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Research Article

Yoga for Diabetic Peripheral Neuropathy

Efficacy of Yoga Therapy on Psychological Variables in Male Persons with Diabetic Peripheral Neuropathy (DPN)

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Abstract: The purpose of this study was to conduct a descriptive analysis of the recognized efficacy of yoga therapy on psychological variables in male persons with diabetic peripheral neuropathy (DPN). The sources of stress among person at 30 males with diabetic peripheral neuropathy were chosen for the study from the Chengalpattu district, Tamil Nadu in India were researched. To determine how stress sources are received by male persons with diabetic peripheral neuropathy (DPN). Studies on DPN participants have examined important psychological variables such as Stress and Anxiety. When receiving yoga therapy, Participants with diabetic peripheral neuropathy had improved Mind function and decreased their DPN level: symptom Stress and Anxiety levels among patients with diabetic peripheral neuropathy (DPN). The Participants were given a Perceived Stress Scale (PSS) and Generalized Anxiety Disorder (GAD-7) questionnaire. The PSS had ten objects rated on a 5-point scale, with 0 being the least stressful and four being the most stressful, and The GAD had seven objects rated on a 4-point scale, with 0 being the least Anxiety and 3 being the most Anxiety. Thirty males with diabetic peripheral neuropathy were chosen for the study randomly; they were between the ages of 35 and 70. Two groups were formed from the selected subjects. There were fifteen in each group. one underwent experimental groups(n=15) another underwent control group (n=15). Group-I received a Yoga therapy practice, and Group II underwent it without any practice. The 12-week training period, six days per week, an hour in the morning. To determine the way to deal with stress through Yoga**.** This study showed that individuals who participated in the yoga module performed better than Control Group II. Yoga Therapy performed much better in Experimental Group I. After practising Yoga for 12 weeks, the experimental group shows better results in psychological characteristics. According to our data, the Yoga practice group benefited more than the control group. The experimental group was significantly less Stressed and Anxiety. On the other hand, the control group showed a modest increase but no improvement. Our data support this notion. Improved mindfulness, which includes specific components for processing experience, being less self-critical and empathetic to themselves, and not over-identifying with Stress and Anxiety, was connected to greater impact in the Yoga practice group. This research study reveals that Yoga Therapy was a significantly more effective treatment for DPN.

Key Words: Yoga Therapy, Diabetes Peripheral Neuropathy, psychological Variables, Perceived Stress Scale.

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1. INTRODCTION

1.1. Diabetic peripheral neuropathy (DPN)

The most severe diabetic neuropathy is diabetic peripheral neuropathy (DPN)[1-3]. Neuropathic pain has a substantial correlation with psychiatric disorders like anxiety and Stress, according to research; however, the pathology that causes these symptoms occur is yet unknown. To find out, we looked at how chronic neuropathic damage affected both male and female subjects' levels of anxiety-like behaviour and how lifelong stress affected those levels of neuropathic pain-like behaviour. Additionally, They examined this connection in patients with both painful and painless. Neuropathic pain is a common sign of DPN and frequently begins in both feet eventually spreading to the calves, fingers, and hands. It is frequently described as burning, tingling, electric, sharp and shooting[4-6]. A decreasing glucose tolerance, being older, having had diabetes for a longer period of time, drinking alcohol, and smoking are risk factors for DPN[7-11]. Diabetic neuropathy is a disorder that usually affects people with diabetes[12-13]. The most typical areas of diabetic peripheral neuropathy (DPN) are the hands and lower limbs. It causes a lack of sense of protection., which enables non-sensitive feet to continuously suffer harm. Because of different motor responses, the balance and sensorimotor components of gait were lost or damaged in DPN participants [14-15]. around 30% of DPN patients struggle with balance and coordination[16-17]. DPN has been suggested that the level of pain severity is related to the It has been proposed by DPN that a person's experience of sleep issues, stress, anxiety, and depression correlated with the intensity of their pain. Even while we did not investigate the relationships between these categories, we did observe that affective distress and sleep impairment differed according to the degree of pain severity, including that Patients with severe pain also had worse quality of life, more sleep issues, anxiety and depressed symptoms than those with moderate pain, and those with moderate pain had worse impairment on similar measures compared to patients with mild pain[18-19]. The yoga study has help us from determining the degree of sleep-related issues and symptoms. when the yoga practice has been successfully treated of stress[20].

1.2. Signs and Symptoms of DPN[21-24]

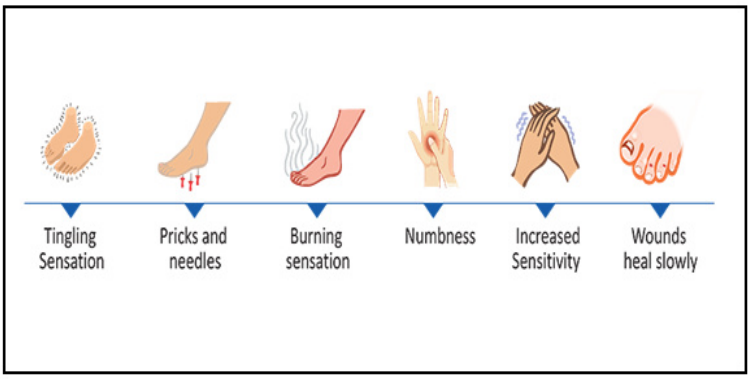


Fig 1: Signs and Symptoms of DPN

Figure 1 shown DPN symptoms and indicators might vary from person to person, and sometimes there may be none at all. One of the symptoms that are frequently present is 1. Tingling Sensation, 2. Pricks and needles, 3. Burning Sensation ,4. Numbness, 5. Increased Sensitivity, 6. Delayed wound healing[21-24].

