



THE NEUROLOGICAL FEATURES OF DIABETIC PERIPHERAL NEUROPATHY (DPN) PATIENTS ARE ADDRESSED BY APPLYING VARMA THERAPY TO BIOCHEMICAL ALTERATIONS.

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Abstract:

Background : The purpose of this study was to conduct a descriptive analysis of that data in order to determine the known efficiency of varma treatment on Neurological characteristics in male patients with diabetic peripheral neuropathy (DPN). In this study, DPN participants have been examined crucially for neurological variables such as Michigan Neuropathy Screening Instrument (MNSI) for estimate the probability of neuropathic pain and Loss of sensation were investigated in 30 males with diabetic peripheral neuropathy from the area of Tamil Nadu, India.

Objectivities: To investigate the neuropathic pain and Loss of sensation response in males with diabetic peripheral neuropathy (DPN). The effects of important neurological elements including Michigan Neuropathy Screening Instrument have been studied in research on DPN participants. Participants who received Varma therapy for diabetic peripheral neuropathy reported enhanced mental function and a decrease in their DPN level.

Materials and Methods: neuropathic pain and Loss of sensation symptom levels in individuals who have diabetic peripheral neuropathy (DPN). Neurological variables such as Michigan Neuropathy Screening Instrument (MNSI) questionnaire were provided to the Participants. A lower extremity examination that looks at and evaluates vibratory sensation and ankle reflexes is included, along with a 15-item self-administered questionnaire. Thirty men with diabetic peripheral neuropathy, ranging in age from 35 to 70, were randomly selected for the study. The subjects who were chosen were divided into two groups. There were 15 no.s of each group. One was placed in an experimental group with 15 participants, and another was placed in a control group. While Group II proceeded without any practise, Group I received a Varma therapy session. twelve weeks of instruction, six days a week, one hour in the morning. to find a varma-based biochemical alterations.

Result & Discussion: The study's findings indicate that participants in the Varma module outperformed the Control Group, whereas Varma Therapy outperformed it significantly in the Experimental Group. The experimental group indicates higher results in Neurological variables traits 12 weeks after beginning Varma practise.

Summary and Conclusions

Our statistics show that the Varma practitioners benefited more than the controls. Neurological variables were much improvement in the experimental group. The control group, on the other hand, displayed a no improvement and no change. Our statistics lend support to this idea. Greater impact was associated with improved biochemical alterations. This study's findings indicate that varma therapy is a noticeably more effective form of treatment for DPN.

Key Words: Varma Therapy, Diabetes Peripheral Neuropathy, Neurological variables, MNSI.

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1. INTRODUCTION

1.1 Diabetic peripheral neuropathy (DPN)

One of the world's most prevalent metabolic diseases with substantial health effects is diabetes mellitus (DM). According to Cho et al. (2018), 424.9 million people worldwide have diabetes, with 82 millions of those living in South East Asia, with that number anticipated to reach 151 million by 2045. As of 2017, there were around 72 million cases of diabetes in India, making it the country with the greatest number of diabetic cases in the world (Cho et al., 2018). At an alarmingly rapid rate, it becomes a worldwide burden. The major complications associated with DM included retinopathy, nephropathy, arteriosclerosis, neuropathy, and many more. The most frequent side effect of both type 1 and type 2 diabetes is diabetic neuropathy (DN)¹⁻¹¹. Individuals with diabetes are usually diagnosed with diabetic neuropathy¹²⁻¹³. The hands and lower limbs are the areas of diabetic peripheral neuropathy (DPN) that are most frequently affected. It causes a loss of protective feeling, allowing non-sensitive feet to sustain harm over time. The sense of motion and balance aspects of gait were lost or harmed in DPN participants¹⁴⁻¹⁵ as a result of various motor responses. 30% of DPN patients experience balance and coordination issues¹⁶⁻¹⁷. According to DPN, there is a correlation between the degree of discomfort and DPN has suggested a connection between a person's level of pain and their experiences with sleep problems, Tingling sensation, pins and needles, burning sensation, numbness, increased sensitivity. Despite the fact that we did not look into the connections between these categories, we did find that affective distress and sleep impairment varied depending on the degree of pain severity, including that patients with severe pain to mild pain¹⁸⁻¹⁹. The Varma study has help us from determining the degree of loss of sensation -related issues and symptoms. when the Varma practice has been successfully treated of Neurological factors²⁰.

