



## **A STUDY ON PURVARUPA OF MADHUMEHA WITH SPECIAL REFERENCE TO PREDIABETES**

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### **ABSTRACT**

A stage in which polydipsia, Burning sensation in the palm and sole, numbness in palm and sole, Lassitude, etc. are predominant is called as *purvarupa* of *Madhumeha*. This will be the alarming stage to be converted to *Madhumeha* if a management schedule is not provided. A stage in which individuals are at greater risk of progressing to type 2 DM & have an increased risk of cardiovascular diseases. Some represents this stage as increased risk for Diabetes or Intermediate hyperglycemia (WHO) rather than Prediabetes which is having resemblance with *purvarupa* of *madhumeha*. Study on this topic is very much integral to take preventive measures because India has become the Diabetes capital of the world. There is dramatic increase of DM worldwide over the past two decades. International diabetes federation projects that 592 million individuals will have diabetes by the year 2035.

**Keywords:** *Purvarupa* of *Madhumeha*, Prediabetes, T2DM, HbA1c,

**INTRODUCTION:** Ayurveda, the pioneer science of life is strongly advocating to possess a balancing attitude towards the dietary & working habits. With the advancement of time we have reached an era when the entire world is being encroached by the prevalence of Diabetes Mellitus & the global pandemic has risen dramatically over the past two decades from an estimated 30 million cases in 1985 to 382 million in 2013 which are expected to be 592 million by the year 2035.<sup>(1)</sup> In the countries DM is the leading cause of end-stage renal disease (ESRD), nontraumatic lower extremity amputations, & adult blindness. It also predisposes to cardiovascular diseases. With an increasing incidence worldwide, DM will be a leading cause of morbidity & mortality in the future<sup>(2)</sup>. So to counter the global encroaching pandemic it has been

documented by the classics to provide management schedule in its *purvarupa* stage.

**AIMS AND OBJECTIVES:** To discuss *purvarupa* of *madhumeha* with special reference to prediabetes which will further be more convenient for treatment.

#### ***Madhumeha:***

Aggravated *Vata dosha* in a long term results into *Madhumeha* in which the urine becomes sweet, astringent in taste pale in color & acerbity in touch.<sup>(3)</sup>

All *Pramehas* which are neglected for treatment are converted to *Madhumeha* in the later stage.<sup>(4)</sup>

#### ***Purvarupa* of *Madhumeha*:**

Symptoms which are manifested before the prevalence of the disease are revealed as *Purvarupa*.<sup>(5) (6)</sup>

Before the prevalence of *Madhumeha* some predominant clinical features like

*Kesheshu Jatila bhava, Asya Madhurya, Karapada Daha, Karapada Suptata, Pipasa, Alasya, Nidra Sarvakalam* are reflected in the patient which are as a whole called as *purvarupa* of *madhumeha*.

#### **Etiology of Purvarupa of Madhumeha:**

Etiological factors are divided into *Sahaja* & *Apathyanimittaja*.<sup>(7)</sup>

**1. Sahaja :** It results due to mutation in *Streeja* & *Pumbeeja* (Ovum & Sperm) considered to be *MatruPitru beejadoshaja* which may have its origin from parents.

#### **2. Apathya Nimittaja :**

Excessive indulgence to the pleasure of sedentary habits (idle sitting), Sleep, Curds, soup of the flesh of domestic, aquatic & marshy land animals, milk preparations, freshly harvested food particles, freshly prepared alcoholic drinks, preparations of jaggery & all *Kapha* – aggravating factors are the etiologies of this disease.<sup>(8)</sup>

#### **Pathogenesis of Purvarupa of Madhumeha:**

Acharya Charak has cited that there is an excessive increase of *Kapha*, *Pitta*, *Meda* & *Mamsa* due to excessive indulgence to unctuous diets having sour & saline tastes, newly harvested rice, freshly prepared wine, too much sleep, idle sitting & those who have given up physical & mental exercise & also those who are addicted to taking curds, soup of the flesh of domestic, aquatic & marshy animals, milk preparations, jaggery preparations & all *Kapha* – aggravating diets obstructs the

path of *Vata* & the *Vata* together with the *ojas* comes down to reach *Vasti* to causes this disease.<sup>(9)</sup>

#### **Prediabetes & its Key Points:**<sup>(10)</sup>

Unlike many other chronic diseases, T2DM is not heralded by a discrete physiologic event which defines diagnoses; rather it sits at one end of a continuous glucose control spectrum with normal glucose control at the other. In – between these two boundaries exists a region of abnormal glucose control which is already characterized by concomitant insulin resistance &  $\beta$ –cell dysfunction but does not yet reach the criteria for T2DM.