1.3. Reaction of the human psychological system

According to a survey done by the Office for National Statistics (ONS) in 2000, stress and anxiety disorders are among the most common mental health issues seen in the community in the United Kingdom. Over 86% of psychotic disorders are anxiety-related, including mixed anxiety and chronic anxiety, depressive disorder, phobias, attention deficit disorder, and panic disorder. A crucial element or symptom of all of these diseases is extreme Stress. Different sensory inputs and thoughts are interpreted as stressors by your brain[25.] Figure 2 shown the wiring between your brain and your organs is created by your central nervous system. It regulates functions like our semi-autonomous relaxation and independent heartbeat. Your sensory system and cognition detect external stresses, which cause fluctuations in that equilibrium. This alteration signals both your immune system and endocrine system to act by activating neurotransmitters, synthesised chemicals. Effect and Symptoms of Psychological Factors[26]

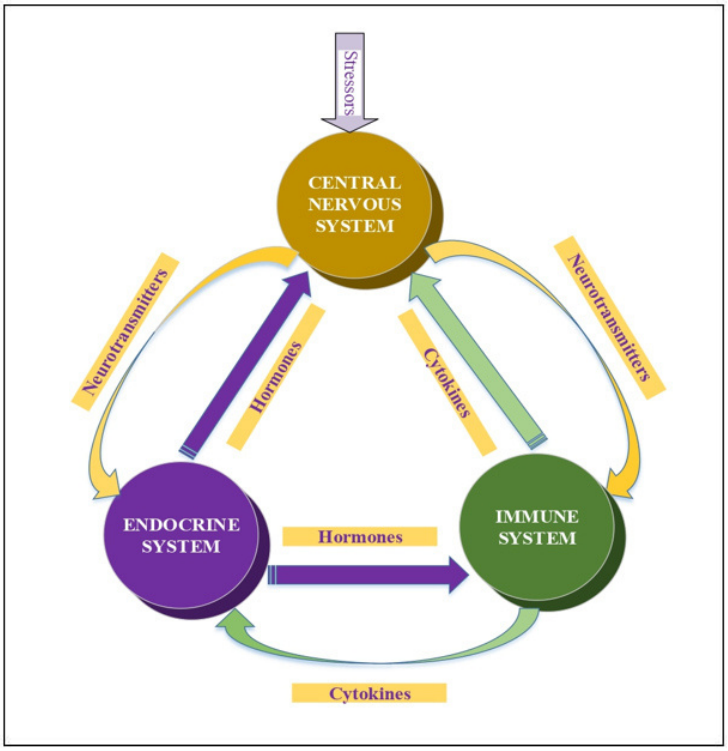


Fig 2: Effect and Symptoms of Psychological Factors

The free flow of blood is obstructed when we are under stress and our muscles are tense. Blood flow obstructions have a negative impact on a person's activities because they affect the arteries, blood pressure, and breathing rate. Our body's adrenal glands, which release hormones in response to stress, help us survive. The adrenal glands will continue to create adrenalin and cortisone as long as we are under stress. However, if stress persists for an extended period, the body may be negatively impacted by these overproductions of hormones, which could impact daily activities. This is where Yoga can help to shield the person from the disease[26].

1.4. Signs and Symptoms of Psychological variables

Stress and Anxiety are normal aspects of the body's fight-or-flight response to threats. This response is intended to make them aware, attentive, and prepared to deal with a threat. The fight-or-flight reaction is the body's natural response, and it involves both stress and anxiety. Stress hormones are released by the body when a person feels threatened. The heart beats more rapidly due to stress hormones, carrying more blood to the limbs and organs. This reaction enables someone to be prepared to either fight or flight.Similarly, they breathe more quickly, and their blood pressure increases. Professionals refer to this extraordinarily quick process as stress. Anxiety is the body's natural response to stress.

- ***Signs and Symptoms of Psychological variables***[27,28]