1.2 Signs and Symptoms of DPN²¹⁻²⁴

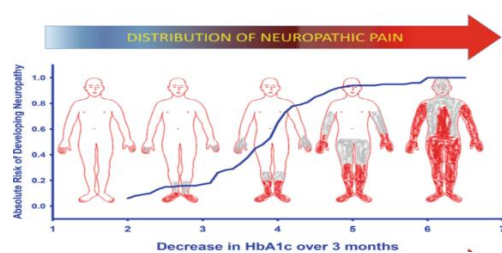


Fig. 1 Signs and Symptoms of DPN

Figure 1 shown Different people may experience different DPN symptoms and signs, and perhaps none at all and x axis indicate decrease in hbA1c over 3 month treatment. axis indicate risk of developing neuropathy. There are Tingling sensation, pins and needles, burning sensation, numbness, increased sensitivity, and delayed wound healing are among the symptoms that are frequently experienced²¹⁻²⁴.

1.3 Human Neurological system's response

Diabetic peripheral neuropathy (DPN) is a common neurological complication of diabetes. It affects the peripheral nerves, which are the nerves outside of the brain and spinal cord. DPN can cause a variety of symptoms related to the nerves' impaired function.

1.4 Siddha system of medicine

The ancient traditional medicine known as the Siddha system is practised across Tamil Nadu. The Siddha system has many specialties, but a few stand out, including Varmam, Pranayamam, Yoga, and Kayakarpam. Varmam is one of the many internal and external medications available in this system, which is used to treat a variety of illnesses, particularly those with musculoskeletal and neurological abnormalities. The 108 Varmam points, which make up the body's essential life force points, were counted by the Siddhars. Varmam, also known as marmam, denotes the therapeutic stimulation of particular locations where intense pranic energy is present. For the management of disease, varmam treatment, which is drug-free, non-invasive, economical, and straightforward therapy, is particularly beneficial²⁵⁻²⁶.

1.5 History of Varma Therapy



Fig. 2 History of Varma Therapy

It is said that Lord Shiva, the first siddhar, taught his wife Lord Parvathy and her son Lord Murugan the technique of Varmam. Siddha Agathiar and their followers are included in the lineage. The majority of the Varmam scriptures that are known in Tamil were authored by Siddhas named Agathiyar, Thirumoolar, Bogar, Therayar, Romarishi, and Ramadevar. The aasan (the master) and disciple tradition has supported and nurtured

varmam art for generations. The master would assume responsibility for imparting his own tested, empirical, and textual knowledge to his dependable pupil, who would then carry on the same procedure

1.6 Historical evidences of Varmam

The "Tholkappiam" is a source of information on varmam. The term "ValiAatral" is used in this ancient text, which serves as the foundation for Tamil grammar and literature from the 5000 BC–Tholkappiam period. In the name of varmam, there are close to 120 books with varied names accessible. About 30,000 verses discuss varmam and its components. The majority of them come with palm leaf name scripts. These manuscripts all have names derived from the siddhar lineage: Agasthiars, Bogar, Ramadevar, and Thirumoolar. Varmam treatment with assistance cures bone dislocation and breathing issues. Varmam therapy is a low-cost treatment for the most prevalent illnesses affecting people today, including nervous disorders, heart ailments, eye issues, digestive problems, and joint aches. Varmam therapy is a first-line treatment for numerous health issues, saving money and having no negative side effects³¹⁻³³.

