



IJAPC

VOLUME 9 ISSUE 3 2018

**GREEENTREE GROUP
PUBLISHERS**

E ISSN 2350-0204

WWW.IJAPC.COM

"A peer-reviewed journal dedicated to allied Sciences"



A Clinical Study on Assessment of *DoshaVruddhi*, *Kshaya* and *PrakopaLakshanas* in *Madhumeha* (Diabetes Mellitus Type2)

Sangita Maharjan^{1*}, Ajantha², Arun Raj MN³ and Geetha Nayak⁴

¹⁻⁴Department of Roga Nidana Evam Vikruti Vigyana, Sri Dharmasthala Manjunatheshwara College of Avurveda and Hospital, Hassan, KA, India

ABSTRACT

Madhumeha is a *Vataja Prameha* and is considered analogous to Diabetes Mellitus Type 2. *Tridosha* in balanced state maintains health and vitiation that leads to pathogenesis with manifestation of diseases. *Tridosha Vaishamy* occurring as *Vruddhi*, *Kshaya* and *Prakopa* can be assessed by manifested *Lakshanas*. *Prameha* is *Santarpanajanya Vyadhi* and its pathogenesis mainly involves *Kapha Dosha Pradhana Tridosha*. Assessment of *Dosha Vaishamy Lakshanas* in *Madhumeha* by questionnaire method showed the *Vaishamy* of all three *Doshas*. Hence, treatment for *Madhumeha* needs to be planned considering all the three *Doshas*.

KEYWORDS

Madhumeha, *Dosha Vaishamy*, *Prameha*



Greentree Group Publishers

Received 17/10/18 Accepted 02/11/18 Published 10/11/18



INTRODUCTION

Prameha is a *Santarpanajanya Vyadhi* with pathogenesis involving *Tridosha* along with *Rasa, Rakta, Mamsa, Meda, Majja, Sukra, Kleda* and *Ojas* as *Dushyas*. *Madhumeha* is identified as a type of *Vataja Prameha* and is considered analogous to Diabetes Mellitus Type 2. *Tridosha* in balanced state maintains health and vitiation leads to pathogenesis with manifestation of disease. *Tridosha Vaishamyas* occurring as *Vruddhi, Kshaya* and *Prakopa* can be assessed by manifested *Lakshanas*. The assessment of the *Dosha Vruddhi, Kshaya* and *Prakopa Lakshanas* paves way to assess state of *Tridosha* presently involved in pathogenesis and manifestation of *Madhumeha* (Diabetes Mellitus Type 2) thereby aid in management and treatment of the disease in early stages.

AIMS AND OBJECTIVES

To evaluate *Dosha Vaishamyas lakshanas* by analyzing *Dosha Vruddhi, Kshaya* and *Prakopa Lakshanas* in patients of *Madhumeha* (Diabetes mellitus type2).

MATERIALS AND METHODS

The study was conducted in 60 patients of *Madhumeha* (Diabetes Mellitus Type 2) in age group of 30-60 years. Diabetes Mellitus

Type 2 was diagnosed by laboratory assessment of plasma glucose level based upon WHO criteria (2012) for Diabetes Mellitus Type 2. Among symptoms, micturation frequency of more than 2 times at night or more than 6 times in a day was considered as *Prabhoot Mootrata*. *Madhura Mootrata* was assessed with urine positive for fasting urine sugar. Patients of Diabetes Mellitus Type 2 associated with complications and other systemic diseases, Type 1 Diabetes Mellitus and Pregnant were excluded.

The *Dosha Vaishamyas Lakshanas* mentioned in *Sushruta Samhita*¹, *AstangaSangraha*² and *AstangaHridaya*^{3,4} were systematically categorized into *Vruddhi, Kshaya* and *Prakopa Lakshanas* of each doshas under *Sharirika* and *Manasika* domains. Each *Lakshanas* was critically analysed with reference to its commentary meaning, meaning from Sanskrit English dictionaries and based upon it questionnaire was prepared. The *Vaishamyas Lakshanas* were assessed as present or absent based upon the presence and absence of *Lakshanas*. Assessment of *Vaishamyas Lakshanas* was carried out before drawing blood for FBS and also at 2 hours after breakfast before drawing blood for PPBS. *Dosha Vaishamyas* was analysed based on percentage of presence of *Dosha Vruddhi, Kshaya* and *Prakopa Lakshanas*.



RESULTS

The observed incidence of *Vruddhi*, *Kshaya* and *Prakopa Lakshanas* in the patients

suffering from *Madhumeha* is presented as below.