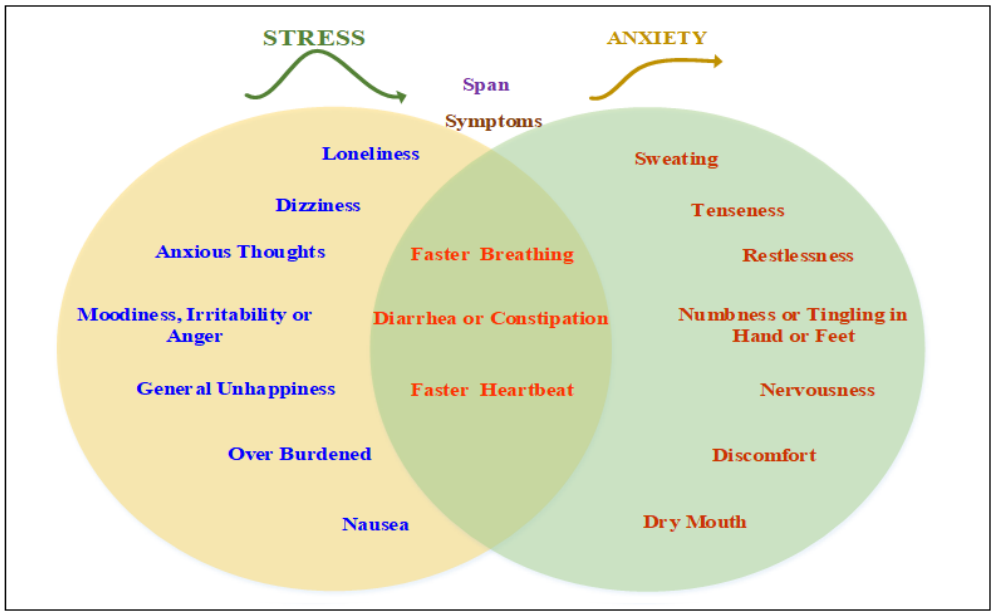


Fig 3: Signs and Symptoms of Psychological variables

Anxiety and stress symptoms often resemble one another. When under stress, an individual might experience Loneliness, Dizziness, Anxious Thoughts, Moodiness, irritability, anger, general unhappiness, a feeling of being overburdened and Nausea. anxious thoughts. The same physiological responses associated with stress and anxiety include a faster heartbeat, faster breathing, and constipation or diarrhea. Stress often lasts a short term and is a reaction to a perceived threat. Anxiety can linger and occasionally feel like nothing is setting off it. yoga Techniques can help participants to cope with Stress and Anxiety[27-28].

1.5. System of Yoga for Psychological Factors

Yoga is a technique that combines three aspects: body intervention, breath awareness exercises and meditation as a mind. Hatha yoga, which combines meditation, breathing exercises, and asanas (postures), is the type that is most popular in the United States. Despite having its roots in Indian culture and religion, yoga can be practised on a scientific level[29]. Yoga originated in India. Yoga practice is useful in the management of various lifestyle diseases, such as diabetes. The therapeutic effects of yoga on diabetes involve immunological, neuroendocrine, and psycho-neuro-endocrine systems[30-32]. DPN may manifest as a lack of balance and coordination, vibration, touch, or temperature sensations as well as sensitivity to pain or touch, discomfort or cramps, tingling, burning, or prickling[33-35]. Yoga's holistic approach assists in strengthening the body throughout its entirety[36]. Yoga enhances co-morbidities associated with DPN, including muscular strength, balance, confidence in one's equilibrium, sleeping habits, quality of life, Stress, and anxiety, can be an effective method for those with DPN[37-38].

1.6. Importance of Yoga Therapy on Psychological Variables with DPN Treatment

Yoga reduces anxiety, Stress and stablish nervous system and maintain life balances. Yoga is an appealing therapeutic choice due to its popularity, which has already been proved in the United States[39].Yoga has Satisfaction for adults with diabetic peripheral neuropathy. If our health worsens, we go into fight-or-flight mode, which could lead to the development of ineffective pain avoidance techniques[40]. Stress can also increase or cause diabetes, which can then result in neuropathy. When the condition worsens to control blood sugar levels adequately, this disease develops. High blood sugar levels have been linked to nerve injury. Pain, numbness, tingling, and other neuropathy symptoms can result from DPN impairment[41-43]. Yogasana were effective in improving static and dynamic balance performance, lower extremity muscle strength, and reducing fear of fall among people with DPN. Yogasana intervention demonstrated marginally greater improvement in static and dynamic balance performance and lower extremity muscle strength compared to conventional exercise[44]. Before undertaking the training programme, the researcher conducted a review of the scientific literature on the topic of the impact of yogic practises on psychological factors. The investigator chose the psychological variable stress based on experience[45-47]. Patients were given intensive instruction in yoga postures, breathing techniques, and meditation in addition to getting regular therapy for DPN with stress. After a few months, both stress levels and glucose levels were significantly improved[48-51]. Yoga has helped persons with DPN by reducing Stress and co-morbidities such physical strength, balance, confidence in one's equilibrium, sleep patterns, and anxiety[52-58].

1.7. Perceived Stress Scale (PSS-10)

The PSS is a ten-item questionnaire designed to measure self-reported stress levels. Each item is assessed on a scale of 0 (never) to 4 (Almost always), with a total possible score of 0 to 40. A higher score indicates a higher level of felt stress. Each item is graded on a 5-point scale, with zero being the Never and five almost always (4). Positively worded items are reverse-scored, and the ratings are added together, with greater scores indicating higher levels of perceived stress. PSS-10 scores are calculated by reversing the scores on the four positive items (e.g., 0=4, 1=3, 2=2, etc.) and then adding the results over all ten items. The positively expressed items are 4, 5, 7, and 8 Individual PSS scores can vary from 0 to 40, with higher scores indicating more stress ('low stress = 0–13, moderate stress = 14–26, and high stress = 27–40') [59-62].