1.7 System of Varma for Neurological Factors

As the founder of various disciplines including acupuncture, acupressure, and martial arts like karate and kung fu, Varmam is highly regarded. The systematic study of vital points (varmams) on humans as well as animal bodies is known as varmology. The vital spots (varmams) are found on internal organs, bones, muscles, tendons and nerve

in the future. Through this procedure, this art endured for centuries and deepened its foundations. It continues to exist now using the same principle²⁷⁻³⁰.

joints³⁴⁻³⁵. The important points' (varmams') right or improper vibration will either improve or worsen one's health. Varmams are rhythmically calibrated by varma professionals to treat a variety of ailments, including diabetes, arthritis, back pain, nerve issues, and more. Numerous disciplines, including Siddha medicine, yoga, therapeutic massage, astrology, psychology, sociology, martial arts, and others are associated to varmology³⁶⁻³⁸. Varma is a technique that combines three aspects: body intervention, Vital point stimulation and varma massage as a body and mind. Varma can be practised on a scientific level. Varma originated in India. Varma practice is useful in the management of various lifestyle diseases, such as diabetes. The therapeutic effects of Varma on diabetes involve immunological, neuroendocrine, and psycho-neuro-endocrine systems. 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 prickling³⁹⁻⁴⁶. Varma point's holistic approach assists in strengthening the body throughout its entirety. Varma enhances comorbidities 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 DPN⁴⁷⁻⁵².

1.6 Varmam Treatment for the DPN Patients



Fig. 3 Varmam Treatment for the DPN Patients

illustrated in Figure 3. Varmam therapy may be used on many different kinds of DPN patients to treat their condition and lessen their Neurological factors.

1.6 Michigan neuropathy screening instrument used to diagnose DPN

Michigan neuropathy screening instrument (MNSI) is widely used for the diagnosis of distal peripheral neuropathy in diabetic population. The MNSI

includes two separate assessments: a 15 items self-administered questionnaire and a lower extremity examination. Michigan neuropathy screening instrument (MNSI) is widely used for the diagnosis of distal peripheral neuropathy in diabetic population. The MNSI includes two separate assessments: a 15 items self-administered questionnaire and a lower extremity examination. Although the ankle reaction is more reproducible, it is a poor indicator of ulceration. According to a

number of studies, 10-g monofilament is the best way to determine whether an ulcer is present or has ever been present. MNSI questionnaires with a score of >7 had 13% sensitivity and 99% specificity, whereas those with a score of >4 had 40% sensitivity and 92% specificity, according to Herman et al. (2012). A MNSI test with a score of >2.5 demonstrated 61% sensitivity and 70% specificity. According to MNSI surveys, the greatest cut-off probability for verified clinical neuropathy was >2.0318, with 38% sensitivity and 96% specificity. Similarly, highest cut-off probability for confirmed clinical neuropathy according to MNSI. examination came out to be > 1.9503, with a sensitivity of 45%, specificity of 87%. In combination of the both questionnaire and examination score, it is predicted for confirmed clinical neuropathy is >3.2516 with sensitivity of 50%, specificity of 92%. The MNSI survey must be completed by the respondent. The sum of the responses is the final score. The answers "yes" to questions 1-3, 5-6, 8-9, 11-12, and 14-15 each get one point. Answers of "No" to questions 7 and 13 are worth one point each. Both questions 4 and 10 were excluded from the published scoring methodology because they were thought to be indicators of general asthenia and poor circulation,

respectively . A score of ≥ 7 was considered abnormal⁵³⁻⁵⁸ .




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 participants were split into two groups of fifteen people each. The experimental group I received Varma Therapy and the control group II no practice.

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 Varma practise would enhance nerve function without having any undesirable effects. Tables 1 shown Each participant underwent a clinical examination using their foot feeling in accordance with their Michigan Neuropathy Instrument (MNSI) score (Objective & Subjective type).

