 20 mt sprint average,⁴⁴⁻⁴⁶ studies in the literature.

In Table 4, when the intra-group conditional features pretest-posttest results for the experimental group athletes were examined, we have seen that while there was significant positive change in flexibility, right-left foot balance, standing long jump, 60-second sit-up, 60-second push-up, free jump and squat jump average values of the athletes ($p < 0.05$), there was significant negative change between the pretest-posttest results in pro agility and 20 mt Sprint average values ($p < 0.05$).

The improvement of vertical jump, speed, agility, flexibility, balance, strength and explosive strength features, which are among the most prominent performance parameters in volleyball, is an important criterion for the success in volleyball.⁴⁷ Volleyball is especially important in improving the motor skills of the athletes.

Many scholars have stated that medium intensity exercises facilitated growth in motor skills such as strength, balance, speed, flexibility, agility, vertical jump, explosive strength, etc.⁴⁸⁻⁵¹ have reported that the technical and coordination improving training drills with correct intensities during the preparation period increased the motor skill levels of the athletes. Many authors⁵²⁻⁵⁴ have reported that planned and regular trainings in every sports branch caused some morphological and functional developments; changes in the muscle, vascular and respiratory systems; and it was possible to improve the performance of the athletes with such loads.

When the literature is examined, while volleyball training strengthens the upper body, arms, shoulders, thighs and lower leg muscles,^{5, 38, 55} flexibility, speed, agility, balance, strength and endurance of athletes. They also reported that they improved their features,^{27, 56-58} volleyball training reported that flexibility, speed, agility, balance, strength and endurance characteristics of flexible athletes improved.⁵⁸ Sozen (2012) has reported that there was a significant increase in the balance, 30-second sit-up and flexibility of the athletes as a result of volleyball trainings. Ekici (2017) has reported that there were exceptional statistically

significant differences in the vertical jump, standing long jump, 30-second sit-up, 30-second push-up and 30-second speed values of the athletes as a result of 12-week volleyball trainings. Kahraman (2019) has reported that after a 11-week volleyball training was applied to young volleyball players, there were statistically significant differences in the free and squat jump, 20 mt speed and standing long jump values of the athletes. Çıtak (2019) has reported that after basic skill trainings were applied to young volleyball players, there were statistically significant differences in the push-up, sit-up, flexibility and balance values of the athletes. In an article where they examine the impact of the volleyball trainings, Kahraman and Şahan (2019) reported that there was a statistically significant difference between the children who played and did not play volleyball in 20 mt sprint, free and squat jump, 30-second push-up and flamingo balance values, and that the athletes who participated in the volleyball trainings had improved explosive strength, abdomen strength, jump, speed and flexibility features. Badak T, Çakmakçı (2019) have reported that there were statistically significant differences in vertical jump, standing long jump, balance, 30 mt sprint and flexibility values of the adolescent athletes after 12-week volleyball trainings. DİNÇER (2015) has reported that the volleyball trainings improved the physical and conditional performance in the athletes. Additionally, Akarçeşme and Aktuğ (2019) have reported that balance performance (one of the requirements for high performance) was related to the lower extremity muscle strength, and that 14-week volleyball trainings played an important role in improving the knee muscle strength and balance performance.

The findings of the abovementioned study are comparable to the findings of our own study. Additionally, while utilizing their technical or tactical skills during the volleyball trainings, the athletes also frequently utilize motor skills such as jumping, muscular endurance, descent, thrust, landing, acceleration and deceleration that involve physical features such as explosive strength, quick power, speed, flexibility, agility, reaction and balance.²⁶ This situation may explain the improvements in the condition values that were part of our study.

When Table 3 is examined and when the pretest-posttest results of the intra-group motor skills of the control group athletes are compared, a statistically significant negative difference in athletes' flexibility, right-left foot balance, standing long jump, 60-second sit-up, 60-second push-up, free jump, squat jump average values was confirmed ($p < 0.05$), however, the statistically significant difference between the pro agility and 20m sprint pretest – posttest scores was 0 ($p < 0.05$). It can be argued that this situation may have been caused by the training flashback principle. The decrease in performance that may occur due to the decrease in the intensity of the two most basic principles of training or due to the pause in the trainings can generally be explained by the pauses in trainings or the length of such pauses. Following the pause in training, almost every athlete's performance starts to fall. Within the training flashback principle, the quickly acquired features during the trainings are lost quicker, but the features acquired in a longer period of time are lost slower.⁶⁵ For the control group athletes, all these reasons can explain the performance loss in athletes due to leaving the training period and not training for an extended period of time.

