

## PREVENTION & CONTROL OF DIABETES MELLITUS

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### ABSTRACT

Diabetes mellitus has emerged as a global health hazard having tremendous socio-economic impact to the individual as well as whole. The prevalence of diabetes in adults globally was estimated to be 150 million and this figure is expected to double by 2025. India has being estimated fastest growing population of diabetes mellitus. It has mentioned in Ayurvedic literature *Madhumeha* as *mahagada*, and *madhumeha* i.e. honey like sweet urine and excessive flow respectively. Types of *Prameha vataja*, *pittaja*, *kaphaja* can be correlate with different stages of diabetes mellitus. *Vataja prameha* is because of insulin deficiency due to autoimmune or idiopathic destruction of beta cell. *Pittaja* is due to over functioning of adrenal, thyroid. *Kaphaja* is due to malfunctioning of pancreas result improper insulin secretion. *Madhumeha* is type of *vataj prameha*. Pathogenesis of *madhumeha* is involvement of *ama* (oxidative free radicals), *Agni* (digestive fire), *Meda* (adipose tissue) recent year have shown *Ojas* (immunity) which play in vital role in development & progression of *madhumeha* & its complication. Increasing incidence has become challenge for Ayurvedists to search for an additional effective treatment so focused on drug *Morinda citrifolia*, *Naimittika rasayana* (*Shilajatu*) and *Yoga*, *Surya namaskar*, *Pranayama*, follow *pathya-aphya* rule (herb & dietry supplement like *amalaki*, *haritaki*, *yava*, *mudga tikta shaka*, *jambu*, *kapitha*, reflexology massage, acupressure, *surya mudra*, *vyayama*) have excellent result in Management of diabetes mellitus.

**Keywords:** *madhumeha*, *naimittika rasayana*, *Morinda citrifolia*, *yoga*, *pranayama*, diabetes mellitus, Ayurvedic herb

**INTRODUCTION:** Diabetes mellitus is an endocrinological or metabolic disorder with an increasing global prevalence and incidence<sup>1</sup>. High blood glucose levels are symptomatic of diabetes mellitus as a consequence of inadequate pancreatic insulin secretion or poor insulin-directed mobilization of glucose by target cells. We live in 21 century where weird quality of day to day physical and mental activities leads an obsessive and erratic lifestyle. One among those topmost lifestyle disorder is *prameha* (diabetes mellitus). The prevalence of diabetes in adults globally was estimated to be 150 million and this figure is expected to double by

2025. Diabetes mellitus is a syndrome characterized by chronic hyperglycemia and disturbance of carbohydrate, fat & protein metabolism associated with absolute and relative deficiencies in insulin secretion. Classification of diabetes mellitus is based on its *aetiology* and clinical presentation. As such, there are four types or classes of diabetes mellitus viz; type 1 diabetes, type 2 diabetes, gestational diabetes<sup>2</sup>, and other specific types diabetic neuropathy is an important complication of diabetes mellitus resulting in a great deal of morbidity. In Ayurvedic literature Acharya Charaka<sup>3</sup>, Acharya Sushruta<sup>4</sup>, Acharya

Vagbhatta<sup>5</sup>, Acharya Madhava<sup>6</sup>elaborate *Madhumeha*(diabetes mellitus). Acharya Charka consider *madhumeha* as a *mahagad*<sup>7</sup>. The main causes of *madhumeha* are lack of exercise and improper food habits in excess food intake which falls in the category of *ushna*, *snigdha* and *guru* are the primal cause of this disease. *Madhumeha* (diabetes mellitus) inherently carry the risk of impaired *Agni* (digestive fire) & depleted *ojas* (immunity) status, that is hypometabolic & immunocompromised status. In our literature it's clearly defined that health and diseases both as product of food & life style. Treatment of *madhumeha* is based on *Shodhana* (purification) & *Shamana chikitsa*<sup>8</sup>. *Naimettika rasayna*<sup>9</sup>, many drugs like *Morinda citrifolia*, *Curcuma longa*, *Salacia chinensis*, Yoga Asana with *pathya aahara vihara* able to treat *Madhumeha* (diabetes mellitus).

**MATERIAL AND METHODS:** The data was collected from scientific journals, electronic media, modern medical books & authentic Ayurvedic text. The data thoroughly analysis to understand the precise pathogenesis of dengue & disintegration as per *Ayurvedic* classics.

#### **AETIOLOGY:**<sup>10</sup>

*Aaharaj nidan:* *shooka dhanya*, *yavaka*, *pistaanna*, immature curd, *katu tiktakasaya* rasa based *dravya* etc.