- Diabetes prevention trials & initiatives have been focused on those with Prediabetes, defined by the presence of impaired glucose tolerance (IGT) &/or impaired fasting glucose (IFG).
- If left untreated, up to 70 % of those with Prediabetes will develop type 2 diabetes (T2DM) over the course of their life time.
- Unhealthy lifestyle practices attributable to modern industrialized environments have been shown to account for 80 - 90 % of all cases of T2DM.
- A two – stepped approach, whereby risk scores are used to identify moderate – to high – risk individuals & blood tests are used to confirm risk (prediabetes) status, is gaining consensus as the cost- effective method of identifying individuals who are suitable for a diabetes prevention program in routine care.

**Table .1 Biochemical Estimation of Prediabetes:**<sup>(11)</sup>

		fasting glucose	2-h post challenge glucose	HbA1c
<b>Current WHO criteria</b>	Impaired glucose tolerance	$< 7 \text{ mmolL}^{-1}$	$\geq 7.8 \text{ mmolL}^{-1}$ & $< 11.1 \text{ mmolL}^{-1}$	$< 6.5 \%$ if measured

	Impaired fasting glucose	$\geq 6.1 \text{ mmolL}^{-1}$ & $< 7.0 \text{ mmolL}^{-1}$	$< 7.8 \text{ mmolL}^{-1}$	$< 6.5 \%$ if measured
	HbA <sub>1c</sub> defined high states	No recommendation given	No recommendation given	No recommendation given
<b>Current ADA criteria</b>	Impaired glucose tolerance	$< 7 \text{ mmolL}^{-1}$	$\geq 7.8 \text{ mmolL}^{-1}$ & $< 11.1 \text{ mmolL}^{-1}$	$< 6.5 \%$
	Impaired fasting glucose	$\geq 5.6 \text{ mmolL}^{-1}$ & $< 7.0 \text{ mmolL}^{-1}$	$< 11.1 \text{ mmolL}^{-1}$	$< 6.5 \%$
	HbA <sub>1c</sub> defined high states	$< 7 \text{ mmolL}^{-1}$	$< 11.1 \text{ mmolL}^{-1}$	$\geq 5.7 \%$ & $< 6.5 \%$

Prediabetes has traditionally been defined by the presence of impaired glucose tolerance ( IGT ) &/Or impaired fasting glucose ( IFG ) . IGT is characterized by elevated postprandial glucose and is identified by means of an oral glucose tolerance test (OGTT) whereby plasma glucose levels are measured 2 hours after a standardized glucose load of 75 gm taken in the fasting state. <sup>(12-A)</sup>

#### **HbA<sub>1c</sub> &Prediabetes:** <sup>(12-B)</sup>

Since WHO revised the criteria for the diagnosis of T2DM to include HbA<sub>1c</sub> there has been continued discussion around the inclusion of HbA<sub>1c</sub> in the definition of a high risk prediabetes category analogous of IGT or IFG. This is highly clinically relevant as it is potentially burdensome and confusing to define category on a continuous glucose control spectrum with different measures .although WHO found insufficient evidence for the use of HbA<sub>1c</sub> in the definition of prediabetes, recent statements from the American diabetes association and an international expert committee recommended that HbA<sub>1c</sub> can be used

to signify a high risk state levels of 5.7- 6.4% and 6.0-6.4%, respectively. NICE have also recently recommended that HbA<sub>1c</sub> levels of 6.0-6.4 % can be used as an alternative to fasting or 2-hr glucose in the identification of prediabetes. Although clinically useful, the effect that this change in classification may have on risk status is unclear; evidence from the UK and elsewhere suggests there is significant discordance in individuals identified with prediabetes through HbA<sub>1c</sub> or traditional criteria.