Table 1 Assessment of *Vata Vaishamya Lakshanas* before FBS and before PPBS

Assessment of <i>Vata Vaishamya Lakshanas</i> before FBS and before PPBS					
S.N	<i>Vata Vaishamya Lakshanas</i>	No. of Patients (N=60)			
		Before FBS (N=60)		Before PPBS (N=60)	
	<i>Vata Vruddhi Sharirika Lakshanas –Assessment Questions</i>	Present	%	Present	%
1	<i>Karshya</i> –(Has there been decrease in weight?)	2	3.3	2	3.3
2	<i>Karshniya</i> –(Do you feel your complexion has changed blackish?)	7	11.7	7	11.7
3	<i>Ushnakamita</i> - (Do you feel like taking warm food/ drinks/ staying warm?)	4	6.7	4	6.7
4	<i>Shakritgraha</i> - (Do you feel constipated?)	2	3.3	2	3.3
5	<i>Gadhavarchastwam</i> - (Do you feel your stool has become hard?)	10	16.7	10	16.7
6	<i>Aanaha</i> - (Do you feel difficulty in passing stool,urine?)	2	3.3	2	3.3
7	<i>Adhmana</i> - (Do you feel distension of abdomen?)	2	3.3	2	3.3
8	<i>Aatopa</i> - (Do you feel gurgling of intestine?)	0	0	0	0
9	<i>Kampa</i> - (Do you have tremors?)	0	0	0	0
10	<i>Gatrasphurana</i> - (Do you feel flickering in any part of body?)	0	0	0	0
11	<i>Alpabalatwam</i> - (Do you feel there is decrease in your strength?)	20	33.3	20	33.3
12	<i>Nidrabhramsas/ Nidranasha</i> –(Do you have complete loss of sleep?)	0	0	0	0
13	<i>Indriyabhramsas/ Indriyaupaghata</i> –(Do you feel there is decline in sense of vision/ hearing/ smell/ taste/ touch?)	12	20	12	20
14	<i>Pralapa</i> - (Is there irrelevant talking?)	0	0	0	0
15	<i>Bhrama</i> –(Do you feel dizzy?)	14	23.3	5	8.3
16	<i>Vakparushya</i> –(Is there hoarseness of voice?)	0	0	0	0
17	<i>Sajnamoha/ Sajnanasha</i> - (Has there been any fainting episode recently?)	0	0	0	0
18	<i>Asthishula</i> - (Do you feel pain in bones?)	0	0	0	0
<i>Vata Vruddhi Manasika Lakshanas- Assessment Questions</i>					
1	<i>Dainya</i> - (Do you feel depressed?)	26	43.3	26	43.3
2	<i>Bhaya</i> - (Have you been feeling more scared recently?)	6	10	6	10
3	<i>Shoka</i> - (Do you feel more sorrow recently?)	10	16.7	10	16.7
<i>Vata Kshaya Sharirika Lakshanas- Assessment Questions</i>					
1	<i>Angasada</i> - (Do you feel difficulty in doing work?)	1	1.7	1	1.7
2	<i>Alpaehitam</i> - (Do you feel you do less work these days?)	17	28.3	17	28.3
3	<i>Alpacheshhta</i> - (Has your effort in doing work decreased?)	14	23.3	14	23.3
4	<i>Mandachestata</i> –(Is there decrease in your working speed?)	18	30	18	30
5	<i>AlpaBhasitam</i> - (Do you speak less?)	0	0	0	0
6	<i>AlpaVakatwam</i> - (Do you speak in incomplete sentences?)	0	0	0	0
7	<i>Sanjnamoha</i> - (Are you aware of doing work?)	0	0	0	0
8	<i>MoodhaSanjnata</i> - (Do you feel confused while doing the routine work?)	0	0	0	0
9	<i>Sleshmavruddhiaamya</i> - (Do you have decreased appetite or excessive salivation?)	0	0	0	0
10	<i>Praseka</i> - (Do you have excessive salivation?)	0	0	0	0



11	<i>Aruchi-</i> (Do you have aversion towards food?)	1	1.7	1	1.7
12	<i>Hrullasa-</i> (Do you have nausea?)	0	0	0	0
13	<i>Agni Vaishamya-</i> (Is your digestion proper?)	1	1.7	1	1.7
Vata Kshaya Manasika Lakshanas- Assessment Questions					
1	<i>Apraharsa-</i> (Are you unhappy?)	8	13.3	8	13.3
Vata Prakopa Sharirika Lakshanas- Assessment Questions					
1	<i>Srams-</i> (Do you have prolapse/ hernia/ dislocation of joint?)	0	0	0	0
2	<i>Vyasa-</i> (Is there flaccidity in muscle?)	0	0	0	0
3	<i>Sankocha-</i> (Do you have contraction in muscle or difficulty in extension?)	0	0	0	0
4	<i>Vyadha-</i> (Do you have piercing type of pain?)	0	0	0	0
5	<i>Ruk-</i> (Do you have continuous pain?)	0	0	0	0
6	<i>Toda-</i> (Do you have splitting type of pain?)	0	0	0	0
7	<i>Bhedana-</i> (Do you have cracking type of pain?)	0	0	0	0
8	<i>Swapa-</i> (Do you have feeling of numbness?)	11	18.3	11	18.3
9	<i>Saada-</i> (Do you feel any of your body part is not functioning?)	0	0	0	0
10	<i>Sanga-</i> (Do you have retention of stool/ urine or difficulty in speaking?)	0	0	0	0
11	<i>Angabhanga-</i> (Do you have breaking type of pain in body parts?)	0	0	0	0
12	<i>Varta-</i> (Do you pass stool in nodular form?)	0	0	0	0
13	<i>Harshana-</i> (Do you feel horripilation?)	0	0	0	0
14	<i>Tarshana-</i> (Has your thirst increased?)	52	86.7	52	86.7
15	<i>Kampa-</i> (Do you have tremors?)	0	0	0	0
16	<i>Spandana-</i> (Do you feel pulsatile sensation in any part of body?)	0	0	0	0
17	<i>Parushya-</i> (Do you feel roughness in the body?)	7	11.7	7	11.7
18	<i>Saushirya-</i> (Are your bones weak?)	0	0	0	0
19	<i>Shosha-</i> (Has there been decrease in muscle mass?)	0	0	0	0
20	<i>Vestana-</i> (Do you feel tight sensation?)	1	1.7	1	1.7
21	<i>Stambha-</i> (Do you feel stiff?)	2	3.3	2	3.3
22	<i>Kashayarasata-</i> (Do you feel astringent taste in mouth?)	0	0	0	0
23	<i>Shyavaarunoapi-</i> (Have you noticed blackish/ reddish discoloration in your body?)	0	0	0	0