*Viharaj ndani:* excessive physical exercise, indulgence in sex, irregular posture of body, exposure to sun.

#### **PATHOGENESIS-**<sup>15</sup>

Etiological factor (*aasya sukha*, *swapna sukha*, *gramyodaka*)



*Kapha* increase and reach various *dusya* (*rasa*, *rakta*, *mamsa*)



*Shraithelyata*(looseness of body)



*Mansik nidan:* anger, anxiety, grief

Genetic factors: type 1 diabetes mellitus

Life style factors: obesity

**TYPE:** *Prameha* is classified *aetiologically* in to-<sup>11</sup>

- *Sahaja* due to *matruja pitruja beej dosha*(Chromosomal defect from parents i.e. hereditary)

- *Apathya nimittaja* (Unwholesome things – food and exercise etc.)

According to physical management:<sup>12</sup>

- *Apatharpana uthaja prameha* describing the lean diabetic

- *Santharpana uthaja prameha* relating the obese diabetic

According to the *doshic* causes, these *pramehas* are classified as twenty types:<sup>13</sup>

- *Vataja prameha:* There are totally four *vataja pramehas*. Insulin deficiency due to autoimmune or idiopathic destruction of beta cell.

- *Pittaja prameha:* There are totally six *pittaja pramehas*. Over functioning of adrenal, thyroid.

- *Kaphaja prameha:* There are totally ten *kaphaja prameha*. malfunctioning of pancreas result improper insulin secretion In modern view-<sup>14</sup>

- 1) Type 1-heredity, beta cell destruction usually leading to absolute insulin deficiency.

- 2) Type 2- characterized by variable degree of insulin resistance, impaired insulin secretion, increase glucose production.



- *Anga gandha* (Bad body odour )
- *Shithilangata* (Flaccidity of muscles )
- *Shayana asana Swapna sukha* (Desire for sedentary life)
- *Shitapriyatwa* (Desire for cold food & environment)
- *Gala talu shosha* (Dryness of palate & throat)

**MODERN VIEW:**

- |                |                                    |
|----------------|------------------------------------|
| 1.Poly- dyspia | 2.Giddiness                        |
| 3.Poly- phagia | 4. Polyuria                        |
| 5.Tired- ness  | 6.Bodyache                         |
| 7.Polyneuritis | 8.Visual disturbance <sup>18</sup> |

**COMPLICATION:**

- Macro-vascular complication (coronary artery disease, peripheral arterial disease, and stroke)
- Micro-vascular complications (diabetic nephropathy, neuropathy, and retinopathy)<sup>19</sup>.

**MANAGEMENT:** Life style management is apparently the cornerstone of management of diabetes mellitus. It is recognized as being an essential part of diabetes. several drugs available in modern science for diabetes mellitus but having lots of side effect like hypoglycemia, weight gain & increase economic cost so patient prefer safe and non toxic Ayurvedic medicine and therapies. In ayurveda many treatment modalities for diabetes like- *Shodhan chikitsa* (purification)*Saman chikitsa* (conservative treatment)*Rasayan- chikitsa* (immune-

modulator therapy)*Yoga*, Pranayama, *Surya namaskar*, Reflexology

**RASAYANA CHIKITSA (TREATMENT MODALITIES FOR REJUVENATION):**

*Prameha* is *anusangi vyadhi* and in its *vatika* types there is a condition of *dhatukshya* so Acharya Sushruta & Acharya Vagbhatta has described *rasayana* therapy for *prameha*. For this purpose *Silajit* are indicated in the text<sup>20</sup>.

**SILAJIT:** Botanical name- *Asphaltum punjabium*<sup>21</sup>It acts as a powerful immune system booster. Reduce stress, physical, mental fatigue. Maintain heart health & control blood pressure, useful in the treatment of urinary disease, remove toxic from body. *Ojo-varadhaka* (immune-booster), *Prameghana*(decrease symptom of diabetes mellitus) property also having in *silajit rasayana*.<sup>22</sup>Dose - 500 mg twice a day with water after meal.

