

**Research Article****STUDY OF MAJJADHATU IN MADHUMEHA WITH SPECIAL REFERENCE TO DIABETIC NEUROPATHY****Madhumati S.Chidre^{1*}, R.S. Dhimdhome², Suvarna R. Dhimdhome³**¹PG Scholar, ²Professor & HOD, Dept. of Kriya Sharir, Government Ayurved College, Osmanabad, Maharashtra.³Professor & HOD., Dept. of Rasashastra & Bhaishajyakalpana, Sai Ayurved College, Solapur, Maharashtra.**ABSTRACT**

Prameha is described as the one of the disease in *Mahagada* by different *Acharyas*. *Majja Dhatudushti* is one of the factor in *Prameha* (in *Pramehadushyas Majjadhatu* is included). However the term '*Majja*' has become synonymous with nervous system, which is encased within bone like bone marrow. The *Majja Dhatu* is associated with entire nervous system. The nervous system and the bone marrow are treated as homologous structures in Ayurveda. According to Ayurveda, ultimately all *Prameha* are finally complicated into *Madhumeha* which can say diabetes mellitus. Diabetes mellitus can be called an epidemic of the 21st century, as The World Health Organization estimates. As estimated, about 60 to 70% of people with diabetes have some form of neuropathy, but not all with neuropathy have symptoms. There are different types of diabetic neuropathies like peripheral, autonomic, focal, etc, among these peripheral neuropathy is most common seen in the diabetics. In this study 50 diabetic patients were selected. Assessment of *Majja Dhatu Dushti* and Diabetic Neuropathy was done by subjective criteria i.e., symptoms and object criteria i.e. by Monofilament Test, Vibration Test and Reflexes Study. This study show that subject having Diabetes Mellitus history more than five years had *Dushti* of *Majjadhatu* and developed the symptoms of Diabetic peripheral neuropathy. This study also shows that symptoms of Diabetic peripheral neuropathy can be correlated with *Majjapradoshajavikara*. Present study indicated that *Majjadhatu* (Nervous system) gets vitiated in *Madhumeha* (Diabetes Mellitus).

KEYWORDS: Diabetes Mellitus, Diabetic neuropathy, *Madhumeha*, *Majjadhatu*.**INTRODUCTION**

In Ayurveda *Dosha*, *Dhatu* and *mala* described as the basic roots of human living body^[1,2]. *Doshas* are of two types *Sharika* (Somatic) *Dosha* viz. *Vata*, *Pitta* and *Kapha* and *Manasika* (Psychic) *dosha* viz. *Raja*, *Tama*. *Dhatu*s are of seven types viz. *Rasa*, *Rakta*, *Mamsa*, *Medas*, *Asthi*, *Majja* and *Shukra*. *Malas* are of three types *Purisha*, *Mutra* and *Sweda*. Among these, *Dhatu*s are the seven fundamental elements, that support the basic structure and nourish the body. *Dharana* (to support) and *Poshana* (to nourish) are important *karma* of Saptadhatu.^[3] *Majja* is one of *Dhatu*s; it also nourishes body and helps to maintain its functions. However the term '*Majja*' has become synonymous with nervous system, which is encased within bone like bone marrow.^[4] The skull is the casing of brain. The vertebra is the casing of the spinal cord while, the brain and spinal cord make up the CNS. The *Majjadhatu* is associated with entire nervous system. The nervous system and the bone marrow are treated as homologous structures in Ayurveda. *Majja Dhatu dushti* is one of the factor in *Prameha* (in *Prameha dushyas Majja dhatu* is

included).^[5] In *Charak Samhita* symptoms of *Prameha* like *Karapadsuptata*, *Karapaddaaha*, etc are described; which we can correlate with diabetic neuropathy symptoms. According to Ayurveda, ultimately all *Prameha* are finally complicated into *Madhumeha* which can say diabetes mellitus.

Diabetes is a group of metabolic disorders, in which each and every cell of the body can affect within this 'Nerve cells' are not exceptions. And when it affects the nerves, it really becomes nerve wracking. In medical terminology, this diabetic condition where the nerves are affected is termed as 'diabetic neuropathy'. Diabetic neuropathies are the nerve disorders caused due to diabetes. People with diabetes mellitus can develop nerve damage throughout the body. Some people having diabetes with nerve damage have no symptoms. Others may have symptoms such as pain, tingling, or numbness loss of feeling in the hand, arms, feet, and legs. Nerve problems can occur in every system including the digestive tract, cardiovascular and reproductive organs. People with diabetes can develop nerve

problems at any time, but rises with age and longer duration of diabetes.