DISCUSSION

Lakshanas Bhrama, Indriyabhramsa, Gaurava, Atinidra, Trit was present in more than one *Dosha*, considering the probable *Dosha* involvement in *Samprapti* of *Madhumeha* each of these *Lakshana* has been considered under only one *Dosha* *Vaishamya* state. *Madhumeha* is *Vataja Prameha* hence *Vata Dosha* has prime role. Thus, *Bhrama* was considered under

Vata Vriddhi Lakshanas and not under *Kapha Kshaya Lakshanas*. *Tirt* was considered under *Vata Prakopa* and not under *Pitta Vriddhi Lakshanas*. *IndriyaBhramsa* was considered under *Vata Vriddhi Lakshanas* and not under *Pitta Vriddhi Lakshanas*. As *Kapha* is the prime *Dosha* involved in initiation of *Prameha*, further *Prakopa* state of *Dosha* leads to *Dosha Dushya Samurchana* and thus manifestation of *Lakshanas*. Hence



Lakshanas Gaurava was considered under *Kapha Prakopa Lakshana* and not under *Kapha Vruddhi* or *Pitta Kshaya Lakshanas*. *Atinidra* was considered under *Kapha Prakopa Lakshanas* not under *Kapha Vruddhi Lakshanas*

Assessment of *Dosha Vaishamya Lakshanas* before drawing blood for FBS and at 2 hours after breakfast before drawing blood for PPBS showed presence following *Lakshanas*:

Vata Vruddhi Lakshanas (Table 1) present includes *Alpabalatwam*, *Bhrama*, *IndriyaBhramsa*, *Gadhavarchastwam*, *Karshniya*, *Usnakamita*, *Karshya*, *Sakritgraha*, *Aanaha* and *Adhmana*. It is interesting to note that *Vata Vruddhi Lakshana Bhrama* was present in 14 patients before FBS. This decreased to 5 patients after having food and just before assessment of PPBS. *Madhumeha* is a type of *Vataja Prameha*, the *Vruddha Vata* gets associated with *Ojas*, *Ojas* which is *Madhura* in nature gets changed to *Kashaya Rasa*. Normal function of *Oja* is to enable functions of *Karmendriya* and *Gyanendriya*. Due to *Ojo Kshaya* the function of *Oja* is altered leading to manifestation of *Alpabalatwam*. Dalhana also states *Dusti* of *Vyana Vayu* leads to *Bala Bhramsa*. Cells in the body rely on insulin to take glucose from the blood for energy. Insulin resistance results in

unavailability of glucose for cellular metabolism leading to general debility in Diabetes Mellitus Type-2.

Majja is one of the *Dushya* involved in *Samprapti* of *Prameha*, the *Vruddha Vata* affects *Majja* leading to *Majja Sosha*. *Bhrama* is the *Lakshanas* of *Majja Kshaya*. Dizziness in patients of diabetes can be due to hypoglycaemia, hyperglycaemia and autonomic dysfunction. In hypoglycaemia brain lacks glucose to function properly. Hyperglycaemia leading to dehydration causes dizziness. As the patients included in the present study are having fasting blood glucose more than 126 mg/dl, here the cause of dizziness can be taken as hyperglycaemia leading to dehydration. Also the patients with *Bhrama* were associated with symptoms like *Trishna* which is the sign of dehydration. Persistence of *Lakshana Bhrama* on analysis before PPBS in some patients could be the due to the postprandial hypotension. Post prandial hypotension in diabetes is closely related to disease severity, especially diabetic autonomic neuropathy⁵.

Vruddha Vata when affects the *Indriyas* leads to *Indriya Karya Nasha*, leading to *Indriyabhramsa*. *Indriyabhramsa* complained by patients was decrease in visual acuity and blur vision. High blood sugar levels can affect the lens, resulting in



blurring of vision. Blurred vision results from effect of hyperosmolar state of lens and vitreous humour. Glucose and its metabolites cause osmotic swelling of the lens, altering its normal focal length⁶.

Sthana Samsraya of *Vata* in *Pakwashaya* leads to *Kruchha Mootra Pureesha* and *Anaha*⁷. Formation of *Pureesha* occurs at the end of *Awasthapaka* due to activity of *Vata* and *Pitta*. Increase in *Vata* leads to increase absorption of *Kleda* from *Mala* which leads to hardness of *Mala*, manifesting as *Gadhavarchastwaam*. *Ruksha Guna* has quality of *Stambhana*. Thus increase in *Ruksha Guna* leads to stasis of *Pureesha*, leading to manifestation of *Sakritgraha*. Patients with diabetes have a significant risk of developing severe constipation often due to dysfunction of autonomic nervous system⁸.

Vruddhi of *Vata* leading to *Agni Vaishamyā* can lead to formation of *Ama*. Thus formed *Ama* and *Sakritgraha* leads to obstruction of *Vata* leading to manifestation of *Anaha*. The accumulation of *Vruddha Vata* in *Pakwashaya* leads to abdominal distension manifesting as *Adhamana*. To manifest *Laskhana* as *Prabhoota Mootrata* there has to be increased formation of *Mootra*, *Mootra Vruddhi* also manifests as *Adhmana* of *Vasti*. Diabetic gastroparesis manifests as early satiety, bloating, vomiting, abdominal pain. *Vruddha Vata* when

affects *Rasa Dhatu*, leads to manifestation of *Twak Vaivarnaya* manifesting as *Karshniya*. Darker area of skin over neck, armpit, groin known as *Acanthosis nigricans* is seen in Diabetes Mellitus Type-2.