1.8. Generalised Anxiety Disorder Questionnaire (GAD-7)

The GAD-7 is a seven-item self-report scale designed to evaluate the GAD. Items are graded using a 4-point Likert scale (0 = not at all to 3 = nearly every day). The GAD-7 items list some of the key diagnostic indicators for GAD (i.e., Anxious, Feeling Nervous or on edge and worrying too much about different things) which range from 0 to 21 with higher Scores reflect extreme level of Anxiety System[63-65].

2. MATERIALS AND METHODS

The study sample's data was examined for Psychological factors in relation to pre- and post-tests in one experimental group and one control group. Thirty men's with diabetic peripheral neuropathy from Tamil Nadu, ranging in age from 35 to 70 years, were chosen this study.The methods carried out in this study that involved people were approved ethically by the Eden Siddha Herbal Centre (Ref No: 231/ME-1/ESHC/2021) Guduvanchery, Chengalpattu -603202. Tamil Nadu).and (NITPy/Phy Edu/IPS/2021/32) institutional permission statement as standard, routine evaluations for patients with DPN. The participants were split into two groups of fifteen people each. The experimental group I received Yoga Therapy and the control group II no practice.

- ***Flow Chart of Methodology***

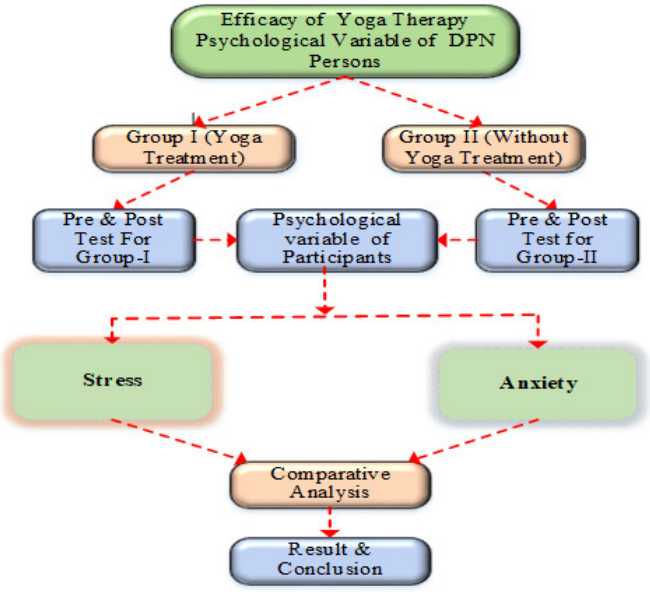


Fig 4: Evaluation of Psychological variables of DPN Persons

Figure 4 shows the Psychological variables, such as Stress and Anxiety, obtained before and after the test. Finally, to strengthen the research, the study's participants compared and analyzed the results.

2.1. INVESTIGATIONS

To prevent any other illnesses and find the underlying cause, the technique was repeated for the Anxious Thoughts counts, the Breathing system, and the metabolism. Blood sugar levels while fasting and after meals were kept within reasonable limits. According to yoga, practice enhances nerve function without having any undesirable effects. Table 1 shows a Summary of demographic data from a single sample test technique comparing yoga group intervention and control group intervention mean values. Table 2 shows Each participant underwent a clinical examination using their foot feeling by their Douleur Neuropathy Questionnaire 4 (DN4) and Michigan Neuropathy Instrument (MNSI) score. Both are assessed using questionnaires of the objective and subjective types.

Table 1: Summary of demographic Information

Variables	Yoga Group intervention(n=15)	Control Group Intervention(n=15)
	Mean(SD)	
Age	48.74	57.00
Duration of Diabetes	6.767	9.466
Marital Status	.9334	1.000
No.of Children's	2.200	2.000

Table 2: DPN Foot Sensation Clinical Test

S.No.	Test	Method	Image
1	Monofilament Test	The monofilament test is used to identify loss of sensitivity for people with diabetes.	

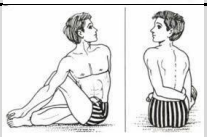
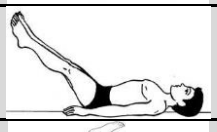
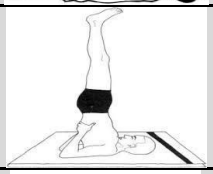
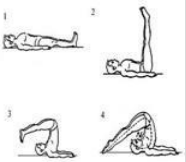
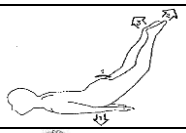
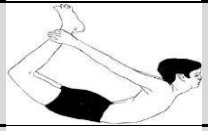
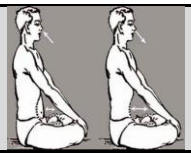
2	Brush Test	The brush test can be used to identify **mechanical allodynia (simple Touch).**	
3	Hot Cold Test	Hot/Cold test is used to identify **thermal allodynia** (the abnormal sensation of pain from the stimulus of hot or cold). Test tube with cold water (5 -10 C) another Warm water (35 -45 C)	
4	Pinprick Test	The pinprick test is used to identify any nerve damage.	
5	Vibration Test	The vibration test can evaluate the **integrity of large nerve fibres**. 128-Hz tuning fork is used. Place the vibrating fork on patient's distal Hallux (big toe) joint and ask them if they can feel vibration	

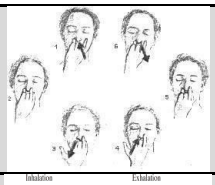
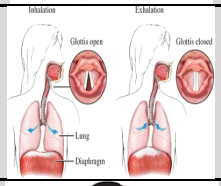
2.2. TREATMENT PROTOCOL

The experimental group underwent the training period of 12 weeks, six days per week received Yoga practice. The concerned medications were also be continued. The table 1 below gives brief descriptions of the treatment protocol.

