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Research Article

A Cross-Sectional Study of Assessment of Predominance of Prakrutiamong Patients with Diabetic Neuropathy in Wardha City

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Abstract: India is a developing country, so much of the Indian subcontinent are converting into urban areas, which lead to changes in lifestyle involving major tourist in battery plateau physical activities and increasing mental stress, which leads to insulin inertia. Approximately 246 million people worldwide have diabetes mellitus. It is estimated that 20 to 30 million people globally suffer from symptomatic diabetic neuropathy. The prevalence of diabetic neuropathy also rises over time. If type 1 diabetes is not well controlled, severe diabetic polyneuropathy and poor glycemic control can appear in young adults just a few months after the disease manifests. *Ayurveda* can be correlated with *MajjaDhatuDushti* (Structural and functional defects of neurons). Identification of the predominance of a specific type of *Prakruti*in patients with diabetic neuropathy in Wardha City. The prime objectives of the present study are to find out the predominance of specific *Prakriti* in patients with diabetic neuropathy in Wardhacity&create awareness in them regarding complications of Diabetes mellitus, especially diabetic neuropathy and its relation with *Prakruti*. The current study was a cross-sectional study based on a personal interview of patients and *Prakruti*questionnaires. It occurred at Salod(H), Wardha, Maharashtra's Mahatma Gandhi Ayurved College, Hospital & Research Center. It was found that the prevalence of diabetic neuropathy is high in *PittajPradhanVataPrakruti*. In this present study, most of the affected patients were male. The present study concludes that diabetic neuropathy was found more prevalently in patients with *Pitta PradhanVataPrakruti*. Specific lifestyle modifications can be recommended for patients with *Prakriti,* as mentioned earlier, to prevent diabetic neuropathy in the future.

Keywords: Lifestyle, Diabetes Mellitus, Diabetic, Neuropathy, Ayurveda and *Prakriti*.

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1. INTRODUCTION

In India, lifestyle transitions in the rural population significantly affect the prevalence of obesity and glucose intolerance[1-2]. It is common knowledge that a person with Diabetes typically has 4 to 7 years between the time of onset and the time of their diagnosis[3-,5]. Prolonged hyperglycemia in a person leads to diabetes mellitus due to obesity and many complications like microvascular complications, including retinopathy, neuropathy, and cerebral-vascular accidents[6-9]. Two hundred forty-six million people have Diabetes. 20-30 million people globally have symptomatic diabetic neuropathy. Young people with uncontrolled type I diabetes can develop diabetic polyneuropathy within months. Most diabetic neuropathy worsens with time and poor glucose control[4-7]. Specific risk factors for diabetic neuropathy include long-term hyperglycemia, glycemic variability, age, hypertension, dyslipidemia, smoking, obesity, metabolic syndrome, insulin resistance, alcohol consumption, hypoinsulinemia, oxidative stress, platelet activation, a deficiency in vitamin D, a genetic predisposition, inactivity, a lack of growth factors, etc.[10-11]. Some preventative interventions are needed to lower the burden of Diabetes in India, which is a medical problem. Prolonged Diabetes develops neuropathy, which is difficult to prevent and control and causes painful complications. [11-15]. It's progressive and irrevocable. Aldose reductase inhibitors, Myo-inositol supplements, -lipoic acid, and nerve growth factor injections have all been explored. Still, none have had a large enough effect on D.S.D.P. to be approved as a specific long-term treatment[16]. Focus on its preventative approach in alternative science or adjuvant therapy in holistic sciences, like Ayurveda. Ayurveda calls the three Doshas in a balanced state *Prakriti*. It may explain individual biological variation. As each person's *Prakriti* is stable from birth, the prevalence of diabetic neuropathy varies, particularly Prakriti. If diabetic neuropathy is common in *Prakriti*, the most prone *Prakriti* can be recognized for early disease prevention. *Prakruti* is an Ayurvedic constitution with morphological, physiological, and psychological features. It's the balanced constitution of *Doshas* in intra-uterine life and varies by person. An imbalance in these *Doshas* creates *Vikars* (diseases). When *Shukra*(sperm) and *Shonit*(Ovum) merge, it remains the same until death based on Beeja (genetics) and Dosha (body humors *Vata*, *Pitta*, and *Kapha*)[11]. When exposed to the same stimuli, each person's *Prakriti* dictates their response. From the perspective of Prakruti, it is important to investigate the variations in disease resistance, the many ways in which illnesses develop naturally, and the various therapeutic responses[12.] Moreover, it is an essential tool for deciding the treatment regime & type of medicine to enhance therapeutic outcomes. Ayurveda relates diabetic neuropathy to *Majjadhatu Dushti* (Structural and functional defects of neurons). It can be treated by modifying lifestyle and diet according to the *Prakriti* type. Prolonged Diabetes produces neuropathy, which is difficult to prevent and control, and painful diseases. With *Prakriti*, a patient prone to diabetic neuropathy can avoid it and stop its progression. The most prone Prakriti for diabetic neuropathy might help in early detection and prevention. *Prakriti*-based treatment helps control illness severity. Observations in the current study related to the notion mentioned above can be examined in diabetic neuropathy. Identification of a specific type of Prakriti predominance among patients with diabetic neuropathy in Wardha city. To compare the prevalence rate of diabetic neuropathy in different *Prakruti*in the population of Wardha. To educate Wardha city's residents on the effects of Diabetes, particularly diabetic neuropathy and its connection to *Prakruti.*