**DRUGS EFFECTIVE IN DIABETES MELLITUS:**

S.No	Drug	Botanical Name	Karma	Probable Mode Of Action
1	AAMALKI <sup>23</sup>	<i>Emblica officinalis</i>	<i>Medhya</i> , <i>Balya</i> for <i>nadisamsthan</i> (nervous system) <i>Prameghna</i> (decrease symptom of diabetes mellitus)	<sup>24</sup> Hypoglycemic effect, anti-oxidant,anti depressant, anti-inflammatory,tissue rejuvenating property
2	HARITAKI <sup>25</sup>	<i>Terminalia chebula</i>	<i>Kusthaghna</i> (decrease skin disorder), <i>Kaphghna</i> , <i>Balmedhya</i> (mental	<sup>26</sup> Antidiabetic activity,antioxidant, hypoglycemic effect is

			development for children), <i>Rasayna</i> (immunomodulator)	probably mediated by extra-pancreatic action.
3	VIBHITAKI <sup>27</sup>	<i>Terminalia a bellirica</i>	<i>Dhatuwardhaka, Tridoshhar a, Chakshu</i> (best for eyes).	<sup>28</sup> Balancing cholesterol & blood <i>pressure, antibacterial, tissue rejuvenating</i>
4	KARVELLKA <sup>29</sup>	<i>Mormord ica charantia</i>	<i>Medonashan</i> (decrease fat), <i>Vishaghna</i> (destroy poison), <i>Prameghna, Kaphg hna</i> .	<sup>30</sup> Antidiabetic, charatine act like insulin peptide shown hypoglycemic activity.
5	SAPTARANGI <sup>31</sup>	<i>Salacia chinensis</i>	<i>Mutrasangrahani, madhumehahar, Shothahar</i> (subside <i>oedema</i> ), <i>raktashodhaka</i> (blood purifier)	<sup>32</sup> Antidibetic effect, decrease in serum creatinine level and body weight.
6	NONI PLANT <sup>33</sup>	<i>Morinda citrifolia</i>	<i>Pramehhara, vranaropaka</i> (wound healing), <i>manhaprasadaka</i> (happiness).	<sup>34</sup> Decrease tri-glyceride level, reduce insulin resistance, antioxidant, anti-dyslipidemic, anti- inflammatory, glucose homeostasis, adipokinine production.
7	HARIDRA <sup>35</sup>	<i>Curcuma longa</i>	<i>Shothhara</i> (subside <i>oedema</i> ), <i>vranaropaka</i> (healing of wound), <i>raktashodhaka</i> (blood purifier), <i>Mutrasanggharini</i>	<sup>36</sup> Antioxidant, blood- purifier, hypoglycemic, antibacterial, reducing glycaemia & hyperlipidemia.
8	DARUHARID RA <sup>37</sup>	<i>Berberis aristata</i>	<i>Kaphghna, Swedjanana, yakritauttejaka</i>	<sup>38</sup> Improve health & functioning of pancreas naturally
9	VIJAYASARA <sup>39</sup>	<i>Pterocarp us marsupiu m</i>	<i>Raktpittshamaka, Mutrsangrhani, Madhumeh ahara</i>	<sup>40</sup> Rich in flavonoids, strengths the cells and maintain normal glucose level.
10	METHIKA <sup>41</sup>	<i>Trigonell a foenum- graecum</i>	<i>Vedanahra</i> (analgesic) <i>, Shothnashna</i> (subsde <i>oedema</i> ), <i>Balya</i> (energy	<sup>42</sup> Best source of micronutrients. Nourish & tone the vital organs

			booster)	lower cholesterol & triglyceroids
11	GILOYA <sup>43</sup>	<i>Tinospora cardifolia</i>	<i>Rasayana</i> (immunomodulator), <i>Dahprashmana</i> (reduce burning sensation) <i>Kaphaghna, Premhahar</i> (subside diabetes mellitus).	<sup>44</sup> Reduction of blood glucose level, hypoglycemic effect, immunomodulator, diuretic effect.
12	GUDMARA <sup>45</sup>	<i>Gymnema sylvestre</i>	<i>Pramehghna</i> (subside diabetes mellitus), <i>kaphvatshamka</i>	<sup>46</sup> Maintain post-prandial blood glucose level by delaying glucose absorption, antioxidant

**YOGA:** *Yoga* has been the cure for various diseases since ages. *Yoga* has been an ancient and effective cure for numerous health related problems. The practice of *yoga* dates back to more than 5,000 years ago. The practice of *yoga* includes meditation, breathing exercises, *Pranayam*, *Asanas* and most important of all – attaining eternal peace improves all sorts of metabolism in the body, So diabetics should perform different types of *yoga*. *Yoga* now-a-days has attracted the attention of Western people.