Table 3: Treatment Protocol[26-63]

Treatment protocol for Yoga Treatment	weeks	Image	Effects
Sukshma Vyayama	12 Weeks		Initiates the flow of blood and oxygen to the body's soft tissues, including the muscles, tendons, ligaments, and bones, and helps your body get ready for the asanas with greater strength.

Surya namaskar (sun salutation) 12-Steps Sequences	12 Weeks		Stimulates insulin production through brain signalling. Significantly decreases hip circumference, exerting beneficial effects on glycaemic outcomes.
Tadasana	12 Weeks		It is known to increase insulin sensitivity in the body.
Utkatasana	12 Weeks		-Midway between the neck and head of arms, four fingers above from midline of the clavicle. -Place the middle three fingers over the supraclavicular fossa; Press and release
Vriksasana	12 Weeks		Situated between anterior neck (Adam's apple) to posterior neck
Gomukhasana	12 Weeks		By energising the kidneys, it can help diabetic patients.
Paschimottanasana	12 Weeks		Below 2.5 Finger breath nipple point.
Ardha Matsyendrasana	12 Weeks		Muscles situated in the lateral lumbar portions of the abdominal region.
Uthanapadasana	12 Weeks		Situated at the end of the Sternum bone point in between the rib cage.
Sarvangasana	12 Weeks		Two small dents found on either side of the back muscles in the sacroiliac joint.
Halasana	12 Weeks		-Middle of the wrist joint (ventral aspect). -Place the middle of the thumb (palmar aspect) and give moderate pressure 3 times.
Salabhasana	12 Weeks		Situated at the mid portion of the thighs.
Dhanurasana	12 Weeks		Situated at the knee cup portion of the below 4 FB.
Savasana	12 Weeks		Eight fingers above the medial malleolus.
Kapalbhati Pranayam	12 Weeks		Seven fingerbreadths above the heel (posterior aspect).

Nadi Shodhana Pranayama	12 Weeks		One finger breadth below the lateral malleolus. It is to open and purify the mind-body organism's subtle channels.
Ujjayi Pranayama	**12 Weeks**		At the junction of big and second toe in plantar region.
Bhramari Pranayama	**12 Weeks**		In order to practice this style of yoga, the practitioner must make a bee-like humming sound. This breathing method can instantly quiet the mind.
Simha Pranayama	**12 Weeks**		Simhasana pranayama, also known as the lion's breath, is a powerful breathing technique that can help you clear your throat chakra and boost your energy
Om Meditation	**12 Weeks**		The universe was created by the vibrations of cosmic energy, which first manifested as the sound Om. It is the creator's expression

2.3. Treatment Schedules

The table 4 below gives brief descriptions of the treatment Schedules for DPN patients.

Table 4: Treatment Schedules for DPN patients

S.No	List of yogasanas and Pranayama	weeks	sets	Duration	Maintaining Duration	Rest in between asanas in seconds	Frequency
1	Sukshma Vyayama (Pavanmuktasana series)	1-12 Weeks	1	10 Minutes	20 Seconds	30 Seconds	6 Days
2	Surya Namaskar	1-12 Weeks	4	10 Minutes	10 Seconds	30 Seconds	6 Days
3	Tadasana	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
4	Utkatasana.	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
5	Vrikshasan.	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
6	Gomukhasan	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
7	Paschimottanasana.	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
8	Ardha Matsyendrasana	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
9	Utthanapadasan	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
10	Sarvangasana.	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
11	Halasana.	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
12	Salabhasana.	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
13	Dhanurasana.	1-12 Weeks	1	50 Seconds	20 Seconds	30 Seconds	6 Days
14	Shavasana.	1-12 Weeks	1	10 Minutes	10 Minutes		6 Days
				Pranayama			
15	Kapabhati	1-12 Weeks	1	60 Seconds	30 Seconds	30 Seconds	6 Days
16	Nadi Shodhana	1-12 Weeks	1	60 Seconds	30 Seconds	30 Seconds	6 Days
17	Ujjayi	1-12 Weeks	1	60 Seconds	30 Seconds	30 Seconds	6 Days
18	Bhamari	1-12 Weeks	1	60 Seconds	30 Seconds	30 Seconds	6 Days
19	Simha Pranayama (Lion's Breath)	1-12 Weeks	1	60 Seconds	30 Seconds	30 Seconds	6 Days
				Meditation			
20	AUM	1-12 Weeks	1	10 minutes	10 minutes	30 seconds	6 Days
	Practice Time			54.16 min.			
	Relaxation Time			5.84 min.			
	Total Time			60.0 min.			