There are different types of diabetic neuropathies like peripheral, autonomic, focal, etc. among these, peripheral neuropathy is most common seen in the diabetics. The best way to prevent neuropathy is to keep blood sugar levels as close to the normal range as possible. Maintenance of safe blood sugar levels protects nerves throughout the body.

India is developing country in the world, the DM is most common disease occurring now a day's in India. Diabetes mellitus can be called an epidemic of the 21st century, as The World Health Organization estimates that the global prevalence of diabetes is currently approaching 5%. Diabetes is considered a major cause of mortality and morbidity, and statistically, diabetic neuropathy is the second most common cause of posttraumatic nerve damage. Nearly about 24% of population is suffering from diabetes. Percentage may go as high as 40-45% in 2020 – WHO says^[6]. Among this, about 17% of total diabetics have found diabetic neuropathy^[7]. As estimated, about 60 to 70% of people with diabetes have some form of neuropathy, but not all with neuropathy have symptoms. So there is intense need to know the graveness of the disease and to understand the role of etiological factor as *Majjadhatudushti* for preventive aspect of this disorder. Diabetic neuropathy is one of the most extreme complication of diabetes, has become a common phenomenon now a days. In Ayurved *samhitas*, the relation between *Majjadhatu* (nervous tissue) and *Madhumeha* is described. Hence the present study is taken to establish the relationship between diabetic neuropathy and *Majjadhatu* (nervous tissue) for developing new therapeutic ideas based on *Majjadhatu* (nervous tissue) for diabetic neuropathy.

In present study, 50 Diabetes Mellitus patients were selected. According to subjective and objective parameters, assessment of Diabetic Neuropathy and *Majja Pradoshajavikara* have been done. Vibration Test, Monofilament Test and Reflexes study were done. There was similarity shown between the *Majja Pradoshajavikara*, *Pramehaupadravas* and symptoms of Diabetic Neuropathy. By statistical analysis relation between *Majjadhatu* and Diabetes Mellitus had shown. Also by DN scale, patients were divided into different grades of Diabetic Neuropathy.

AIM AND OBJECTIVES

To study the *Majjadhatu* (Nervous system) in patients suffering from *Madhumeha*. To achieve the objective were, to review the assessment of *Majjadhatu* in *Madhumeha* w.s.r. to Diabetic Neuropathy.

MATERIAL AND METHODS

Materials

- Classical signs and symptoms of *Madhumeha*.
- Classical *Lakshanas* of *Majjavahasrotasadushti* and *Majja-pradoshaja Vikara*.
- Investigations according to Ayurvedic and Modern parameters.
- Assessment of Diabetic Neuropathy.

Methods

Patients were selected as per inclusion and exclusion criteria. The known cases of *Madhumeha* patients were subjected for the study. Patients were observed on the basis of classical sign and symptoms of *Madhumeha*, *Majjapradoshajavikara* and Diabetic peripheral neuropathy.

Sample Size: 50 Patients

Inclusion Criteria

1. Patients given history of *Madhumeha* (DM)
2. Gender- Both male and female patients will be selected.
3. Age-Patient between ages 40 - 70 years.
4. Patients having hyperglycemia confirmed by laboratory investigation.
5. Presence of cardinal symptoms of *Madhumeha* described in Ayurvedic text.
6. All patients of type-2 DM (Non -insulin dependent).

Exclusion Criteria

1. Age of patients less than 40 years and more than 70 years.
2. Emergency cases in diabetes mellitus.
3. Patients having cervical/thoracic/lumbar (spine) / reticulo neuropathy.
4. Patients having chronic and infectious disorder.

Investigations

- Blood Sugar : Fasting and Post prandial
- Urine : Routine and Microscopic

Criteria of assessment

Criteria for Diagnosis of *Prameha* by classical sign and symptoms:

- *Prabhutmutrata* (Polyuria)
- *Avilmutrata* (Turbidity in urine)
- *Pipasaadhikya* (Polydypsia)
- *Kshudhaadhika* (polyphagia/Increase in appetite)
- *Karpadasuptata* (Numbness in palm and foot)

- *Swedaadhikya* (Excessive perspiration)
- *Daurbalya* (Weakness)
- *Alasya* (General debility)

According to sign and symptoms of *Madhumeha*, it can be correlated with DM. So according to modern science criteria for Diagnosis of *Madhumeha*, By American Diabetic Association which is accepted by WHO was followed:

- Above Sign and Symptoms of *Prameha* plus
- Patients having random blood sugar level >200mg/dl.
FBS > 126mg/dl or
PPBS > 200mg/dl

Objective parameters

Questionnaire based on *Majjadhatudushti lakshanas* by classical sign and symptoms

(*Majjapradoshajavikara*- Disease due to vitiated bone marrow tissue and nervous tissue)