2. MATERIAL AND METHODS

It is an Observational study compromising of Crossesctional study design. Based on the personal interview of the person matching the study's eligibility requirements, this study was conducted utilizing a survey approach in the form questioner. The study was conducted at the AcharyaVinoba Bhave Rural Hospital in Sawangi (Meghe) and the Mahatma Gandhi Ayurved College, Hospital, and Research Centre in Salod (H), Wardha, Maharashtra. Total duration of the study was six months.Among them, data collection done within 5 months and data analysis made within 2 months. 100 Patients having signs and symptoms of Diabetic neuropathy as per I.C.D. – 10 Criteria E11 and already diagnosed by Nerve conduction velocity study. Specific inclusion and exclusion criteria used for the analysis are as follows:

2.1 Inclusion Criteria

Known cases of diabetes mellitus in the age group between 35-75 years, irrespective of gender, who are willing to participate in the study and who are suffering from symptoms of Diabetes neuropathy, e.g., Pricking Pain, burning sensation, tingling sensation, over sensitivity or loss of sensitivity on foot, soles or hands occurred as a result of diabetes mellitus (both type I &II) (ICD – 10 Criteria E11) which is already diagnosed by NCV. Patients with a history of chronic diabetes mellitus, irrespective gender and who are willing to participate were recruited in the study.

2.2 Exclusion Criteria

Newly diagnosed cases of Diabetes Mellitus (diagnosed since 6 Months) and patients with other neuropathies are excluded from the study. Patients with paralysis, stroke, psychologically disturbed or patients with Alzimer disease, Patients with Chronic addiction such as alclhol, tobacco are excluded from the study.

2.3 Ethics & Dissemination

Ethics approval was obtained from Institutional Ethics Committee, Mahatma Gandhi Ayurved College Hospital & Research Centre, Salod (H.), Wardha, Maharashtra, with Ref. No. MCACHRC/IEC/JUNE-2021/257, dated 21/06/2021. After receiving IEC Letter,data collection started. The Prakriti Questinnarie was prepared and it got verified from Subject expert. Inclusion and exclusion criteria was modified as per suggetsions given by IEC.

2.4 Recruitment and Data Extraction, Management

All eligible participants were informed of the study's purpose and the time allotted for questionnaire completion in advance. The patients' proper, fully informed consent was obtained in their native languages—Marathi, Hindi, and English. The patient's involvement was voluntary, and no financial aid was provided. During the participant interviews, the intern student completed the questionnaire. For additional assistance, if needed, all pertinent information, including name, address, affiliation, phone number, and email address, was noted. Researchers doing the investigation provided answers to any inquiries the participants had about the research or study. A literature review and search were conducted to design the *Prakruti* survey questionnaire, and the questionnaire was then created using the results of those searches. With the aid of intern students, the responses were entered into the questionnaire by marking the proper response. After completing the survey, the participant's *Prakruti* was examined, and a list of Dos and Don'ts (*Ahara and Vihara*) was also given regarding their *Prakriti.* Manual data entry was done in an excel sheet from marked answers in the completed *Prakruti* questionnaire and case record form. All the data were analyzed with the help of statistical experts using the Chi-square test to assess the association between categorical variables. In windows, S.P.S.S. software was used for all statistical analysis.