#### **Pathogenesis of Prediabetes:**

It is due to:-

1.  $\beta$  – cell dysfunction <sup>(13)</sup>
2. Insulin resistance syndrome <sup>(14)</sup>

#### **1. $\beta$ -cell dysfunction**

Given that  $\beta$ -cell dysfunction is one of the underlying causes of T2DM & is already present in Prediabetes

#### **2. Insulin resistance syndrome**

Insulin Resistance Syndrome describes a condition where an individual is unable to use insulin properly (insulin resistance) to move glucose into cells where it is used for energy. The insulin resistance condition

comprises a spectrum of disorders, with hyperglycemia representing one of the most readily diagnosed features. The metabolic syndrome, the insulin resistance syndrome, and syndrome X are terms used to describe a constellation of metabolic derangements that includes insulin resistance, hypertension, dyslipidemia (decreased HDL and elevated triglycerides), central or visceral obesity, All the etiologies responsible for causation of this disease are primarily to be avoided. So in this regard general principles have been adopted like:-

**Risk Factors:**<sup>(15)</sup>

- a. Family history of diabetes (i.e., parent or sibling with type 2 diabetes)
- b. Obesity (BMI  $\geq 25$  kg/m<sup>2</sup> or ethnically relevant definition for overweight)
- c. Physical inactivity
- d. Race/ethnicity (e.g., African American, Latino, Native American, Asian, Pacific Islander)
- e. Previously identified with IFG, IGT, or an hemoglobin A1c of 5.7–6.4%
- f. History of GDM or delivery of baby  $>4$  kg (9 lb)
- g. Hypertension (blood pressure  $\geq 140/90$  mmHg)
- h. HDL cholesterol level  $<35$  mg/dL (0.90 mmol/L) and/or a triglyceride level
- i.  $>250$  mg/dL (2.82 mmol/L)
- j. Polycystic ovary syndrome or acanthosis nigricans
- k. History of cardiovascular disease

#### **Prevention of prediabetes:**

- Diabetes Prevention Programme (DPP) demonstrated that intensive changes in lifestyle (diet and exercise for 30 min/d five times/week) in individuals with IGT prevented or delayed the development of type 2 DM.
- Translation Of Diabetes Prevention Into Routine Primary Care
- Cessation Of Smoking<sup>(17)</sup>

#### **● Vitamin D administration<sup>(18)</sup>**

#### **Prevention of Purvarupa of Madhumeha**

- 1. *Nidana Parivarjana*
- 2. *Vyayama*
- 3. *Yogic Practices*
- 4. *Pathya & Apathya*
- 5. Medication

#### **1. *Nidana Parivarjana:***

All the etiologies responsible for causation of this disease are primarily to be avoided. So in this regard general principles have been adopted like:-

- Avoidance of indulgence to unctuous diets having sour & saline tastes, newly harvested rice, freshly prepared wine, too much sleep, idle sitting & those who have given up physical & mental exercise & also those who are addicted to taking curds, soup of the flesh of domestic, aquatic & marshy animals, milk preparations, jaggery preparations & all *Kapha* – aggravating diets.

#### **2. *Vyayama:*<sup>(19)</sup>**

- Different types of strenuous exercise, unction bath, sprinkling of water over the body & application of ointment made from *Usira, Ela, Aguru, Chandana* have been indicated as a result of which person never gets affected by *prameha* in future.
- Sushrut has also recommended to possess strenuous works if anybody does not want to be affected by *prameha* in future.

#### ***vyayama matra***

- When the appearance of perspiration in the axilla, fore head, tip of the nose is observed, *vyayama* ought to be stopped.
- When aerophagia is observed, *vyayama* ought to be stopped.
- *vyayama* ought to be continued till the half of the body power is utilized.

#### **3. *Yogic Practices:*<sup>(20)</sup>**

*Ardha Matsyendrasan, Dhanurasana, Bhujangasana, Naukasana, Paschimotasana, Shavasana Ardha-Bakraasana* are the *asanas* indicated for practice.