CONCLUSION

In conclusion, this study showed that the 12-week volleyball trainings that are planned with techniques and tactics specific to the branch played a positive role in the development of the select conditional parameters of the young male volleyball players. Furthermore, we argue that volleyball has an important place in sport sciences for the development of motor skills and performance skills of the youth. Volleyball as a team sport has many components of both aerobic and anaerobic activities, and is considered one of the ideal models of health-focused physical activity. Transformational processes in volleyball lead to improved motor skills, connecting the basic elements of volleyball, adopting various tactics that will be useful during matches and competitions.

REFERENCES

1. Brenner JS. Sports specialization and intensive training in young athletes. *Pediatrics*. 2016;138(3).
2. Telama R, Yang X, Laakso L, Viikari J. Physical activity in childhood and adolescence as predictor of physical activity in young adulthood. *American journal of preventive medicine*. 1997;13(4):317-23.
3. Tammelin T, Näyhä S, Hills AP, Järvelin M-R. Adolescent participation in sports and adult physical activity. *American journal of preventive medicine*. 2003;24(1):22-8.
4. Turnagöl H. Voleybolda enerji sistemleri. 1994.
5. DİNÇER Ö, TÜRKAY İ. The examination of effect on anthropometric characteristics and motor activities of infrastructure training at volleyball. *International Journal of Sport Culture and Science*. 2015;3(Special Issue 3):757-63.
6. Häkkinen K. Changes in physical fitness profile in female volleyball players during the competitive season. *The Journal of sports medicine and physical fitness*. 1993;33(3):223-32.
7. Suni JH, Oja P, Laukkanen RT, Mülunpalo SI, Pasanen ME, Vuori IM, et al. Health-related fitness test battery for adults: aspects of reliability. *Archives of physical medicine and rehabilitation*. 1996;77(4):399-405.
8. Mackenzie B. Performance evaluation tests. London: Electric World plc. 2005;24(25):57-158.
9. Baechle TR, Earle RW. Essentials of strength training and conditioning: Human kinetics; 2008.