3. OBSERVATION

The demographic distribution of patients in this study are tabulated in table No. 1.

Table No. 1: Demographic Distribution

S.N	Parameters	Divisions	% of patients
1	Age	35 to 45 years	12
		46-55 Years	64
		56-65Years	16
		66-75	8
2	Sex	Male	59.3
		Female	40.7
3	Religions	Hindu	84
		Muslim	13
		Christian	3
4	Marital Status	Married	100
		Unmarried	-
5	Occupation	Sedentary	28
		Active	25
		Laborious	47
6	Socio- economics Status	Upper	12
		Middle	68
		Lower	20

The mean age of these patients was around 55 year, ranging from 35 to 75 years. Males comprised 59.3% of these patients. The patients of diebetic retinopathy at the age of 35 to 45 years,46-55 Years,56 -65 Years and and 66 -75 Years are 12 %, 64% and 16 % and 8 % respectively. Whereas the generality of males is 59.3% and females are 40.7 %. In Religions of Hindu are 84 %, Muslim are 13% and Christian are 3 %. The more prevalence of diebetic retinopathy in male patients of sedentary, active and Laborious lifestyle are 28%, 25 %, and 47%, respectively.

Table No.2: Observations obtained based on Prakriti Questionaries

S.N.	Heads	Subheads	Percentage	*Predominant Prakriti*
1.	Skin temperature	Cold	16.3%	*Vata*
		Warm	34.9%	
		Mild cold	36%	
2.	Speech	Normal	62.8%	*Pitta*
		Fast	30.2%	
		Slow	7%	
3.	Speech character	Diffused word	27.9%	*Pitta*
		Clear impressive	53.5%	
		Clear less	18.6%	
4.	Nail color	Black	18.6%	*Pitta kaphaj*
		Red	40.7%	
		Pink	40.7%	
5.	Hair texture	Rough, dry	31.4%	

		Soft delicate	41.9%	*Pitta*
		Soft shiny	26.7%	
6.	Working style	Fast	22.1%	*Pitta*
		Medium	61.6%	
		Slow	16.3%	
7.	Frequency of eating	More	9.3%	*Vata*
		Medium	79.1%	
		Less	11.6%	
8.	Quantity of meal	Less	15.1%	*Vata*
		medium	68.6%	
		more	16.3%	
9.	Cognition power Memory	Fast	19.8%	*Pitta*
		Medium	65.1%	
		Slow	15.1%	
10-11	Skin character	Cracking	37.2%	*Vata*
		Soft, oily	34.9%	
		Smooth	27.9%	
	Skin color	Black	30%	*Kapha*
		Yellow	30.2%	
		Fair	39.5%	
12.	Stool habit	Irregular	17.4%	*Pitta*
		Regular	57%	
		Regular but sometimes constipated	25.4%	
13.	Stool consistency	Hard	7%	*Pitta*
		Semi-solid	67.4%	
		Well formed	25.6%	
14.	Stool color	Black	19.8%	*Pitta*
		Yellow	59.3%	
		Mildyellowish	20.9%	
15.	Sleep character	Interrupted	20.9%	*Pitta*
		Uninterrupted	46.5%	
		Sound	32.6%	
16.	Control on desire	Hardly	27.9%	*Kapha*
		Cannot control	22.1%	
		Can control	50%	
17.	Concentration on work	Lack	22.1%	*Pitta*
		can concentrate	64%	
		easily concentrate	14%	
18.	Cognition process- grasping.	Quick/poor	22.1%	*Vata*
		Quick/good	64%	
		Delayed	14%	
19.	Cognition process-store	Poor	14%	*Pitta*
		Average	72.1%	
		Good	14%	
20.	Eye color	Black	44.2%	*Vata*
		Red	39.5%	
		Milky white	16.3%	
21.	Lip character	Cracked	23.3%	*Pitta*
		Smooth, soft	54.7%	
		Smooth, glossy	22.1%	
22.	Strength	Less	29.1%	*Pitta*
		Medium	54.7%	
		Good	16.3%	
23.	Style of tackling problems	Worrying	32.6%	*Vata*
		Losing self-control	43%	
		With cool	24.4%	
24.	If meal skipped	Constipation	22.1%	*Kapha*
		Headache	36%	
		Nothing	41.9%	