Increase of *Sheeta Guna* of *Vruddha Vata* usually lead to manifestation of *Ushnakamita*. *Vruddhi* of *Vata* increases *Ruksha Guna* of *Vata*, which leads to decrease of *Snigdha Guna*. *Snigdha Guna* leads to *Sthaulya*. Thus *Vata Vruddhi* manifests as *Karshya*. Moreover loss of *Dhatu* and *Ojas* through urine can lead to manifestation of *Karshya*. As the body stores the excess glucose in form of fats, in Diabetes Mellitus Type-2 due to insulin resistance the body is not able to utilize the glucose present in blood. As a result gluconeogenesis takes place, burning the stored fat and muscle, which cause reduction in overall body weight.

Vata Vruddhi Manasika Lakshanas observed were *Dainya*, *Bhaya* and *Shoka*. *Vruddhi* of *Vata* affecting the *Rajo Guna* leads to manifestation of *Dainya*. *Bhaya* and *Shoka* are the *Nidana* for *Vata Vruddhi*. *Dainya* (depressed state), *Bhaya* (fear) and *Shoka* (sorrow) are state of emotional stress. This causes body to secrete stress hormones and prepares body by raising blood sugar levels. In response to raised blood sugar levels insulin is secreted, which



brings down blood sugar level to normal in case of healthy individuals. But in case of Diabetes Mellitus Type-2 as there is resistance to insulin the rise in blood sugar levels remains prolonged.

Vata Kshaya Sharirika Lakshanas present were *Manda chestata*, *Alpaehitam*, *Alpachestatah*, *Aruchi* and *Agni Vaishamy*. *Chesta* is the *Prakruta Karma* of *Vata Dosha*. *Kshaya* of *Vata* thus leads of decrease of its *Prakruta Karma* manifesting as *Alpa Chestatah*. *Ehitam* is defined as *Kayika Karma*. *Vata* is the motivator of all the functions of body. *Kshaya* of *Vata Dosha* thus leads to *Alpaehitam*. *Vata* has quality of *Shighra*. Thus *Kshaya* of *Vata* can enhance *Manda Guna*, leading to manifestation of *Manda Chestatah*. Studies have shown that patients with Type 2 Diabetes have been associated with poor performance in tasks involving learning; reasoning and complex psychomotor performances.⁹ Derangement of *Vata* brings *Agni Vaishamy*. During the process of digestion *Samana Vayu* enhances functions of *Pitta* to enable proper digestion. *Kshaya* of *Vata* thus lead to impairment of *Pitta* which can lead to *Agni Vaishamy*. Defective carbohydrate metabolism is pathology of Diabetes. *Vata* in balanced state is responsible for proper functioning of *Indriyas*. *Kshaya* of *Vata* affecting *Rasanaendriya* can lead to

Aruchi. *Vata Kshaya Manasika Lakshana* observed was *Apraharsha*. *Harsha* is the *Prakruta Karma* of *Vata*. *Kshaya* of *Vata* manifests as *Apraharsha*. *Vata Prakopa Sharirika Lakshanas* observed was *Trishna*, *Swapa*, *Parushya*, *Sthambha* and *Vestana*. Excretion of *Kleda* and *Dhatu* through *Mootra* in *Madhumeha* leads to *Dhatu Kshaya*. *Dhatu Kshaya* is the *Nidana* of *Trishna*. Polydipsia seen in Diabetes mellitus Type-2, is response to hyperosmolar state and dehydration. *Prakupita Vayu* when gets *Sthana Samshraya* in *Twak* manifests *Swapa*. Increased blood glucose levels, long duration of diabetes and low levels of insulin leads to nerve damage manifesting as numbness, pain and tingling sensation. *Prakupita Vata* when gets *Sthana Samshraya* in *Twak* manifests as *Rukshata*. Long standing hyperglycemic conditions decreases synthesis of epidermal lipids and decreases subcutaneous hydration resulting in xerosis¹⁰. *Vestana* is *Vata Nanatmaja Vikara*. *Ruksha Guna* has quality of *Stambhana*. Thus *Vata Prakopa* can bring about *Stambha*.

Pitta Vruddhi Sharirika Lakshanas (Table 2) observed were *Daha*, *Alpanidrata*, *Kshut*, *Sheetakamita*, *Balahani* and *Tiktasyata*. *Daha* is the *Pittaja Nanatmaja Vikara*. *Daha* was observed in hands and feet in patients. *Lakshana Daha* present



here can be taken as diabetic neuropathic pain (DNP) which in the initial stages present with the common tingling, burning and other changes in perception of

temperature. *Vrudhhi* of *Pitta* leading to *Vrudhhi* of *Usna Guna* affects to *Sheeta Guna*. *Sheeta Guna* has quality of *Daha Shaman*.