Table 1 DPN Foot Sensation Clinical Test

S.No.	Test	Method	Image
1	Monofilament Test	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)	


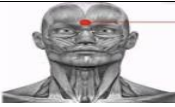



4	Pinprick Test	The pinprick test is used to identify any nerve damage.	
5	Vibration Test	The vibration test can evaluate the integrity of large nerve fibres . 128-Hz tuning fork is used. Place the vibrating fork on patient's distal Hallux (big toe) joint and ask them if they can feel vibration	
6	Reflexion Test	This test helps determine how effective your nervous system is by assessing the reaction between your motor pathways and sensory responses.	

2.2 TREATMENT PROTOCOL



The experimental group underwent the training period of 12 weeks, six days per week received

Varma practice. The concerned medications were also be continued. The table 2 below gives brief descriptions of the treatment protocol.

Table 2 Treatment Protocol

Treatment protocol Varmam Points	Location	Image
Kodaikolli(Uchi) varmam	Top point of the skull	 உச்சி வர்மம்
Thilantha varmam	Situated one grain size below the midpoint of both the eyebrows. (Between the Eye Brow region.)	 திலர்த்த வர்மம்
Ottu varmam	A small depression below the chin.	 ஓட்டு வர்மம்
Kaakkattai	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	 காக்கட்டை வர்மம்
Pakka-Kaluthu Varmam	Nadukku Situated between anterior neck (Adam's apple) to posterior neck.	 பக்க-கழுத்து நடுக்குவர்மம்

Nher Varmam	Varmam is located in the middle of the thorax.	
		நேர் வர்மம்
Ellurukki Varmam	Below 2.5 Finger breath nipple point.	
		எள்ளுருக்கி வர்மம்
Palla Varma	Muscles situated in the lateral lumbar portions of the abdominal region.	
		பள்ள வர்மம்
Urumi Kaalam	Situated at the end of the Sternum bone point in between the rib cage.	
		உருமி காலம்
Nangana Poottu	Two small dents found on either side of the back muscles in the sacroiliac joint.	
		நங்கன பூட்டு
Manibandha Varmam	-Middle of the wrist joint (ventral aspect). -Place the middle of the thumb (palmar aspect) and give moderate pressure 3 times.	
		மணிபந்த வர்மம்
Aamai Kaalam	Situated at the mid portion of the thighs.	
		ஆமை காலம்
Ganapathy Mugha Varmam	Situated at the knee cup portion of the below 4 FB.	
		கணபதி முக வர்மம்
komberikalam	Eight fingers above the medial malleolus.	
		கொப்பேறி காலம் Komberi Kalam
kuthikalvarmam	Sevenfingerbreadthabovetheheel(posterioraspect)	
		குதிகால் வர்மம்

Kanpugaichal Varmam	One finger breadth below the lateral malleolus.	
Ullankalvellai varmam	At the junction of big and second toe in plantar region.	

கண்புகைச்சல்
வர்மம்

உள்ளங்கால்
வெள்ளை வர்மம்

2.3 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 Varma as a form of treatment before being diagnosed, the categorisation of Varma practises, the resources evaluated, the safety, and the efficacy of Varma 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. Result :

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 features⁵⁹⁻⁶⁰.

3.2 Interpretation of Result

If $t_{cal} < t_{tab}$ Value , Accept H_0 there is no relationship between varma practice (Experimental Group) to one Neurological variables. If $t_{cal} > t_{tab}$ Value , Rejected H_0 there is relationship between Varma practice (Experimental Group) to one Neurological variables. If $t_{cal} < t_{tab}$ Value, Accept H_0 there is no relationship between without Varma practice (Control Group) to one Neurological variables. If $t_{cal} > t_{tab}$ Value , Rejected H_0 there is relationship between without Varma practice (Control Group) to one Neurological variables. Degree of freedom (df) = n-1 So df= 14. Then t table value is 14 df = 2.14.