25.	Body odor	Present More Mild	48.8% 15.1% 36%	*Pitta*
26.	Lip color	Black Red Pink	23.3% 43% 33.7%	*Pitta*
27.	Nail character	Small cracked Small, smooth Big	30.2% 50% 19.8%	*Pitta*
28.	hair color	Black Gray Brown	39.5% 44.2% 16.3%	*Pitta*
29.	Hair thickness	Less Medium More	24.4% 61.6% 14%	*Pitta*
30.	Sleep duration	6hr 6-8hr >8	31.4% 52.3% 16.3%	*Pitta*
31.	Excitement	Quick, cooldown Quickly, does not cool down Rarely	27.9% 43% 29.1%	*Pitta*
32.	*Agni*	*Visham* *Sama* *Manda* *Tikshna*	34.9% 30.2% 23.3% 11.6%	*Vata*
33.	*Koshta*	*Mrudu* *Krura* *Madhyam*	19.8% 18.6% 61.6%	*Pitta*
34.	Numbness	Yes No	53.5% 46.5%	

The *Prakriti* wise observations of this study are tabulated in table no.2. The highest manifestation of this disease was obtained in the lower extremities in 45.3% of recruited patients. In this study, numbness is the most common symptom of diabetic neuropathy, bringing in 56.5% of patients. Most of the patients in the current study had a craving for the consumption of *Madhur*(69%), *Amla*(58%), *and Katu* (54.4%) rasa(food having a sweet, sour, and spicy taste). Maximum patients (34.9 %) enrolled in this study had *Visham Agni*, which is more predominant in persons with *VataPrakruti*.

4. DISCUSSION

Diabetes mellitus leads to serious complications, which later damage the nervous system, i.e., peripheral damage. This deformity occurs due to Diabetes which nervous system is known as diabetic neuropathy. It can be a compressive or ischemic cause. Neuropathy is a prevalent complication of Diabetes which results in the loss of movements, Pain, and many more deformities in the body. Accordingly, statistics show that a person with Diabetes somewhere in the world loses their leg every thirty seconds**)**[17-18]. It can be assessed by different types of tests like the monofilament test, vibration test, and study of reflexes in the body. There is a need to know about the pathogenesis and pathophysiology of Diabetic Neuropathy mentioned in Figure No.1 to get rid of some serious issues and improve treatment. Pathogenesis of diabetic neuropathy can be explained by the loss of nerve fibers progressively, which can be identified by signs and symptoms like Pain, loss of sensations, tingling, or pricking Pain caused due to damage to peripheral nerves or excessive pressure on them. This nerve damage results in vascular change; also, it may lead to impaired glucose intolerance and cause deformities in the lower nerve extremities. It also alters protein kinase activity and causes considerable damage to the body[14]. According to Ayurveda, it can be correlated with *MajjaDhatu* vitiation. These, i.e., structural and anatomical defects, occurred due to the vitiation of *Vata* and *Pitta Dosha*, along with degenerative changes created due to *KaphaKshaya*. Previous Studies showed that *MajjaDhatu,* i.e., the Nervous system, gets affected in *Madhumeha*[Diabetes Mellitus][13]. A total of 100 diabetic patients were enrolled in the current cross-sectional study. Maximum patients belong to the 50-55years age group that comes under the *VriddhiAvastha (*Geriatric population), which is explained by a predominance of *Vata* naturally in this age; as *Vata* increases degeneration of nerve and nerve damage get started, cramps and Pain occurs due to vitiation of *Vata* in diabetic neuropathy. Maximum patients belong to *Pitta Pradha Vata Prakruti*. So, because of vitiated *Pitta,* it leads to further nerve damage that induces a burning sensation in the soles and feet. The predominance of Diabetes neuropathy in *Vata* and *Pitta* predominant *Prakriti* can be well understood considering its pathophysiology according to *Ayurveda* mentioned in figure no.2. Maximum male patients were recruited in the current study. This study's finding was proved by Tabatabaei Malazy O AL et al. 2011 [17]. The highest manifestation of this disease in the lower extremities is also supported by