Table 2 Assessment of *Pitta Vaishamya Lakshanas* before FBS and before PPBS

Assessment of <i>Pitta Vaishamya Lakshanas</i> before FBS and before PPBS					
S.N	<i>Pitta Vaishamya Lakshanas</i>	No. of Patients (N=60)			
		Before FBS (N=60)		Before PPBS (N=60)	
		Present	%	Present	%
<i>Pitta Vrudhhi Sharirika Lakshanas –Assessment Questions</i>					
1	<i>Peeta Vin-</i> (Has your stool colour become dark yellow?)	0	0	0	0
2	<i>PeetaMootra-</i> (Has your urine colour become dark yellow?)	0	0	0	0
3	<i>PeetaNetra-</i> (Have your eyes (sclera) become yellow?)	0	0	0	0
4	<i>Peetatwak/ Peetavabhasata-</i> (Has your skin colour become yellow?)	0	0	0	0
5	<i>Kshuth-</i> (Do you feel hungrier?)	13	21.7	13	21.7
6	<i>Daha-</i> (Do you feel burning sensation?)	45	75	45	75
7	<i>Alpanidrata-</i> (Has your quality of sleep decreased?)	39	65	39	65
8	<i>Santhapa-</i> (Do you feel temperature of your body is increased?)	0	0	0	0
9	<i>Sheetakamita-</i> (Have you felt inclination to cold comfort?)	1	1.7	1	1.7
10	<i>Murcha-</i> (Has there been fainting episodes?)	0	0	0	0
11	<i>Balahani-</i> (Do you frequently suffer from disease due to reduced immunity?)	2	3.3	2	3.3
12	<i>Ojovibramsa-</i> (Do you feel your joints are loose or your strength is decreased?)	0	0	0	0
13	<i>Tiktasayata-</i> (Do you feel bitter taste in your mouth?)	1	1.7	1	1.7
<i>Pitta Vrudhhi Manasika Lakshanas- Assessment Questions</i>					
1	<i>Krodha-</i> (Has there been increased tendency to develop anger?)	18	30	18	30
<i>Pitta Kshaya Sharirika Lakshanas- Assessment Questions</i>					
1	<i>Mandaanala/ Mandagni-</i> (Has your appetite decreased?)	1	1.7	1	1.7
2	<i>Sheeta/ Shaitya-</i> (Do you feel uncomfortable on exposure to cold?)	1	1.7	1	1.7
3	<i>Prabhahani/ Nisprabha-</i> (Do you feel change in lusture?)	5	8.3	5	8.3
4	<i>Mandoshma-</i> (Do you feel your body temperature is low?)	0	0	0	0
5	<i>Stambha-</i> (Do you have restricted movement?)	2	3.3	2	3.3
6	<i>Aniyattoda-</i> (Do you feel pricking pain in irregular intervals?)	13	21.7	13	21.7
7	<i>Arochaka-</i> (Do you feel tastelessness?)	0	0	0	0
8	<i>Avipaka-</i> (Do you suffer from indigestion?)	0	0	0	0
9	<i>Anga-parushya-</i> (Do you feel roughness in any part of your body?)	5	8.3	5	8.3
10	<i>Kampa-</i> (Do you have tremors?)	0	0	0	0
11	<i>Nakhashuklyam-</i> (Have your nails become pale?)	0	0	0	0
12	<i>Nayanashuklyam-</i> (Have your eyes become pale?)	0	0	0	0
<i>Pitta Prakopa Sharirika Lakshanas- Assessment Questions</i>					
1	<i>Daha-</i> (Do you feel increased body temperature?)	0	0	0	0
2	<i>Raaga-</i> (Do you have reddish discoloration in any part of the body?)	0	0	0	0



3	<i>Ushma-</i> (Do you feel more warmth compared to others?)	0	0	0	0
4	<i>Pakita-</i> (Do your wounds suppurate?)	0	0	0	0
5	<i>Sweda-</i> (Do you sweat more?)	36	60	36	60
6	<i>Kleda-</i> (Do you have feeling of wetness?)	4	6.7	4	6.7
7	<i>Shruti-</i> (Do you feel increased secretion?)	0	0	0	0
8	<i>Kohta-</i> (Do you suffer from any lesions in the body?)	0	0	0	0
9	<i>Sadana-</i> (Do you feel fatigue or exertion with less activity?)	51	85	51	85
10	<i>Murchana-</i> (Do you have episodes of fainting?)	0	0	0	0
11	<i>Mada-</i> (Do you feel intoxicated?)	0	0	0	0
12	<i>Katu/Amla Rasa-</i> (Do you feel pungent and sour taste in mouth?)	0	0	0	0
13	<i>Varna panduarunovarjita-</i> (Have you noticed any discoloration except pale and red, in your body?)	0	0	0	0

Thus manifests *Daha* as *Lakshana*. *Tamo Guna* brings *Nidra*. *Vruddhi* of *Pitta Dosh*, increased *Rajo Guna*, thus manifests as *Alpanidrata*. Clinical research has shown that prevalence of concomitant sleep disorders is more in Diabetes Mellitus as compared with controls without Diabetes Mellitus. Usually nocturia is a leading cause of sleep disturbance, affecting sleep onset and maintenance. Here, *Alpanidrata* can be taken as poor sleep due to nocturia. *Kshut* is the *Prakruta Karma* of *Pitta*. *Vruddhi* of *Pitta* brings *Vrudhhi* of its *Karma*, manifesting as *Kshut*. Inability of cells to utilize available glucose triggers the hunger centre in brain manifesting as polyphagia. *Vruddhi* of *Pitta* leads to increase of *Usna Guna*, thus manifesting *Lakshana Sheetakamita*. *Vruddha Pitta*, occurring due to *Kshaya* of *Vata* and *Kapha*, affects *Ojas*. Thus, *Bala* which is *Karma* of *Ojas* is hampered leading to manifestation of *Balahani*. Therefore *Balahani* is decrease in immunity. Studies show decreased cellular

innate immunity functions of diabetic monocytes/ macrophages compared to cells of controls. Moreover, hyperglycaemic environment can enhance the virulence of certain microorganisms. *Prakruta Pitta* has *Tikta Rasa*. *Vruddhi* of *Pitta* can lead to manifestation of *Tikthasyata*. *Pitta Vruddhi Manasika Lakshana* observed was *Krodha*. *Krodha* is due to *Pitta*.