OBSERVATIONS AND RESULTS

Distribution of Diabetes mellitus (DM) patients according to chronicity (no. of years DM present)

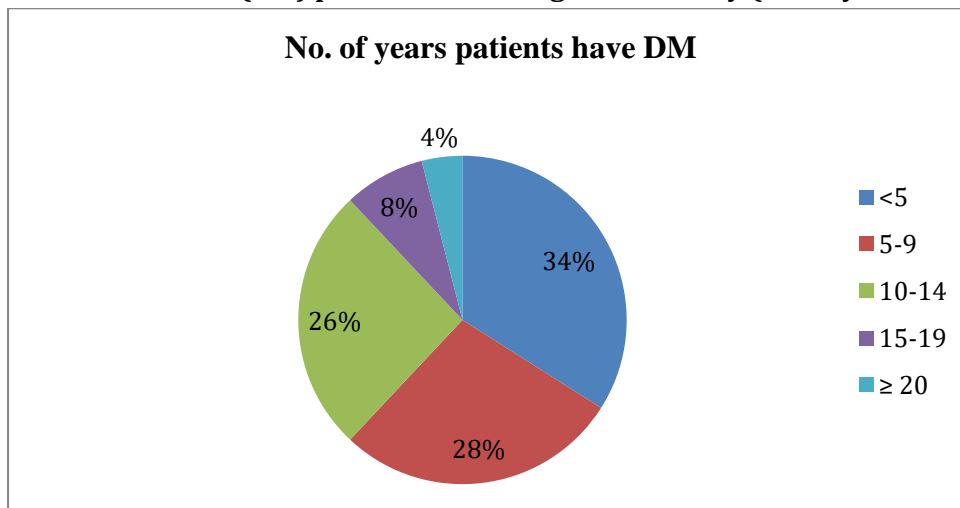


Figure no.1- Chronicity wise distribution

Table1: Chronicity wise distribution

Sr. No.	DM since	No. of patients	Percentage
1.	<5	17	34
2.	5-9	14	28
3.	10-14	13	26
4.	15-19	4	8
5.	≥ 20	2	4
	Total	50	100

In this study, 17(34%) patients have DM history since below 5 years, 28% have between 5-9 years, 26% have DM history between 10-14 years, 8% have between 15-19 years and 4% patients have DM history since 20 and more than 20 years i.e. maximum of patients; 66% had history of DM above five years.

Symptom wise distribution of DM patients**Table 2: Symptom wise distribution**

Symptoms	Yes		No	
	No.	%	No.	%
<i>Bhrama</i>	45	90	05	10
<i>Tamodarshana</i>	34	68	16	32
<i>Murchha</i>	28	56	22	44
<i>Parvaruk</i>	44	88	06	12
<i>Arushi</i>	20	40	30	60
<i>Dourbalya</i>	47	94	03	06
Tingling	45	90	05	10
Numbness	36	72	14	28
Pain in toes	45	90	05	10
Weakness	44	88	06	12
Heel walk	39	78	11	22
Vaginal dryness in female	11	73.3	04	26.7
Erectile Dysfunction in male	32	91.4	03	8.6

Test result wise distribution of DM patients**Table 3: Test result wise distribution**

Test	Absent		Normal	
	No.	%	No.	%
Vibration test	32	64	18	36
Monofilament test	32	64	18	36

In this study, Vibration Test and Monofilament Test is absent in 64% patients and normal in 36% patients.

Reflex result wise distribution of DM patients**Table 4: Reflex result wise distribution**

Reflex	Normal		Absent	
	No.	%	No.	%
Plantar	24	48	26	52
Abdominal	50	100	00	00
Conjunctival & Corneal	50	100	00	00
Pharyngeal	50	100	00	00
Biceps jerk	50	100	00	00
Triceps jerk	50	100	00	00
Knee jerk	47	94	03	06
Ankle jerk	19	38	31	62
Brachioradialis jerk	36	72	24	48

In this study, Plantar, Abdominal, conjunctival, corneal, pharyngeal, Biceps jerk, Triceps jerk were seen as normal in all 50 (100%) patients. Knee jerk was normal in 47 (94%) patients and absent in 03 (6%) patients. Ankle jerk was normal in 19 (38%) patients and absent in 31 (62%) patients. Brachioradialis jerk is normal in 36 (72%) patients and absent in 24 (48%) patients.

RESULTS

The information gathered on the basis of above observations was subjected to statistical analysis with the help of Chi square test.