Calle-Pascual et al. 1997 [18]. In this study, numbness is the most common symptom of diabetic neuropathy obtained in 56.5% of patients. In a 1996 study by Murray HJ, Young Mollis, et al., peripheral neuropathy was the most common risk factor for foot ulcers in diabetic patients, accounting for more than 80% of these ulcers. Approximately 53% of patients had numbness[19-22]. In this study, most of the patients had more cravings for the consumption of *Madhur* (69%), *Amla*(58%), *and Katu*(54.4%) *rasa*(food having sweet, sour, and spicy tastes). *Madhur Rasa* causes a further increase of sugar level in the blood sugar, whereas *Katu Rasa* causes aggravation of *Vata Dosha*, which leads to nerve damage. And *Amla Rasa*causes a burning sensation due to the aggravation of *Pitta Dosha*. All these factors are responsible for the formation of neuropathy. Due to ignorance towards healthy diet and lifestyle and lack of awareness and knowledge, diabetic neuropathy has become the most common complication of diabetic Mellitus and which is increasing worldwide. Based on the above observations of this study, the following recommendations can be made for such patients prone to Diabetes and induced neuropathy. Awakening at the time of *Brahma Muhurat*, i.e., early morning, is advised. A daily workout of 30-45 minutes is recommended regularly for the body's fitness. Yoga and different types of *Asana* should be routinely performed to maintain the body's flexibility and good health. *Vata* and *Pitta* provoking diet, e.g., junk food, oily and fried food items, Alcohol –Beverages such as cold drinks should be avoided. Excessive intake of *Viruddhaahara* (Incompatible food) and *Madhura Rasa* (excessive intake of sweets) or food intake which results in the *Vridhhi* of *Kapha Dosha*should be avoided. Slow walking after meals is advised to do for 15 to 20 minutes. Sleeping activities in the daytime should be avoided[15].