10. Barak R. Periyotlanmış kor egzersizlerinin genç voleybolcularda bazı motorik özellikler ile servis hız ve isabet oranına etkisi: Bartın Üniversitesi, Sosyal Bilimler Enstitüsü; 2019.
11. Arin A, Jansson D, Skarphagen K. Maximal unilateral leg strength correlates with linear sprint and change of direction speed. 2012.
12. Balcıoğlu A. Futsal training for 12-14 year olds, strength, agility and anaerobic strength: MA Thesis, Hatay Mustafa Kemal Pasha University, Hatay; 2018.
13. Hara M, Shibayama A, Arakawa H, Fukushima S. Effect of arm swing direction on forward and backward jump performance. *Journal of Biomechanics*. 2008;41(13):2806-15.
14. Açıkada C. Track and field talent model report. Athletic Federation Board of Education Publications II, Ataofset Matbaacılık. 2008.
15. Akın G, Tekdemir İ, Gültekin T, Erol E, Bektaş Y. Anthropometry and sport. Ankara: Alter Publicationsı. 2013.
16. Plisky PJ, Gorman PP, Butler RJ, Kiesel KB, Underwood FB, Elkins B. The reliability of an instrumented device for measuring components of the star excursion balance test. *North American journal of sports physical therapy: NAJSPT*. 2009;4(2):92.
17. Robinson R, Gribble P. Kinematic predictors of performance on the Star Excursion Balance Test. *Journal of sport rehabilitation*. 2008;17(4):347-57.
18. Hertel J, Miller SJ, Denegar CR. Intratester and intertester reliability during the Star Excursion Balance Tests. *Journal of sport rehabilitation*. 2000;9(2):104-16.
19. Günay M, Tamer K, Cicioğlu İ. Spor fizyolojisi ve performans ölçümleri. Ankara: Baran Ofset. 2006.
20. Ramírez-Vélez R, Martínez M, Correa-Bautista JE, Lobelo F, Izquierdo M, Rodríguez-Rodríguez F, et al. Normative reference of standing long jump for colombian schoolchildren aged 9–17.9 years: The FUPRECOL Study. *The Journal of Strength & Conditioning Research*. 2017;31(8):2083-90.
21. Hebbelinc M, Clarys P, De Malsche A. Growth, development, and physical fitness of Flemish vegetarian children, adolescents, and young adults. *The American journal of clinical nutrition*. 1999;70(3):579s-85s.
22. Harbin G, Shenoy C, Olson J. Ten-year comparison of BMI, body fat, and fitness in the workplace. *American journal of industrial medicine*. 2006;49(4):223-30.
23. Ryman Augustsson S, Bersås E, Magnusson Thomas E, Sahlberg M, Augustsson J, Svantesson U. Gender differences and reliability of selected physical performance tests in young women and men. *Advances in Physiotherapy*. 2009;11(2):64-70.
24. Esco MR, Olson MS, Williford H. Relationship of push-ups and sit-ups tests to selected anthropometric variables and performance results: A multiple regression study. *The Journal of Strength & Conditioning Research*. 2008;22(6):1862-8.
25. Medicine ACoS. ACSM's health-related physical fitness assessment manual: Lippincott Williams & Wilkins; 2013.
26. Reilly T, Secher N, Snell P, Williams C. Physiology of sports: An overview. *Physiology of sports*. 1990:465-85.
27. Gabbett T, Georgieff B. Physiological and anthropometric characteristics of Australian junior national, state, and novice volleyball players. *The Journal of Strength & Conditioning Research*. 2007;21(3):902-8.
28. Trajković N, Milanović Z, Sporiš G, Radisavljević M. Positional differences in body composition and jumping performance among youth elite volleyball players. *Acta Kinesiológica*. 2011;5(1):62-6.
29. Fonseca-Toledo C, Roquetti P, Fernandes-Filho J. Anthropometrical profile of Brazilian junior volleyball players for different sports requirement levels. *Revista de Salud Pública*. 2010;12(6):915-28.
30. Zary JCF. Identification of the dermatoglyphic and somatotype profile of high-performance adult male, youth and children volleyball athletes in Brazil. *Brazilian Journal of Science and Movement*. 2008;15(1):53-60.
31. Bozo D, Lleshi E. Comparative analysis of Albanian female volleyball players with anthropometric, performance and hematological parameters. *Ovidius University Annals, Series Physical Education and Sport/Science, Movement and Health*. 2012;12(2):S287-S.
32. Yıldırım T. The effect of eight-week pliometric training program on selected physical and physiological parameters of high school male volleyball players: Selçuk University Institute of Health Sciences; 2010.
33. Plisky PJ, Rauh MJ, Kaminski TW, Underwood FB. Star Excursion Balance Test as a predictor of lower extremity injury in high school basketball players. *Journal of orthopaedic & sports physical therapy*. 2006;36(12):911-9.
34. AKTAŞ Y. Comparison of some physical and condition parameters of the athletes in the turkey men's third and regional volleyball leagues 2011.
35. Yılmaz M. Investigation of the effect of 8-week strength training on some physical fitness parameters in children aged 13-16: Selcuk University Institute of Health Sciences; 2014.
36. Sever K. Genç Comparison of Volleyball and Basketball Athletes' Physical Fitness According to Selected Variables: Istanbul Gelişim University Institute of Health Sciences; 2017.
37. Yüksel MF, Sevindi T. Physical fitness profiles of sitting volleyball players of the Turkish National Team. *Universal Journal of Educational Research*. 2018;6(3):556-61.
38. Taware GB, Bhutkar MV, Surdi AD. A profile of fitness parameters and performance of volleyball players. *Journal of Krishna Institute of Medical Sciences University*. 2013;2(2):48-59.
39. Demir YK. The acute effects of static stretching applications on the vertical jump agility and speed performance of volleyball players: Kırıkkale University; 2018.
40. Riggs MP, Sheppard JM. The relative importance of strength and power qualities to vertical jump height of elite beach volleyball players during the counter-movement and squat jump. *Journal of human sport and exercise*. 2009;4(III):221-36.

