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Research Article

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Association of Obesity and Overweight with Different Risk Factors Among Female Public Health Students: A Cross Sectional Study

Mohamed Osman Elamin Bushara

Faculty of Public Health & Informatics, Umm Al-Qura University. KSA

Abstract: Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk factor to health. A crude population measure of obesity is the body mass index (BMI), which is used to classify weight status, overweight is the person with a BMI of 25 or more, while a person with a BMI equal to or more than 30 is considered obese.The aim of the study is to assess students' perception on obesity &overweight association with different risk factors, clarify students' knowledge, behaviors and practices that increase risks of obesity, overweight and related diseases correlating all these with the BMI status of the respondents.A cross-sectional study was conducted to achieve the study objectives among female students of public health at Umm Al-Qura University, in which 50% of students (179) were randomly selected using stratified sampling technique.The study clarified that 84% of students understood BMI-obesity relationship, while 16% didn't know. The study found that the perceptions, knowledge of overweight and obese respondents towards associated risk factors was very low in comparing to normal and underweight respondents, in term of practicing physical activities, study clarified that 79.4%of students were practicing physical activities, their majority were from normal and underweight BMI participants.The study concluded toweakness in the perception, knowledge and practices of students on BMI relation with different risk factors among overweight and obese students although they understood the BMI-Obesity relationship. The study clarified that the knowledge of students on major risk factors of obesity, such as relations with diabetes mellitus type 2, Hypertension, Hyperlipidemia, among students with normal BMI were acceptable. Study recommended for more concentration in academic activities to change these perceptions.

Keywords: Obesity, Overweight, Risk Factors, Public Health, Female and Students.

***Corresponding Author**

Mohamed Osman Elamin Bushara , Faculty of Public Health & Informatics, Umm Al-Qura University. KSA

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1. INTRODUCTION

Background Obesity and Overweight are defined as an increase in body mass, particularly fatty mass, which is caused by an imbalance between the energy consumed from food. Obesity has become a health epidemic, and a worldwide phenomenon, with over than 2 billion adult people are overweight, and 640 million of which are obese. Also the prevalence of obesity and overweight among children and adolescent aged 5-19 are on the rise[1,2]. Obesity is a complex disease involving an excessive amount of body fat, obesity isn't just a cosmetic concern. It is a medical problem and a chronic disease that can hold a serious health consequence and increases your risk of other diseases and health problems, an NHS cohort study indicates that obesity and overweight can work as risk factor for mortality and morbidity, because it's associated with the risk of heart diseases, diabetes, certain types of cancer, and premature death[3].The longer you are obese, the more likely you are to develop diseases then complications. The most common complications are metabolic syndrome which is the biochemical processes involved in the body's normal functioning. When it comes to risk factors, they can be a person's traits, conditions, or habits which can increase the chance of developing a disease. Type 2 diabetes it occurs when your blood glucose (blood sugar) is too high. Over time, having too much glucose in your blood can cause health problems, such as heart disease, nerve damage, eye problems, and kidney disease. Other complications that can develop because of obesity are high blood cholesterol, and high levels of LDL cholesterol that causes plaque to build up in blood vessels. Which in turn may lead to heart attack, stroke, or other health problems. Also, one of the complications of obesity are the development of different types of Cancers, as cancer of colon, breast, ovaries, liver, kidney. Chronic obesity can also cause Osteoarthritis (chronic inflammation that damages the cartilage and bone in the joint[4].Fortunately, obesity and overweight can be prevented and are manageable.is that even modest weight loss can improve or prevent the health problems associated with obesity, as weight loss has an impact on diabetes prevention and control, and dyslipidemia, and blood pressure. Accompanying weight loss with dietary changes, increased physical activity and behavior changes can help you lose weight. Prescription medications and weight-loss procedures are additional options for treating obesity 5,6.Body mass index (BMI) is a tool that associate risk of health problems with the weight at population level, for adults it measures person's weight in kilograms divided by the square of the person's height in meters (kg/m2).the World Health Organization defines (overweight) as the condition in which the body mass index is between 25)kg/m2(to 29.9)kg/m2(, and (obesity) is defined as the case where the body mass index is more than 30)kg/m2(.[7] Furthermore, Body mass index)BMI(can be such a helpful tool to use for the indication of the nutritional status for children and adolescent aged 0–19 but with the use of different cut-offs values as gender- and age-specific ones[8].Keeping above facts in mind, the objectives of the current study was to assess students' perception on obesity and overweight and their risk factors, to observe the students' knowledge about Obesity-related diseases and to analyze behaviors and practices increasing risks of Obesity.