3.3 Table 4 Paired Samples T Test For Pre-test and Post-test for Group I (Varma) Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
MNSI	Varma Pre-Test	11.7333	15	1.27988	.33046
	Varma Post-Test	10.9000	15	1.27055	.32805

Examining the experimental Group-I involved using the analysis tool. Table 4 displays the pre-test and post-test values for varma therapy based on MNSI for neurological variables. The results were

mentioned into the Mean Value, Standard Deviation, Standard Error Mean, and Number of Participants 15, accordingly.

Table 5 Paired Samples T Test For Pre-test and Post-test for Group I(Varma) Paired Samples Correlations

		N	Correlation	Sig.
MNSI	Varma Pre-Test & Varma Post-Test	15	.872	.000

Table 5 displays the pre-test and post-test for Varma therapy based on Correlation and Significant values

Table 6 Paired Samples T Test For Pre-test and Post-test for Group I(Varma)

Paired Samples Test									
Paired Samples		Paired Differences					t	df	Sig. (2-tailed)
Variables	Test	Mean	Std. Dev.	Std. Error Mean	Lower	Upper			
MNSI	Pre-test Post-test	.83333	.64550	.16667	.47587	1.1908	5.000	14	.000

The analysis tool was used to examine the experimental Group-I and Control Group-2. Table-3 Shows that MNSI presents the pre-test and post-test value of Varma Therapy. The Mean Value .83333, Std. Deviation .64550, Std. Error Mean .16667, lower value .47587 upper value 1.1908t test value 5.000 df 14 respectively, resulted in Sig.

(2-tailed) of .002, the t calculation value of 5.000 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 MNSI in Varma Therapy. Table 6 reveals that the MNSI pre-test and post-tests varma Therapy had a significant value.

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

**Table-7: Paired Samples T Test For Pre-test and Post-test Group II (Control Group)
 Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
MNSI	Without Varma Pre-Test	6.6667	15	1.34519	.34733
	Without Varma Post- Test	7.1333	15	.91548	.23637

Examining the experimental Group-II involved using the analysis tool. Table 7 displays the pre-test and post-test values for without Varma therapy based on MNSI for neurological variables. The

results were mentioned into the Mean Value, Standard Deviation, Standard Error Mean, and Number of Participants 15, accordingly.

**Table 8 Paired Samples T Test For Pre-test and Post-test for Group II
 Paired Samples Correlations**

		N	Correlation	Sig.
MNSI	Without Varma Pre-Test Without Varma Post-Test	&15	.735	.002

Table 8 displays the pre-test and post-test for without Varma therapy based on Correlation and Significant values.

Table 9 Paired Samples T Test For Pre-test and Post-test for Group II (Control Group)

Paired Samples Test									
Paired Samples		Paired Differences					t	df	Sig. (2-tailed)
Variables	Test	Mean	Std. Dev.	Std. Error Mean	Lower	Upper			
MNSI	Pre-test Post-test	-.46667	.91548	.23637	-.97364	.0403	-1.974	14	.068

Table 9 shows the SPSS analysis of MNSI presents the pre-test and post-test in Control Group-II. The Mean Value is -.46667, Std.Deviation .91548, Std.Error .23637, lower value -.97364 upper value .0403, t value -1.974, df 14 and respectively, resulted in Sig. (2-tailed) of .068 the t calculation value of -1.974 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 test of MNSI in

Without Varma Therapy. Table 9 reveals that the MNSI pre- and post-tests in without Varma Therapy had a no Significant value.

4. Discussion

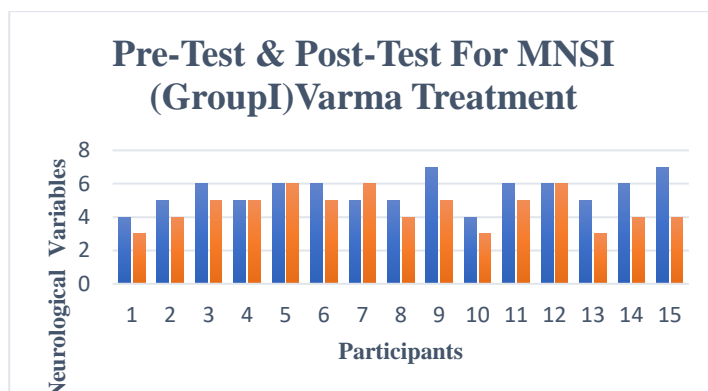
We examined two groups; one group showed a significant difference, while the other Control group did not; as a result, they were assessed for the study. After a 12-week study period, the varma group's MNSI for neurological