#### **4.Pathya & Apathya:**

- Fried *yava*, old *Sali – shastika* rice, *Sidhu, Madhwika*, roasted barley, dry corn-flour are indicated as *pathya* & by following these *pathya*, a person shall not suffer from *prameha*<sup>(21)</sup>
- *Ekshyu Vikara, Soubiraka, Tushodaka, Asava, Ghrita, Dadhi* are described as *apathyia* etc.<sup>(22)</sup>

**5.Medication:** It has not been depicted in the texts regarding the indication of medication in of *purva rupa* of *Madhumeha*. Indication of *Vyayama, yogasana & Pathya* is only to have thoughts on the preventive aspect of the disease that's why Acharya charak has emphasized the preventive aspect by possessing different types of strenuous exercise, unction, bath, sprinkling of water over the body & application of ointment made by *Usira, Ela, Aguru, Chandana*. Acharya Vasavarajeeeyam had described *Chandaprava Vatika* & by the intake of this medicine one can never be affected by *Prameha* which is suggestive of prevention.

#### **Nutritional recommendations :**

- Hypocaloric diet that is low-carbohydrate. Fat in diet (optimal % of diet is not known; should be individualized)
- Minimal *trans* fat consumption
- Mediterranean-style diet rich in monounsaturated fatty acids may be better
- Carbohydrate in diet (optimal % of diet is not known; should be individualized)
- Monitor carbohydrate intake in regard to calories

- Amount of carbohydrate determined by estimating grams of carbohydrate in diet (type 1 DM)
- Use glycemic index to predict how consumption of a particular food may affect blood glucose
- Fructose preferred over sucrose or starch
- Protein in diet (optimal % of diet is not known; should be individualized) Other components
- Dietary fiber, vegetable, fruits, whole grains, dairy products, and sodium intake as advised for general population
- Nonnutritive sweeteners routine supplements of vitamins, antioxidants, or trace elements not advised

#### **Works on Prediabetes :**

I.The Indian Diabetes Prevention Programme 1 ( IDPP – 1) was the first study to show the life style modification was effective in preventing diabetes in native Asian Indians.

II.Diabetes Prevention Programme Research group 2002.Reduction in the incidence of diabetes type 2 with lifestyle intervention or metformin. (N Eng J Med 2002;346:393 – 403.Type 2 prevention: A review <http://www.worlddiabetesfoundation.org/composite->)

#### **DISCUSSION:**

The disease review envisages an complete depiction on *Purvarupa* of *Madhumeha* in the field of *Nidana, Purvarupa & Samprapti* & the same from modern point of view deals with definition, pathogenesis, impaired glucose tolerance and risk factors of Prediabetes.

*Purvarupa* of *madhumeha* results due to mutation in *Stri & Pumbeeja* (Ovum & Sperm) considered to be *MatruPitru beejadoshaja* which may have its origin from parents & the same has been

described in modern science under risk factor as family history of diabetes (i.e., parent or sibling with type 2 diabetes). Excessive indulgence to unctuous diets having sour & saline tastes, newly harvested rice, freshly prepared wine, too much sleep, idle sitting may cause *Purvarupa* of *madhumeha* which may be compared to Obesity (BMI  $\geq 25$  kg/m<sup>2</sup> or ethnically relevant definition for overweight) coming under risk factor in modern science.

*Purvarupa* of *madhumeha* results in persons who have given up physical exercises & the same has been described in modern science under risk factor as Physical inactivity.

When we try to compare *Purvarupa* of *madhumeha* to prediabetes, we will observe many similarities but the only deviation we will find that the Prediabetes is not diagnosed without pathological investigation as it is asymptomatic what modern says but from ayurvedic classical references it is inferred that some prodromal syndromes become prevalent in prediabetes which help in diagnosis prior to doing pathological investigation.

**CONCLUSION:** Major etiological factors, described in the classics are *Kapha*, *Pitta*, *Meda*, *Mansa* aggravating *Ahara* & *Vihara* in which *Vata* and *kapha* are main culprits in *purvarupa* of *Madhumeha*. Tendency towards sedentary life style and faulty dietary habits, leads to vitiation of *kapha*, *Pitta*, *Meda* and *Mansa* leading to *purvarupa* of *madhumeha*.

Prediabetes is not diagnosed without pathological investigation as it is asymptomatic what modern says but from the discussion it was concluded that some prodromal syndromes become prevalent in prediabetes which help in diagnosis prior to doing pathological investigation

which is the key point that we can provide as preventive measure to the patients because every patients ignore investigation.

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