2.4. Data collection

Whether they felt pain or not, patients with DPN who met the inclusion criteria were included in the trial. They had to be at least 35 years old. The questionnaire examined at the patients' psychological build, their assessment of the benefits of using yoga as a form of treatment before being diagnosed, the categorisation of yoga practises, the resources evaluated, the safety, and the efficacy of yoga therapy. Patients received standard forms that had already been created and approved by the researcher. The patients' histories, diagnoses, and other information were recorded along with their data.

3. RESULTS

3.1. Calculations in statistics

Statistical analysis was performed on the study's by using SPSS 19.0. The Percentages, averages, and standard deviations were used to characterise the results. From its roots as a tool for statistical analysis, SPSS has evolved into a favourite among academics in a range of features[66-67].

3.2. Interpretation of Result

If $t_{cal} < t_{tab}$ Value , Accept H_o there is no relationship between Yoga practice (Experimental Group) to two Psychological variables. If $t_{cal} > t_{tab}$ Value , Rejected H_o there is relationship between yoga practice (Experimental Group) to two Psychological variables. If $t_{cal} < t_{tab}$ Value, Accept H_o there is no relationship between without Yoga practice (Control Group) to two Psychological variables. If $t_{cal} > t_{tab}$ Value , Rejected H_o there is relationship between without Varma practice(Control Group) to two Psychological variables. Degree of freedom (df) = n-1 So df= 14.Then t table value is 14 df = 2.14.

3.3. Paired Samples T Test For Pre-test and Post-test for Group I

Table 5: Paired Samples T Test for Pre-test and Post-test for Group I (experimental Group-I)

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Variable-I	Stress Pre-Test	23.54	15	7.348	1.898
	Stress Post-Test	20.00	15	6.918	1.787
Variable-2	Anxiety Pre-Test	14.61	15	4.596	1.187
	Anxiety Post-Test	13.34	15	4.609	1.189

Examining the experimental Group-I involved using the analysis tool. Table 5 displays the pre-test and post-test values for yoga therapy based on Stress and Anxiety. The results were mentioned into the Mean Value, Standard Deviation, Standard Error Mean, and Number of Participants 15, accordingly.

Table 6: Paired Samples T Test for Pre-test and Post-test for Group I

Paired Samples Correlations				
		N	Correlation	Sig.
Variable-I	Stress Pre-Test & Stress Post-Test	15	0.982	0.00
Variable-2	Anxiety Pre-Test & Anxiety Post-Test	15	0.971	0.00

Table 6 displays the pre-test and post-test for yoga therapy based on Correlation and Significant values.

Table 7: Paired Samples T Test for Pre-test and Post-test for Group I

Paired Samples Test									
Paired Samples		Paired Differences					t	df	Sig. (2-tailed)
Variables	Test	Mean	Std. Dev.	Std. Error Mean	Lower	Upper			
Stress	Pre-test &Post-test	3.533	1.4074	.36341	2.753	4.31	9.723	14	.000
Anxiety	Pre-test &Post-test	1.266	1.0997	.28396	.6576	1.87	4.461	14	.001

The analysis tool was used to examine the experimental Group-I and Control Group-2. Table-7 Shows that Stress presents the pre-test and post-test value of Yoga Therapy. The Mean Value 3.533, Std. Deviation 1.4074, Std. Error Mean .36341, lower value 2.753 upper value 4.31, t value 9.723, df 14 respectively, resulted in Sig. (2-tailed) of .000, the t calculation value of 9.723 greater than the table value of 2.14 so it's considered statistically significant difference between the pre & post-test means at 0.05 level of confidence for the both test of Stress in Yoga Therapy. Anxiety presents the pre-test and post-test in Yoga Therapy as Mean Value 1.266, Std. Deviation 1.0997, Std.Error Mean .28396, lower value .6576 upper value 1.87, t value 4.461, df 14 and resulted in Sig. (2-tailed) of .001, the t calculation value of 4.461greater than the table value of 2.14 so it's considered statistically significant difference between the pre & post-test means at 0.05 level of confidence for the both test of Anxiety in Yoga Therapy. Table 7 reveals that the Stress and Anxiety pre-test and post-tests yoga Therapy had a significant value.

3.4. Paired Samples T Test for Pre-test and Post-test for Group II

Table 8: Paired Samples T Test for Pre-test and Post-test Group II (Control Group)

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Variable-1	Stress Pre-Test	24.40	15	7.119	1.839
	Stress Post-Test	25.00	15	7.367	1.903
Variable-2	Anxiety Pre-Test	13.27	15	4.589	1.186
	Anxiety Post-Test	13.87	15	4.274	1.104

Examining the experimental Group-II involved using the analysis tool. Table 8 displays the pre-test and post-test values for yoga therapy based on Stress and Anxiety. The results were mentioned into the Mean Value, Standard Deviation, Standard Error Mean, and Number of Participants 15, accordingly.

Table 9 : Paired Samples T Test for Pre-test and Post-test for Group II

Paired Samples Correlations				
		N	Correlation	Sig.
Variable-1	Stress Pre-Test & Stress Post-Test	15	0.987	0.00
Variable-2	Anxiety Pre-Test & Anxiety Post-Test	15	0.956	0.00

Table 9 displays the pre-test and post-test for yoga therapy based on Correlation and Significant values.