variables significantly decreased. Control group without Varma practice Shown no changes . However, the Control Group did not indicate much of a difference in MNSI levels . We observed significant reduction neurological variables scores in Varma groups. Therefore, Varma practice were effective in reducing neurological factors in Group 1 Participants. varma is frequently used to treat DPN. varma has helped DPN patients achieve better results. To show the efficiency of varma therapy in the DPN on a worldwide platform, a

methodically planned and executed systematic evaluation is still needed..

4.1 Graph I Pre-test and Post-test for Varma Treatment

According to the graph analysis, participants in Group -1 Varma Therapy module outperformed the Control group. 12 weeks varma therapy has shown to be effective and causes significant neurological changes in MNSI.



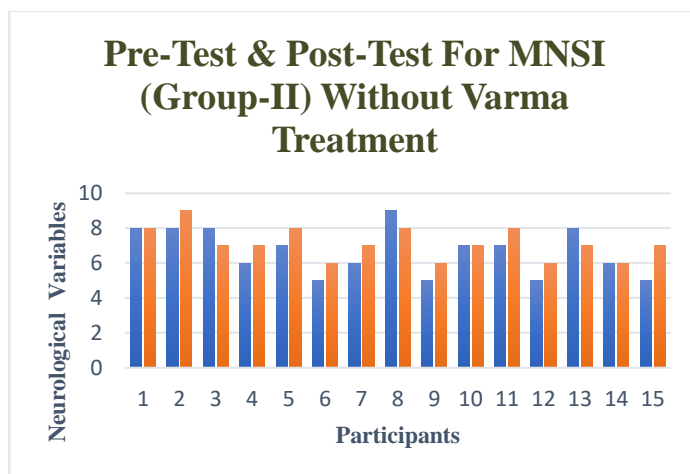
Graph-I MNSI Pre-Test & Post Test for Varma Treatment

Fig. 7: Pre and Post Test data of Experimental Group I (With varma Practice)

In graphs 1, the 'x' axis represented the number of 15 participants, while the 'y' axis represented Neurological data including MNSI. Following the pre-test, the participants were given Varma vital points focuses on helping with diabetic peripheral neuropathy perform better neurologically. After post-test diagnosis, patients' assessments of the benefits of varma treatment were used with positive outcomes in experimental group. Graphs I on the 'y' axis reflected Neurological data, MNSI Pre-test results indicated Blue. MNSI post-test results indicated Orange.

4.2 Graph II Pre-test and Post-test for without varma Treatment

Participants in Group -II control group did not benefit significantly, as seen in graph II as shown in Figure 8. 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 neurological factors. The graph shows that there is no positive outcomes.



Graph-II MNSI Pre-Test & Post Test for Without Varma Treatment

Fig. 8: Pre and Post Test data of Control Group II (Without Varma Practice)

5. Conclusion

In comparison to the Control Group II, Varma Therapy performed much better in the Experimental Group I. After practising varma for 12 weeks the experimental group's shows better results in neurological characteristics, such as MNSI, considerably improved. we conclude practising varma enhances the Sensation, vitality, nerve function, stability to the person with Diabetic Peripheral Neuropathy. We found a varma-based biochemical alterations.

Ethical Clearance

The Institutional Ethics Review Committee, Eden Siddha Herbal Centre Reg.1711 Guduvanchery, Chengalpattu -603202.Tamilnadu, granted ethical approval.

Disclosure statement

No potential conflict of interest was reported by the authors.

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