2. METHODOLOGY

2.1 Study Area

The study was conducted in the faculty of public health and health informatics, Umm Al-Qura University in Makkah city, Kingdom of Saudi Arabia.

2.2 Study Population

All female students in the faculty of Public Health.

2.3 Study Design

A cross-sectional study was conducted to assess the association of Obesity and Overweight with different Risk factors of female Public Health students at Umm Al-Qura University, Students who were invited responded voluntarily. The students were informed of the purpose of the study and the manner of completing the questionnaire and BMI measurements.

2.4 Sample Size

Sample size determined by using stratified sampling technique and using the Raosoft program to calculate the recommended sample size based on the available population size, the needed sample size was 179, in which 63 agreed to participate in the study.

2.5 Inclusion Criteria

All Female students of public health
Studying at Umm Al-Qura University, Makkah city.
Those who are in second,third and fourth years during second semester 2022.
Those who read the consent and agreed to participate

2.6 Exclusion Criteria

All Male students
All female students who refused to participate.
All female students who are in the internship year

2.7 Data Collection

Data were collected from participants using an online survey on the platform (Google Forms), It took about less than 6 minutes to complete the questionnaires. Reminders were continuously sent to students to participate in the survey. The questionnaire consisted of 25 questions, divided into 3 sections. The first section focused on assessing knowledge and awareness, the second section, it focused on assessing the level of perception towards obesity.As for the third section, it focused on assessing related behaviors and practices towards obesity.BMI measurements for the participants had been registered.

2.8 Measures

Body mass index measurements. Students were weighed and measured by our volunteers who were trained for this purpose using standardized procedures. Height of each student was measured to the nearest 0.1 cm, using a stature meter. Participants were weighed to the nearest 0.01 kg, the

scale used during the survey is first calibrated with a standard weight and checked daily during study period. Body mass index (BMI) was calculated for each participant by dividing weight in kilograms by the square of height in meters [50]. Body mass index (BMI) was used as an indicator of overweight (≥25 kg/m2) and overweight was defined as 25–29.9, and Obesity = BMI of 30 or greater[8].Physical activity was assessed using questions about the duration of daily physical activities depending on WHO recommendations, as a general goal, aim for at least 30 minutes of moderate physical activity every day for the adults (9),in which wecorrelate the duration of daily physical activities for 30 minutes, 1 hour and more than that with the BMI status of participants (9).

2.9 Social Variables

Socio-economic characteristics of female students participated were taken in terms of ages, social status and type of living; these variables drown from the questionnaire to reflect the social and economic status of participants by classifying them into single or married, and the type of living in family or husband home.

2.10 Statistical Analysis

Data analysis was done via the statistical package for the social sciences (SPSS) (version 25).

2.11 Ethical Approval

This study was performed in line with the principles of the Declaration of Helsinki. The institutional review board of the University ethical committee granted approval under the number 101/2/22.

2.12 Consent to Participate

The institutional review board waived the requirement for informed consent.

3. RESULTS

3.1 Characteristics of Sample of Students Participated in The Study

Table 1: Characteristics of sample of students participated in the study

Variable	Level of variance	freq.	%
Age	18 -20	31	49.2
	21-23	32	50.8
	Total	**63**	100
Academicyear	second	40	63.5
	Third	11	17.5
	Forth	12	19
	Total	**63**	100
AcademicSpecialization	Health education and promotion	37	58.7
	Health information technology and management	26	41.3
	Total	63	100

Table 1 is showing characteristics of female students participating in terms of ages, academic specialization, social status and type of living.

Table 2: Socio-Demographic

social status	Single	60	95.2
	Married	3	4.8
	Total	63	100
Type of living	In the family home	61	96.8
	With husband	2	3.2
	Total	63	100
Practicing physical activity	Yes	48	76.2
	No	15	23.8
	Total	63	100

Table .2 illustrates socio demographic characterstics of participants I which more than 95% are single and 76.2% of them practicing physical activity.