41. Fuchs PX, Mitteregger J, Hoelbling D, Menzel H-JK, Bell JW, von Duvillard SP, et al. Relationship between General Jump Types and Spike Jump Performance in Elite Female and Male Volleyball Players. *Applied Sciences*. 2021;11(3):1105.
42. A. B. Agility Performance Relationship Between Strength Performance In Young Volleyball. *International Journal Of Currentresearch*. 2017;9(2).
43. Barnes JL, Schilling BK, Falvo MJ, Weiss LW, Creasy AK, Fry AC. Relationship of jumping and agility performance in female volleyball athletes. *Journal of Strength and Conditioning research*. 2007;21(4):1192.
44. Çıtak U. The Effects of Volleyball Basic Skill Training on Motoric Properties in Boys. Kocaeli University, Institute of Health Sciences, Department of Physical Education and Sports, Scientific Thesis Kocaeli 2019.
45. Moir G, Sanders R, Button C, Glaister M. The effect of periodized resistance training on accelerative sprint performance. *Sports Biomechanics*. 2007;6(3):285-300.
46. Nikolaidis PT, Afonso J, Clemente-Suarez VJ, Alvarado JRP, Driss T, Knechtle B, et al. Vertical jumping tests versus wingate anaerobic test in female volleyball players: The role of age. *Sports*. 2016;4(1):9.
47. Johnson TM, Brown LE, Coburn JW, Judelson DA, Khamoui AV, Tran TT, et al. Effect of four different starting stances on sprint time in collegiate volleyball players. *The Journal of Strength & Conditioning Research*. 2010;24(10):2641-6.
48. Moraru C, Neculaeş M, Hodorcă RM. Comparative study on the balance ability in sporty and unsporty children. *Procedia-Social and Behavioral Sciences*. 2014;116:3659-63.
49. Gerime G. Measuring Physical Fitness of Male and Female Students Between 9-12 Years Doing Sports and Not Doing Sports with Eurofit Test Battery. . Master Thesis Muğla University Health Sciences, Muğla 2003.
50. Pense M, Serpek B. Determination of physiological and biomotor characteristics of girls playing basketball between the ages of 14 and 16 with the EUROFIT test battery. *Selcuk University Journal of Physical Education and Sports Science*. 2010;12(3):191-8.
51. Alp M, Suna G, Baydemir B. Effects of The Preparation Period Trainings On Biomotoric Features Of 10-12 Age Male Tennis Players. *Sstb International Refereed Academic Journal Of Sports, Health & Medical Sciences*. 2016(18):89-97.
52. Haff GG, Triplett NT. *Essentials of strength training and conditioning* 4th edition: Human kinetics; 2015.
53. Viru AA, Viru M. *Biochemical monitoring of sport training: Human Kinetics*; 2001.
54. Šimonek J. *Coordination abilities in Volleyball: Walter de Gruyter GmbH & Co KG*; 2014.
55. Mahmutović I, Rađo I, Talović M, Lakota R, Alić H, Jelešković E. Level of transformation of motor skills in female volleyball players influenced by training operators. *Sport Mont*. 2016;14(2):39-43.
56. Theos A, Gortsila E, Maridaki M. Effects of training surface on physiological characteristics of prepubescent female volleyball players. *International Journal of Pediatric Health Care & Advancements*. 2017;4(5):48-53.
57. Kocakulak NA, Polat Y, Hamurcu Z, Pepe Z, Çoksevim B. Comparison of physical and physiological parameters of children skier and volleyball players. *Natural & Applied Sciences Journal*. 2018;2(1):26-30.
58. Karahan M. The effect of the prolonged competitive season on semi-elite female volleyball players' physical performance. *Turkish Journal of Sports and Exercise*. 2018;20(1):15-20.
59. Sozen H. The effect of volleyball training on the physical fitness of high school students. *Procedia-Social and Behavioral Sciences*. 2012;46:1455-60.
60. Ekici F. 12 12 Weekly Volleyball Trainers Focus on Physical and Motorcycle Features of 15-18 Group Members 2017.
61. Kahraman Y. The Effect of Volleyball Teaching with Sports Training Model on the Motor Performance and Problem Solving Skills of 11-13-year-old Girl Volleyball players. Akdeniz University, Institute of Health Sciences, Department of Movement and Training, Master Thesis, Antalya 2019.
62. Kahraman Y, Şahan A. Investigation of the Effects of Volleyball Training on Physical Performance Characteristics of 10–13 Years Old Children. *Sport*. 2019;2(2):27-35.
63. Badak T, Çakmakçı O. The effects of 12-week training on some basic motor properties in adolescence. *Gaziantep University Journal of Sport Sciences*. 2019;4(4):450-8.
64. Akarçeşme C, Aktuğ ZB. Investigation of the effect of 14-week volleyball training on Isoquetic straight muscle strength and dynamic balance performance. *İnönü University Journal of Physical Education and Sport Sciences*. 2019; 5(1):33-40.
65. Bompa T, Buzzichelli C. *Periodization training for sports, 3e: Human kinetics*; 2015.