Pitta Kshaya Sharirika Lakshanas observed were *Aniyata-toda*, *Prabhahani*, *Angaparushya*, *Manda-anala* and *Sheeta*. *Vruddha Vata* in *Twak* causes *Toda*. *Pitta Kshaya* leading to *Vata Vruddhi* can manifest as *Aniyata-toda*. Studies show elevated pain threshold in early diabetic neuropathy¹¹. *Prabha* is the *Prakruta Karma* of *Bhrajaka Pitta*. *Kshaya* of *Pitta* leads to *Prabhahani*. *Pitta Kshaya* affecting its *Snigdha Guna* and *Drava Guna* can manifest as *Angaparushya*. *Pachana* is *Prakruta Karma* of *Pitta*, *Kshaya* of *Pitta* leads to *Mandagni*. The function of *Pachaka Pitta* is to provide *Usnata* to whole body. *Kshaya* of *Pitta* leads to



decrease of *Ushma*, leading to *Lakshana Sheeta*. Studies suggest that hyperinsulinemia can be associated with moderate skin vaso-dilation in resting condition. Individuals with Type 2 Diabetes mellitus appear to have lower skin blood flow¹²; this can contribute to feeling of cold in diabetic patients.

Pitta Prakopa Sharirika Lakshanas observed were *Sadana*, *Sweda* and *Kleda*. *Vruddha Pitta* leading to *Ojo Kshaya* leads to *BalaKshaya*. This can manifest as

Sadana. *Sadana* here can be taken as fatigue in diabetics. *Sweda* is the *Mala* of *Medas*. *Medas* is the prime *Dushya* in *Prameha*. *Prakupita Pitta* with vitiated *Medas* leads to manifestation of *Lakshana Sweda*. Autonomic neuropathy, due to hyperglycemia interfering with the nerves that supply sweat glands can contribute to excessive sweating. *Kleda* taken as *Aadrattwam* can result due to excessive *Sweda*. *Drava Guna* leads to *Kleda* formation.

Table 3 Assessment of *Kapha Vaishamya Lakshanas* before FBS and before PPBS

Assessment of <i>Kapha Vaishamya Lakshanas</i> before FBS and before PPBS					
S.N	<i>Kapha Vaishamya Lakshanas</i>	No. of Patients (N=60)			
		Before FBS (N=60)		Before PPBS (N=60)	
		Present	%	Present	%
<i>Kapha Vruddhi Sharirika Lakshanas –Assessment Questions</i>					
1	<i>Agnisada-</i> (Has your appetite decreased?)	0	0	0	0
2	<i>Praseka-</i> (Do you have excessive salivation?)	0	0	0	0
3	<i>Aalasya-</i> (Do you feel lazy?)	14	23.3	14	23.3
4	<i>Shwāityam-</i> (Has your complexion become pale?)	0	0	0	0
5	<i>Shāitya-</i> (Do your body remain cold compared to others?)	0	0	0	0
6	<i>Slathangatwa-</i> (Do you feel flaccidity of muscles?)	0	0	0	0
7	<i>Shwasa-</i> (Are you suffering from respiratory disorders causing breathing difficulty?)	0	0	0	0
8	<i>Kasa-</i> (Do you have cough?)	0	0	0	0
9	<i>Shthairya</i> – (Do you have difficulty in movements?)	0	0	0	0
10	<i>Avasada-</i> (Do you feel fatigue mentally and physically?)	44	73.3	44	73.3
11	<i>Tandra-</i> (Do you feel stupor?)	0	0	0	0
12	<i>Sandhivishlesha-</i> (Do you have looseness in joints?)	0	0	0	0
13	<i>Shthaulya-</i> (Has your weight increased?)	0	0	0	0
14	<i>Angasada-</i> (Do you feel tired?)	51	85	51	85
15	<i>Sroto-pidana-</i> (Do you have congestion in throat/ nose/ sinuses or difficulty in passing stool or retention of urine?)	0	0	0	0
<i>Kapha Kshaya Sharirika Lakshanas- Assessment Questions</i>					
1	<i>Shleshmasayasunyata-</i> (Do you have feeling of lightness in chest, head and joints?)	0	0	0	0
2	<i>Hrid-drava-</i> (Do you have palpitation?)	2	3.3	2	3.3
3	<i>Slathasandhi-</i> (Do you feel your joints are loose?)	0	0	0	0
4	<i>Rukshata-</i> (Do you feel dryness in the body?)	8	13.3	8	13.3
5	<i>Antardaha-</i> (Do you feel burning sensation inside body?)	0	0	0	0
6	<i>Pari-plosha-</i> (Do you have burning sensation all over the body?)	0	0	0	0