3.2 Knowledge of Participants On the Association Between Obesity and Hyperlipidemia, According to Their BMI Status

Table 3: Knowledge of participants on the association between Obesity and hyperlipidemia, according to their BMI status, N=63

Weight Status	Level of knowledge				P-value
	High level	Moderate level	Low level	Total	
Underweight	16	2	0	18	0.29
Normal	27	3	0	30	0.29
overweight	5	3	0	8	0.18
Obeseclass(1)	4	2	0	6	0.28
Obeseclass(3)	1	0	0	1	0.15
Total	**53**	**10**	**0**	**63**	

Table .3 showing that there were no significant relations between weight status and their knowledge about risk factors associated

with overweight and obesity.

3.3 Knowledge of Participants If It's Possible to Maintain a Healthy Weight According to Their BMI Status

Table 4: Knowledge of participants if it's possible to maintain a healthy weight

	Level of knowledge				P-value
Weight status	Exercise	Diet	Exercise+ diet	Total	
Underweight	0	0	18	18	0.27
Normal	3	1	26	30	0.19
Overweight	0	0	8	8	0.08
Obese class (1)	1	0	5	6	0.26
Obese class (3)	0	0	1	1	0.03
Total	**4**	**1**	**58**	**63**	

Table.4 showing that the perception of among participants if it's possible to maintain healthy weight according to their weight status.

3.4 Perception of Student If There Are Obesity –Type 2 Diabetes Relationship According to Their BMI Status

Table 5: Perception of student if there are obesity –type 2 diabetes relationship according to their BMI status

	Level of knowledge				P-value
Weight Status	Low level	Moderate level	High level	Total	
Underweight	0	1	17	18	0.02
Normal	2	0	28	30	0.03
Overweight	1	0	7	8	0.06
Obese class (1)	0	0	6	6	0.02
Obese class (3)	0	0	1	1	0.17
Total	**3**	**1**	**59**	**63**	

Table. 5 showing perceptions of students about obesity –type 2 diabetes relationship according to their weight status in which there are some significant relations

3.5 Perception of Student On Obesity - Hypertension Relationship According to Their BMI Status

Table 6: Perception of student on obesity - hypertension relationship according to their BMI status N= 63

	level of knowledge				P-value
Weight status	Low level	Moderate level	High level	Total	
Underweight	0	1	17	18	0.29
Normal	1	0	29	30	0.20
Overweight	0	1	7	8	0.27
Obese class (1)	0	1	5	6	0.28
Obese class (3)	0	0	1	1	0.01
Total	**1**	**3**	**59**	**63**	

The table showing the perception of student on obesity - hypertension relationship according to their BMI status in which most of them were knowledgeable about the relations

3.6 Perception of Participants Toward Obesity and Different Associated Factors

Table 7: Perception of participants toward different associated factors with obesity N= 63

Phrase		Yes	I don't know	No	Total	P-Value
Most obese people are aware of the health risks of obesity	Freq.	33	15	15	63	1
	%	52.4	23.8	23.8	100	
The use of herbal medicine is an excellent and quick solution to losing weight:	Freq.	9	15	39	63	0.12
	%	14.3	23.8	61.9	100	
Diet and physical activity are important for weight loss	Freq	62	0	1	63	0.11
	%	98.4	0	1.6	100	

Table.7 showing perception of students towards obesity and different associated factors including health risks of obesity, using herbal medicine, diet and physical activities to lose weight.

3.7 Association of The Duration of Daily Physical Activities and BMI Status

Table 8: Association of the duration of daily physical activities and BMI status N=50

	Duration of daily physical activities				P-value
Weight status	30 minutes	1 hour	More than 1 hour	Total	
Underweight	7	4	3	14	0.23
Normal	13	6	5	24	0.16
Overweight	4	2	1	7	0.08
Obese class (1)	2	2	0	4	0.25
Obese class (3)	1	0	0	1	0.07
Total	**27**	**14**	**9**	**50**	

Table. 8 clarified that no significant relation between the duration of daily physical activities and BMI status among study participants.