Table 5: Correlation between Majja Pradoshajavikara and Symptoms of diabetic neuropathy

	Symptoms of diabetic Neuropathy	Test statistic	P value
Majja Pradoshajavikara	r= 0.69	t=5.04	P<0.01

Statistically highly significant positive correlation found between *MajjaPradoshajavikara* and Symptoms of diabetic neuropathy (P<0.01)

Table 6: Association of Chronicity of DM with Vibration test, Monofilament test, Reflexes

	Chronicity of DM	Test statistic	P value
Vibration test	r= 0.69	t=5.04	P<0.01
Monofilament test	r= 0.69	t=5.04	P<0.01
Reflexes	r= 0.81	t=7.30	P<0.01

Statistically chronicity of DM is highly positively correlated with Vibration test, Monofilament test and Reflexes (P<0.01).

Table 7: A common staging scale of diabetic Peripheral neuropathy

	Common staging scale of diabetic polyneuropathy	No. of patients
N0	No Neuropathy	04
N1a	Signs but no symptoms of neuropathy	14
N2a	Symptomatic mild diabetic peripheral neuropathy; sensory symptoms; patient able to heel walk (Five and more than Five Symptoms present, Vibration, Monofilament, Reflex Tests are absent, heel walk sign is present)	11
N2b	Severe symptomatic diabetic peripheral neuropathy (as in N2a, but patient unable to heel walk) (Five and more than Five Symptoms present, Vibration, Monofilament, Reflex Tests are absent, heel walk sign is absent)	21
N3	Disabling diabetic polyneuropathy	00 (No results seen)

Statistically severe symptomatic diabetic polyneuropathy was highly significantly most common stage among other stage in Diabetics mellitus patients (Chi-square test =27.4, DF=4, P<0.01).

DISCUSSION

India has the higher Diabetic population in the world, hence India is known as a Diabetes capital of the world. Most of the population of India live in urban area where people are not aware about the health and many times Diabetes in urban area remains undiagnosed; which on later results into the complications. Diabetic Neuropathy, Retinopathy and Nephropathy, etc are the most common complications of Diabetes Mellitus. There are different types of diabetic neuropathies like peripheral, autonomic, focal, etc. among these, peripheral neuropathy is most commonly seen in the diabetics. As estimated, about 60 to 70% of people with diabetes have some form of neuropathy, but not all with neuropathy have symptoms. So there is intense need to know the graveness of the disease.

In Ayurveda, *Majja* is described as one of the *Dushyas* in *Prameha* pathogenesis. Hence, in this

study association between *Majjapradoshajavikaras* and symptoms of Diabetic neuropathy are studied. According to Ayurveda principles, there is involvement of *Vata* and *Pitta Dosha* in Diabetic neuropathy. As, *Majja* gets vitiated *Vatavruddhi* occurs. *Dalhanacharya* described that, *Majjadharakala* is as similar to *PittadharaKala*.^[8] Hence, as *Majjadhatu* vitiated *Pitta dosha* also gets vitiated.

Correlation between the *Majja Pradoshajavikara*, *Prameha Upadrava*^[9] and symptoms of Diabetic Peripheral Neuropathy (Table 26)

In this study, we can correlate the *Majja Pradoshajavikara*, *Prameha Upadrava* with the symptoms of Diabetic Peripheral Neuropathy.

- Tingling symptom is the *Hastapada chimchimayana, Kampa* which is described as the *Prameha Upadrava*.
- Numbness is the *Hastapada Suptata* which is described as the *Prameha Upadrava*
- Pain in toes, feet, shoulder, etc. is the *Parvaruka* which is the *Majja Pradoshajavikara* and *Prameha Upadrava*.
- Weakness is the *Dourbalya* which is the *Majja Pradoshajavikara* and *Prameha Upadrava*.
- Vaginal dryness in female and Erectile Dysfunction in male is the *Alpashukrata Lakshana* which is the *Majja Pradoshajavikara* and *Prameha Upadrava*.

CONCLUSION

Mostly Diabetes Mellitus affects the middle aged people living a sedentary life and positive family history plays a major role in its development. *Majjapradoshajavikara* and *Pramehaupadravas* are homologous with Diabetic neuropathy symptoms. Patients having DM history with minimum 5 years shows maximum *Majja Pradoshajavikara* and Diabetic neuropathy symptoms. Development of Diabetic peripheral neuropathy depends upon the Chronicity of DM.

There is strong correlation between *Majjadhatu* and *Madhumeha*. This study concluded that vitiation of *Majjadhatu* is significantly seen in *Madhumeha* (diabetes Mellitus) which leads to complications as Diabetic peripheral neuropathy. Furthermore, larger studies are needed to evaluate the *Pramehaupadravas* (Diabetic complications) and possible treatment options in Ayurveda, as there is no specific treatment mentioned in modern medicine for Diabetic neuropathy.

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