7	<i>Dhava-</i> (Do you experience burning pain like burn from wooden fire?)	0	0	0	0
8	<i>Sphotana-</i> (Do you have bursting skin lesions?)	0	0	0	0
9	<i>Toda-</i> (Do you feel pricking pain?)	0	0	0	0
10	<i>Daurbalya-</i> (Do you feel weakness?)	23	38.3	23	38.3
11	<i>Prajagarana-</i> (Do you have loss of sleep?)	0	0	0	0
12	<i>Udwestana-</i> (Do you have tight feeling?)	1	1.7	1	1.7
13	<i>Angamarda-</i> (Do you have pain in body?)	3	5	3	5
14	<i>Vepana-</i> (Do you have tremors?)	0	0	0	0
15	<i>Dhumayana-</i> (Do you feel smoke emitting from throat?)	0	0	0	0
Kapha Prakopa Sharirika Lakshanas- Assessment Questions					
1	<i>Sneha-</i> (Do you have unctuousness on body?)	0	0	0	0
2	<i>Kathinya-</i> (Do you have feeling of firmness?)	0	0	0	0
3	<i>Kandu-</i> (Do you have itching?)	1	1.7	1	1.7
4	<i>Shita-</i> (Do you feel cold when it is warm?)	0	0	0	0
5	<i>Gaurava-</i> (Do you have feeling of heaviness?)	22	36.7	22	36.7
6	<i>Bandho-</i> (Do you have constipated bowels?)	1	1.7	1	1.7
7	<i>Upalepa-</i> (Do you have feeling of coated (tongue/ throat/ body?)	4	6.7	4	6.7
8	<i>Staimitya-</i> (Do you feel difficulty to move?)	0	0	0	0
9	<i>Shopha-</i> (Do you have swelling?)	0	0	0	0
10	<i>Apakti-</i> (Do you have indigestion?)	0	0	0	0
11	<i>Atinidra-</i> (Are you sleepy even after sleeping for adequate hours?)	13	21.7	13	21.7
12	<i>Shwetavarna-</i> (Have you noticed white discoloration in your body?)	0	0	0	0
13	<i>Swadu, lavana rasa-</i> (Do you have sweet salty taste in mouth?)	2	3.3	2	3.3
14	<i>Chirakarita-</i> (Does it take long time for you to heal/ manifest disease?)	0	0	0	0

Kapha Vruddhi Sharirika Lakshanas (Table 3) observed were *Angasada*, *Avasada*, *Aalasya*. *Angasada* is physical tiredness. *Avasada* is physical and mental tiredness. Fatigue in people with Diabetes is multidimensional, encompassing physiological, psychological, and life style factors. One likely reason for fatigue in diabetes is alteration in blood glucose levels. Unavailability of glucose to be utilized by cells due to insulin resistance contributes to fatigue. Reduction in hepatic and muscular glycogen stores is also responsible for fatigue¹³. *Aalasya* is understood as *Anutshaha*. *Vruddhi* of

Kapha leads to increase of *Manda Guna* leading to *Aalasya*.

Kapha Kshaya Sharirika Lakshanas observed were *Daurbalya*, *Rukshata*, *Angamarda*, *Hrid-drava*, *Udwestana*. *Bala* is the *Prakruta Karma* of *Kapha*, *Kshaya* of *Kapha* leads to manifestation of *Daurbalya*. *Angamarda* is taken as pain in body. *Udwestana* is *Vataja Nanatmaja Vikara*. *Kapha Kshaya* leading to *Vata Prakopa* can lead to manifestation of *Udwestana*. *Sthira Guna* of *Kapha* can be taken as steadiness. *Kshaya* of *Kapha* leading to *Kshaya* of *Sthira Guna* can manifests as *Hrid-drava*. Dehydration is also one of the causes of



Palpitation. Dehydration in Diabetes can occur as a result of polyuria in combination to less water intake.

Kapha Prakopa Sharirika Lakshanas observed were *Gaurava*, *Atinidra*, *Upalepa*, *Swadu Lavana Rasa*, *Bandha* and *Kandu*. *Guru* is the *Prakruta Guna* of *Kapha*. *Prakupita Kapha* leading to increase of *Guru Guna* leads to manifestation of *Gaurava*. *Atinidra* here is understood as *Sleshama-tamo-bhava Nidra*. *Vruddhi* of *Kapha* leads to *Vruddhi* of *Tamo Guna* leading to *Atinidra*. The feeling of excessive sleep in Diabetes Mellitus Type 2 could be contributed by fatigue or by sleep disturbances due to nocturia. *Guru Guna* has quality of *Upalepa*. Thus *Kapha Prakopa* leads to *Upalepa*. In this study *Upalepa* was in terms of tongue coating. Study shows that diabetic patients have high prevalence of tongue coating in comparison to controls. Presence of coated tongue is associated with reduction of salivary flow and high salivary viscosity that can lead to reduced cleaning capacity and reduced action of salivary antimicrobial factors¹⁴. *Swadu* is the *Prakruta Rasa* of *Kapha*, *Prakupita Kapha* can lead to manifestation of *Swadu Rasa* in the mouth. Sweet taste in mouth in diabetics could be either due to poor controlled plasma glucose or due to diabetic ketoacidosis. Studies show salivary glucose

levels were higher in diabetic patients in compared to healthy individuals, there was also significant correlation between plasma glucose levels and salivary glucose level¹⁵. *Kandu* is one of the *Kaphaja Nanatmaja Vikara*. Pruritus is common skin manifestation of diabetes and is reported to be secondary to diabetic neuropathy, metabolic derangements associated with renal failure or autonomic dysfunction resulting in anhidrosis, xerosis, pruritus ani and pruritus vulvae. *Bandha* is the *Prakruta Karma* of *Kapha*. *Prakupita Kapha* leading to increase of *Bandha Karma* manifests as *Lakshana Bandha*. *Prakupita Kapha* affecting its *Sandra Guna* leads to *Bandha* as *Sandra Guna* is *Bandhakaraka*.