3.8 Association of The Type of Daily Physical Activities and BMI Status

Table 9: Association of the type of daily physical activities and BMI status N=48

	Type of daily physical activities					P-value
Weight status	Walking	Doing house chores	jogging or running	Dancing	Total	
Underweight	10	2	1	1	14	0.08
Normal	12	3	5	2	22	0.06
Overweight	2	5	0	0	7	0.09
Obese class (1)	3	1	0	0	4	0.12
Obese class (3)	1	0	0	0	1	0.05
Total	**28**	**11**	**6**	**3**	**48**	**0.014**

Table.9 showing the association of the type of daily physical activities practiced by participants and their BMI status

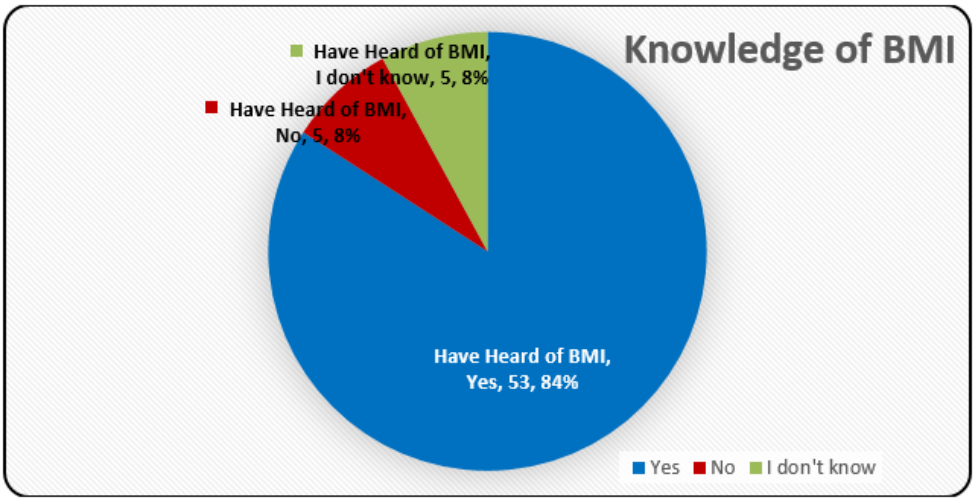

Figure 1, showing the knowledge about the mean of BMI and how its calculated, in which 84% were knowledgeable about it.

Fig 1: Knowledge of students on BMI

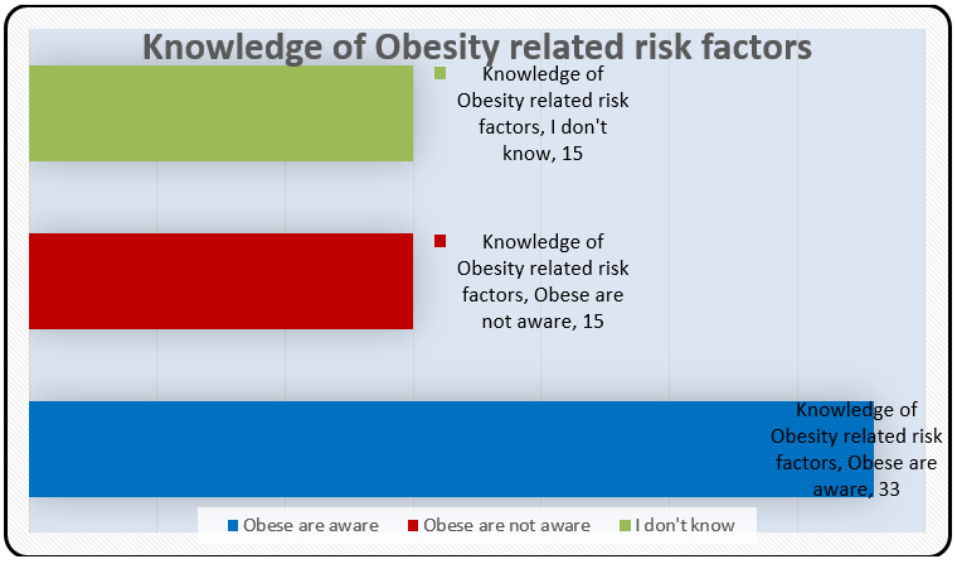

Figure 2, showing the perceptions of students participated in the study about obese people awareness that they are at risk of many diseases. the majority mentioned that obese people in the community are aware of risk factors associated with their obesity.