Table 10: Paired Samples T Test for Pre-test and Post-test for Group II

Paired Samples T Test									
Paired Samples		Paired Differences					t	df	Sig. (2-tailed)
Variables	Test	Mean	Std.Dev.	Std. Error Mean	Lower	Upper			
Stress	Pre-test &Post-test	-.6.000	1.18	.30551	-1.255	.0552	-1.964	14	.070
Anxiety	Pre-test &Post-test	-.6000	1.35	.34915	-1.348	.1488	-1.718	14	.108

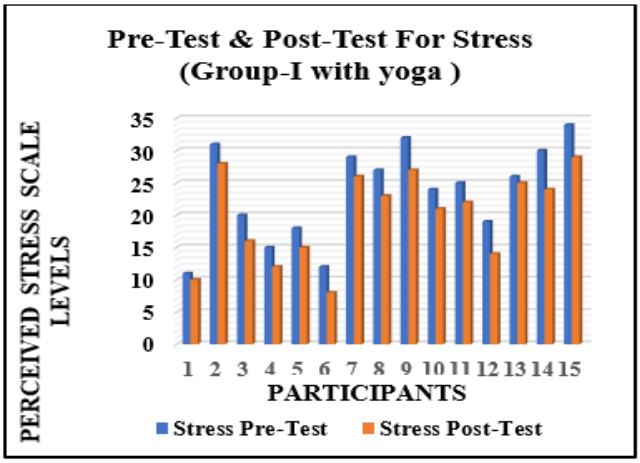
Table 10 shows the SPSS analysis of Stress presents the pre-test and post-test in Control Group-II. The Mean Value is -.6000, Std.Deviation 1.18, Std.Error .30551, lower value -1.255 upper value .0552, t value -1.964, df 14 and respectively, resulted in Sig. (2-tailed) of .070. the t calculation value of -1.964 Less than the table value of 2.14 so it's considered statistically no significant difference between the pre & post-test means at 0.05 level of confidence for the both test of Stress in Without Yoga Therapy. Anxiety presents the pre-test and post-test in without Yoga Therapy as Mean Value -.6000, Std.Deviation 1.35, Std.Error Mean .34915, lower value -1.348 upper value .1488, t value -1.718, df 14 and respectively, resulted in Sig. (2-tailed) of .108. the t calculation value of -1.718 Less than the table value of 2.14 so it's considered statistically no significant difference between the pre & post-test means at 0.05 level of confidence for the both test of Anxiety in Without Yoga Therapy. Table 10 reveals that the Stress and Anxiety pre- and post-tests in without Yoga Therapy had a no Significant value.

4. DISCUSSION

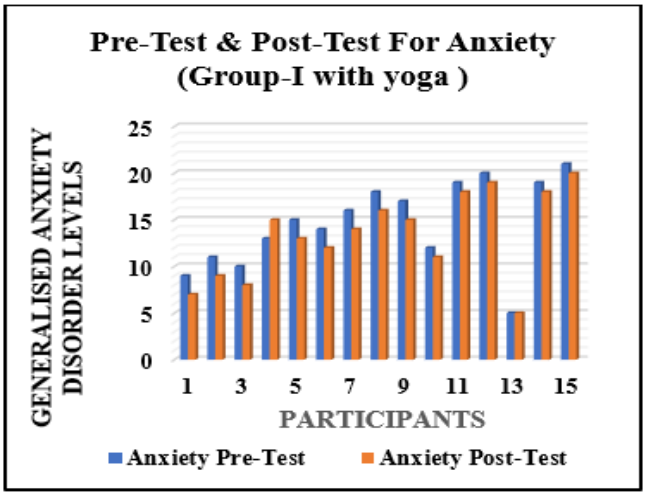
We observed the baseline characteristics of the two groups, one group showed significant difference and another group showed no significant difference, therefore they have been evaluated for the study. After 12 weeks of study period, we observed a significant decrease in Stress and Anxiety done by Yoga group. Control group without yoga practice Shown no changes. However, the Control Group did not indicate much of a difference in stress and anxiety. We observed significant reduction in PSS and GAD-7 scores in Yoga groups. Therefore, Yoga practice were effective in reducing perceived stress and Anxiety in Group I Participants. Reduction in stress and Anxiety may have occurred due to better autonomic tone (higher parasympathetic and lesser sympathetic tone) observed in Group 1. The Yoga group may have had better stress and anxiety performances as a result of DPN. Yoga is extensively applied in Tamil Nadu to treat DPN. Yoga practice given better result for DPN persons[68-69].

4.1. Graph I and II Pre-test and Post-test for Group I

According to the graph analysis, participants in Group -1 Yoga Therapy module outperformed the Control group. 12 weeks' yoga therapy has shown to be effective and causes significant Psychologically changes in Stress and Anxiety.