CONCLUSION

Assessment of *Dosha Vruddhi*, *Kshaya* and *Prakopa Lakshanas* in *Madhumeha* (Diabetes Mellitus Type 2) showed *Vaishamyia Lakshanas* of all three *Doshas*. *Vata Vruddhi Lakshanas* present includes *Alpabalatwam*, *Bhrama*, *Indriyabhramsa*, *Gadhavarchastwam*, *Karshniya*, *Usnakamita*, *Karshya*, *Sakritgraha*, *Aanaha* and *Adhmana*. *Vata Vruddhi Manasika Lakshanas* observed were *Dainya*, *Bhaya* and *Shoka*. *Pitta Vruddhi Sharirika Lakshanas* observed were *Daha*, *Alpanidrata*, *Kshut*, *Sheetakamita*,



Balahani and *Tiktasyata*. *Pitta Vruddhi Manasika Lakshana* observed was *Krodha*. *Krodha* is due to *Pitta*. *Kapha Vruddhi Sharirika Lakshanas* observed were *Angasada, Avasada, Aalasya*. *Vata Kshaya Sharirika Lakshanas* present were *Mandachestata, Alpaehitam, Alpachestatah, Aruchi* and *Agni Vaishamy*. *Vata Kshaya Manasika Lakshana* observed was *Apraharsha*. *Pitta Kshaya Sharirika Lakshanas* observed were *Aniyata-toda, Prabhahani, Angaparushya, Manda-anala* and *Sheeta*. *Kapha Kshaya Sharirika Lakshanas* observed were *Daurbalya, Rukshata, Angamarda, Hrid-drava, Udwestana*. *Vata Prakopa Sharirika Lakshanas* observed was *Trishna, Swapa, Parushya, Sthambha* and *Vestana*. *Pitta Prakopa Sharirika Lakshanas* observed were *Sadana, Sweda* and *Kleda*.

Kapha Prakopa Sharirika Lakshanas observed were *Gaurava, Atinidra, Upalepa, Swadu Lavana Rasa, Bandha* and *Kandu*. *Madhumeha* is the *Vataja Prameha* and pathogenesis of *Prameha* includes all three *Doshas*. There was no change observed in *Vruddhi, Kshaya* and *Prakopa Lakshanas* assessed before FBS and before PPBS except for *Lakshanas Bhrama*. *Lakshana Bhrama* was found to be reduced during the assessment before PPBS. From the above findings it is clear that treatment

for *Madhumeha* needs to be planned considering all the three *Doshas*.



REFERENCES

1. Sushruta. Sushruta Samhita with Nibandha Sangraha commentary of Sri Dalhanacharya. 8th edition. Varanasi: Choukamba Orientalia. 2009. p. 67-70
2. Vagbhata. Astanga Sangraha with Sasilekha Sanskrit Commentary by Indu. 3rd Edition. Varanasi: Chowkhamba Sanskrit Series Office. 2012. p.149
3. Vagbhata. Astanga Hridaya with commentaries Sarvangasundara of Arundatta and Ayurvvedarasayana of Hemadri. Varanasi: Chaukhamba Snaskrit Series Office. p.183-85.
4. Vagbhata. Astanga Hridaya with commentaries Sarvangasundara of Arundatta and Ayurvvedarasayana of Hemadri. Varanasi: Chaukhamba Snaskrit Series Office. p.201.
5. <https://www.ncbi.nlm.nih.gov/m/pubmed/1478151/> [Visited on 11 Feb, 2018]
6. <https://emedicine.medscape.com/article/117739-clinical#b1> [Visited on 11 Feb, 2018]
7. Sushrut. Sushruta Samhita with Nibandhasangraha commentary of Sri Dalhanacharya and Nyayachandrikapanjika of Sri Gayadasa. Reprint edition Varanasi: Chaukhambha Orientalia: 2014. p.261.
8. https://www.researchgate.net/publication/15441583-treating_constipation_in_the_patient_with_diabetes. [Visited on 12 Feb, 2018].
9. <https://www.ncbi.nlm.nih.gov/pubmed/>
10. Hwa-Young Park et.al. A long standing hyperglycemic condition impairs skin barrier by accelerating skin ageing process. John Wiley & Sons A/S, Experimental Dermatology.
11. Chieko Suzuki et.al. Elevated pain threshold in patients with asymptomatic diabetic stimulation study. Wiley online library.
12. Skyrme-jones RA, Berry KL, O'Brien RC, Meredith IT. Basal and exercise-induced skeletal muscle blood flow is augmented in type 1 diabetes mellitus. ClinSci (Lond) 2000; 98:111-20.
13. Cynthia Fritschi. Fatigue in Patients with Diabetes: A Review. Journal of Psychosomatic research.
14. Ranna A. Omar. Prevalence and Factors related to tongue coating among a sample of Jordaian Royal Medical Services Dental Outpatients. Journal of Royal Medical Services. Vol 22. No. 1 March 2015.
15. Bhumika J Patel et.al. Comparison and correlation of glucose levels in serum and saliva of both diabetic and non- diabetic patients. Journal of International Oral Health: JIOH.