Fig 2: Perception of students towards obese people's knowledge of risk factors.

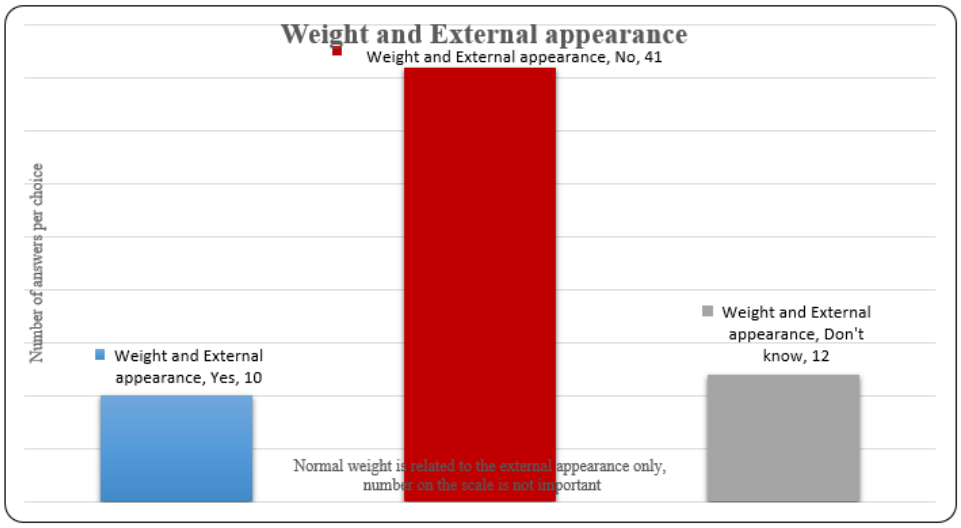

Figure 3, showing the perceptions of students who participated in the study about normal weight relation to external body appearance, in which their majority mentioned that normal weight has no relation with external appearence

Fig 3: Perception of students on normal weight, relation to external appearance

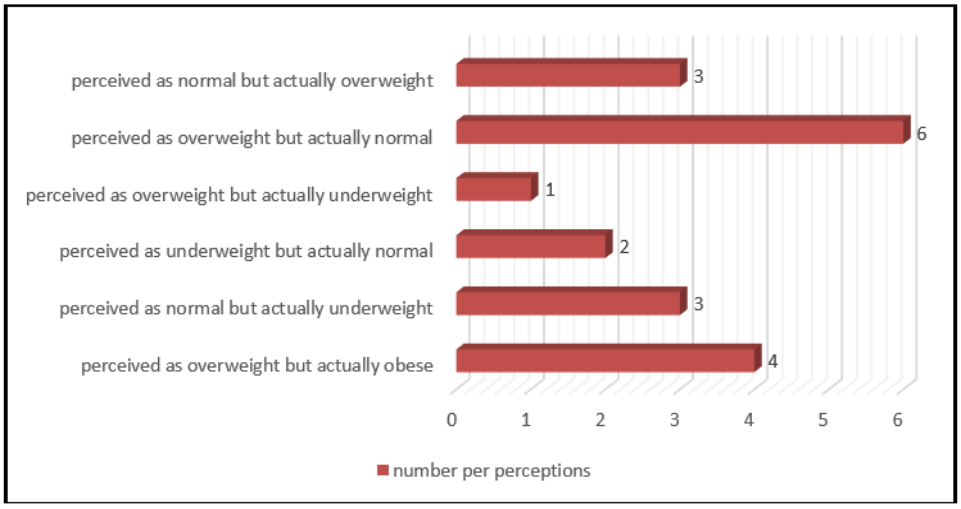

Fig 4: Self-perception of BMI status, relation to actual BMI status

Body image and dieting behavior. While the number of the normal weight and overweight female students perceived their body weight status correctly according to their BMI was high, a few proportion misjudged their body weight. 4 of the obese category perceived themselves as overweight, while 6 of the normal also perceived that they are overweight. 3 perceived themselves as normal while they were actually underweight.