Graph I: Stress Pre & Post-Test with Yoga



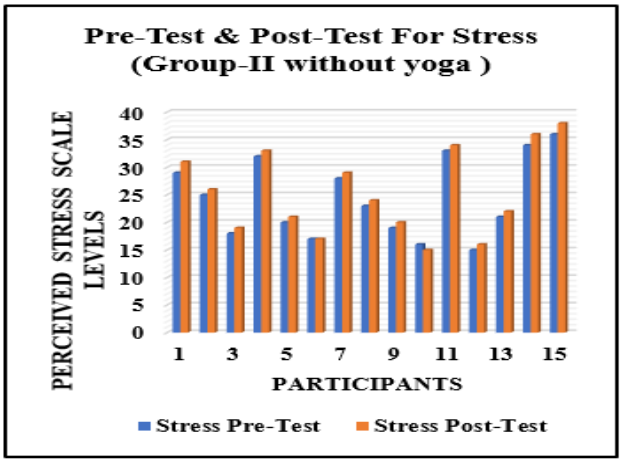
Graph-II Anxiety Pre & Post-Test with Yoga

Fig 6: Pre and Post Test data of Experimental Group I (With Yoga Practice)

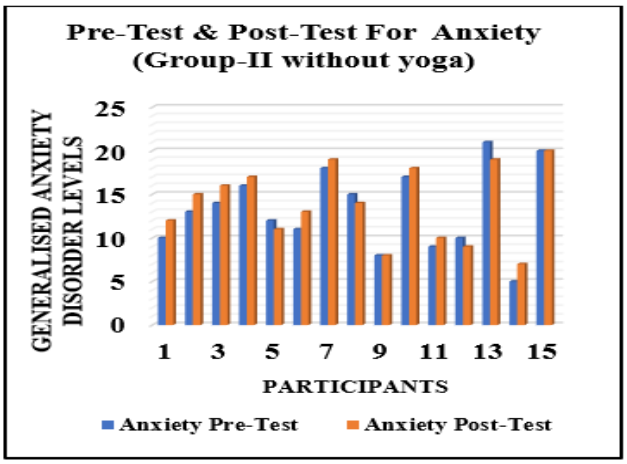
In graphs I and II, the 'x' axis represented the number of 15 participants, while the 'y' axis represented psychological data including PSS and GAD-7. Following the pre-test, the participants were given yoga pose such as SukshmaVyayama (PavanmuktasanaSeries) ,Surya Namaskar, Tadasana, Utkatasana, Vrikshasana, Gomukhasana, Paschimottanasana, Sarvanana, Utthanapadasana, Ardha Matsyendrasana, Utthanapadasana, Sarvangasana, Halasana, Salabhasana, Breathing exercise and Om Meditation focuses on improving psychological aspects of diabetic peripheral neuropathy. After post-test diagnosis, patients' assessments of the benefits of Yoga treatment were used with positive outcomes in experimental group-1. All graphs on the 'y' axis reflected psychological data, Stress and anxiety pre-test results indicated blue. Stress and anxiety post-test results indicated orange.

4.2. Graph III and IV Pre-test and Post-test for Group II

Participants in Group -II control group did not benefit significantly, as seen in graph III and IV as shown in Figure 4. The participants were not provided any practice after the pre-test. Comparing the results of pre- and post-tests, there was no significant difference in Stress and Anxiety. The graph shows that there are no positive outcomes.



Graph-III Stress Pre & Post-Test without Yoga



Graph-IV Post-Test for Control Group

Fig 7: Pre and Post Test data of Control Group II (Without Yoga Practice)

5. CONCLUSION

In comparison to the Control Group II, Yoga Therapy performed much better in the Experimental Group I. After practising yoga for 12 weeks the experimental group's shows better results in psychological characteristics, such as Stress and Anxiety. basis of the respiratory, cardiovascular, and nervous systems fundamental structural asymmetries, as well as the fact that each of these systems coupling mechanisms like the heart-lung, heart-brain, and lungs-brain—is also asymmetrical. As a result of the mechanical activity of the heart, lungs, and blood flowing throughout the circulatory system, these asymmetrical vector pressures will also generate a lateralization impact in the autonomic balance. By applying mechanical forces to the body with the intention of eliminating current mechanical force vector imbalances, it is possible to enhance autonomic balance over the long term in addition to respiratory, cardiovascular, and brain function. yoga practises involves continuously managing the body's functions for perfect timings. also we conclude practising yoga enhances the Hormone balance, nerve function, Mind stability to the person with Diabetic Peripheral Neuropathy.

6. AUTHORS CONTRIBUTION STATEMENT

Mr.P.Sudhan conceptualized, designed, performed the experiment, gathered and analyzed the data. Dr.Rajeev Sukumaran encouraged Mr.P.Sudhan to investigate the effect of Yoga Therapy on Diabetic patients, through a spark to conduct this experimental study on the Psychological changes in Diabetic Peripheral Neuropathy(DPN) Patients. As an intiative this study has begun with the Male patients in supervision of Dr.Babu Subbiah and with the help of the Yoga Teachers Ms.Prema Nagesh from Vyaniti Yoga Center, Oman and Ms.L.Kalpana from Athma Gnanalayam, India. Dr.G.Janaki helped in writing the manuscript, providing critical feedback and helped shape the research analysis. All authors contributed to their fullest extent to complete this manuscript successfully.

7. ETHICAL CLEARANCE STATEMENT

The Methods carried out in this study that involved people were approved ethically by the Eden Siddha Herbal Centre (Ref No: 231/ME-1/ESHC/2021 Guduvanchery, Chengalpattu - 603202. Tamil Nadu). as standard, routine evaluations for patients with DPN.

8. CONFLICT OF INTEREST

Conflict of interest declared none.

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