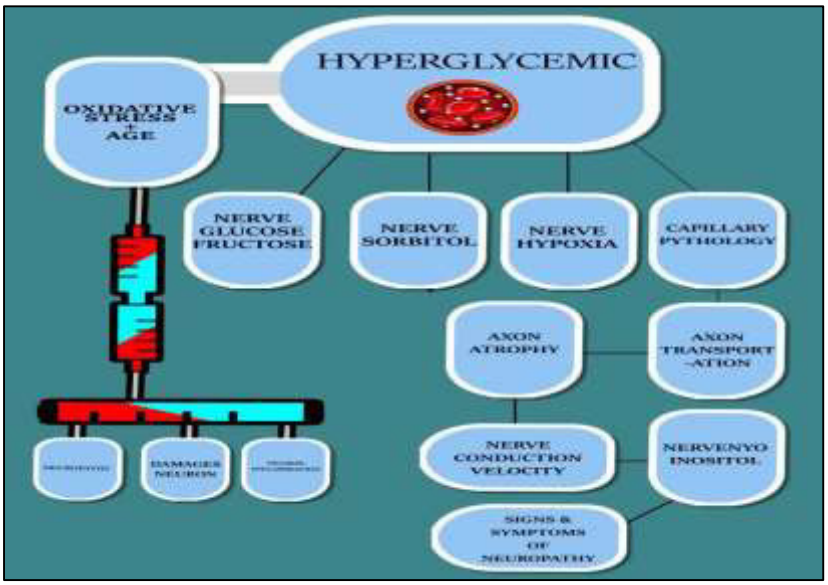

Fig No.1: Pathology of Diabetic neuropathy as per modern science

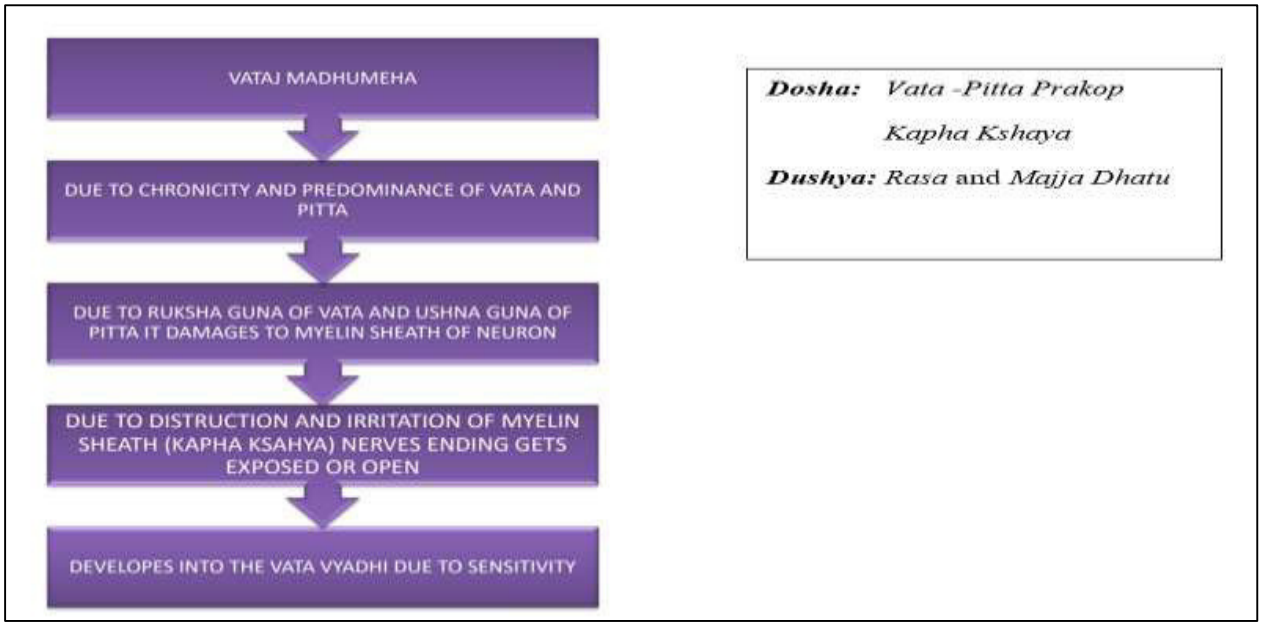

Fig No.2: Pathology of Diabetic neuropathy as per Ayurveda

5. CONCLUSION

A higher prevalence of diabetic neuropathy was observed in *Pitta PradhanVataPrakruti*. Diet and behavioral regimes provoking *Pitta* &*Vata*should be strictly avoided in such patients from childhood to prevent diabetic neuropathy in the future. On the other hand, such patients should be encouraged to undergo a specific *Pitta* pacifying diet & lifestyle. Moreover, these vulnerable patients should be advised to choose a stress–free profession. *Rutu Shodhana* (such people should prefer seasonal purification recommended by *Ayurveda to* maintain the person's health and avoid lifestyle-induced disorders like Diabetes. Among them, *Pitta* eliminating putative therapies such as *Virechana* & *Raktamokshana* among *Panchkarama* should be regularly prescribed for such patients as an integral part of their lifestyle.

6. AUTHORS CONTRIBUTION STATEMENT

Dr. Punam Sawarkar conceptualized the study protocol. Dr. Gargi Jaiswal Collected the Data. Dr. Gaurav Sawarkar made the data analysis. All authors discussed the methodology of the study. Dr. Punam Sawarkar and Dr. Shubham Verma made the final manuscript.

7. CONFLICT OF INTEREST

Conflict of interest declared none.

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