4. DISCUSSION

This study outlined the relations between BMI and different risk factors among female public health students at Umm Al-Qura University, study shows the socio-demographic characteristics of the study sample[10], majority of respondents were single (95.2%), (4.8) of them were married, (76.2) of them were practicing different types of physical activities[11]. The age of half of participants was between 21 to 23 years (50.8%), with another age group of 18 to 20 years (49.2).[12]The study clarified that the level of students' knowledge of the association of obesity with hyperlipidemia was very high, as there are (53) participants have a high level of knowledge in this matter[13], while only (10) participants have an average level of knowledge , the majority of those who have a high awareness on obesity -hyperlipidemia relations are normal BMI participants[14], this also is agreed with the study of YaaObirikorang et al, Knowledge and Lifestyle-Associated Prevalence of Obesity among Newly Diagnosed Type II Diabetes Mellitus Patients Attending Diabetic Clinic at KomfoAnokye Teaching Hospital, Kumasi, Ghana, which showed same results[15].The study showed that normal BMI respondents were the most aware of the factors that contribute to maintain a healthy weight[16], as there are (30) normal of them believed that exercise and diet are important for losing weight and avoiding obesity, with p-value = 0.19, and the individuals came in second place were Underweight respondents[17], , while no obese respondent mentioned that food and exercise factors have any role in losing weight showing significant relation, p value 0.03, ,[18]. Study clarified that normal BMI respondents were the most aware of the association of obesity with type 2 diabetes, as there were (30) of them believed that obesity is linked to the incidence of type 2 diabetes, , p value = 0.03,[19] the Underweight individuals came in second with (18) respondents with p value of 0.02, (significant relations), and only (8) respondents who were overweight mentioned that being overweight is linked to type 2 diabetes[20]. The study showed that normal BMI respondents were the most aware of the association of obesity with hypertension[21], as there are (30) of them believed that obesity is linked to hypertension, Underweight individuals came in second place.The study clarified that majority of participants (52.4%) believed that most of those who suffered from obesity were fully aware of the risks related to obesity[22], (61.9%) mentioned that medicinal herbs are not feasible as a quick solution to get rid of obesity, while (14.3%) of the study participants believe that it is a quick solution to obesity problems, (98.4%) believed that diet with physical activities is essential for weight loss[23,24].It was clear from study that normal BMI participants were the most aware of the association of being normal weight with different exercise practices, as there are (30) of them believed that different exercise practices is associated with being normal weight, only (8) respondents who were overweight believed that there were relations of being normal weight with different exercise practices, p value 0.074[25].Study showed that participants having normal BMI were the most aware of the importance of practicing different physical activities [26], accordingly (13) of them regularly practice physical activities for 30 minutes on daily basis. [27].

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study concluded that there was a weakness in the perception and knowledge of students on the understanding of BMI and practicing of physical activities, especially among higher BMI participants. The study recommends more concentration in academic and non-curricular activities to change these perceptions and practices. The level of students' awareness of the risks of obesity was relatively high, but their practices are different, this requires more research to identify the reasons in order to mitigate consequences of obesity and overweight in future.The study was planned to represent all student's female and male, but due to technical and logistical issues male section was excluded, on theother hand due to time constraints the study was not able to make further investigations, many students didn't agree to participate or agreedto participate but were not available on required time. This leads to a reduction in the number of participants

5.2 Recommendations

1. Introduce extra educational and non-curricular programs on lifestyle, nutrition, and obesity for public health students.
2. Establishment of regular physical activities programs for students especially for those who are overweight or obese.
3. Strengthening of health education programs on obesity and other associated health problems inside and outside university campus.
4. The supply of weight machines in faculty departments.
5. Training of public health students on blood glucose, hypertension measurements methods and equipment.
6. More researchers are required for evaluating knowledge, perception, behavior and practice among public health and other students towards obesity and associated risk factors.

6. AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed during this study are included in this published article

7. CONFLICT OF INTEREST

Conflict of interest declared none.

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