- It improves digestion, circulation, and immunity<sup>47</sup>
- *Yoga* enhances function of neurological and endocrine organs
- It can prevent and provides relief from chronic illnesses
- Overall the body feels healthier, more energetic
- <sup>48</sup>*Pranayama* controls the motion of inhalation, exhalation and the refection of vital energy.
- *Pranayama* can cure diabetes by reducing blood sugar levels.
- It also reduces the blood pressure, weight the rate of progression to the complications and the severity of the complications as well.

### FOLLOWING TYPES OF YOGA, PRANAYAMA, AASANA HELP TO TREAT DIABETES MELLITUS:

#### AASANA:<sup>49</sup>

- **Mandukasana:** It's an ideal asana for people with diabetes. It gently massages intestinal organs, specifically pancreas and liver, thus betterment the digestion and excretory system. This asana help heals diabetes, high cholesterol and its complications.
- **Sarvangasana:** It's the queen of all asana; it stimulates thyroid and parathyroid glands, which are responsible for protein, fat, and carbohydrate metabolism. it stimulates pituitary and pineal glands, which controls the brain, nervous system, and all bodily sensory functions. It rejuvenates nervous system helps stop or repair nerve damage in diabetes.
- **Ardha Matsyendrasan:** The sitting half spinal twist massages the abdominal organs, increases the oxygen supply to lungs and makes the spinal supply. It also helps calm the mind and improves blood flow to spine.
- **Shavansna:** The final resting *yoga* pose,corpse pose, takes the body into a deep meditative state, letting it relax and rejuvenate.

- **Paschimottasana:** The two-legged forward bend massages and tones the abdominal and pelvic organs, and helps people suffering from diabetes. This *yoga* posture helps balance the *prana* in the body and also calms the mind.

- **Dhanurasana:** The Bow pose strengthens, regulates the pancreas and is highly recommended for people with diabetes. This *yoga* pose also strengthens the abdominal muscles and is a good stress and fatigue buster.

#### PRANAYAMA:

- **Kapalbhati:** The Skull shining breathing technique helps energize the nervous system and rejuvenates brain cells. It is very helpful for patients suffering from diabetes, as it stimulates abdominal organs. This *pranayama* also improves the blood circulation and uplifts the mind.

- **Anulom-viloma:** Improves the circulatory system, without which the processes of digestion and elimination would suffer. *Pranayama* makes the most for diabetes in controlling their blood-glucose level and A1C by boosting digestion and metabolism. Additionally, it stops diabetes complications by increasing blood circulation and calming down the mind.

- **Bhastrika:**<sup>50</sup> This *Pranayama* brings about a proper balance of the three *Doshas* i.e. *Vata*, *Pitta*, and *Kapha*, and maintains their balance. Blood is purified and the body gets rid of foreign objects and toxins. Stabilizes *Prana* and calms mind, and helps the upward journey

**REFLEXOLOGY:** Diabetes Causes of high blood-glucose may be due to defect in carbohydrate or glucose metabolism. This defect may be due to stomach, intestine, liver, pancreas, or muscle cells. These problems can be resolved by stimulating

the respective reflex points of the organs. Massaging endocrine glands (all the seven glands); which controls the entire metabolic system<sup>51</sup>.

**SURYANAMSKAR:** The sun is venerated because it is the central source of energy in our solar system. Salutation to the Sun is a sequence of 12 *Asanas* draw peace, harmony and strength to the body<sup>52</sup>.

- Acts as detoxifying agent
- Normalizes the activity of the endocrine glands
- Makes the spine and waist flexible.
- Produces health, strength, efficiency and longevity.

**PATHYA:** The role of *aahara* (diet) is equally important in diabetes to control blood glucose level and prevent complication<sup>53</sup>

**1.Cereals:** *Yava* (Hordeum vulgare), *Wheat* (*Godooma*), *Purana shali*.<sup>54</sup>

**2.Pulses:** *Mudga* (*Vignaradiata greengram*), *Chanaka* (*Cicer arietinum*), *Kulattha* (*Dolichos biflorus*), *Adhaki* (*Cajanus cajan*)

**3.Vegetables:** *Tikta shaka Karela* (*Momordica charantia* - Bitter gourd), *Methi* (*Trigonella foenum-graecum* - Fenugreek), *Patola* (*Vietnamese luffa*), *Rasona* (*Allium sativum*), *Udumbara* (*Ficus racemosa*)

**4.Fruits:** *Jambu* (*Syzygium cuini*), *Amalaki* (*Phyllanthus emblica*), *Kapitta* (*Limonia acidissima*), *Talaphala* (*Borassus flabellifer*), *Kharjura* (*Phoenix sylvestris*)

**5. Seeds:** *Kamala*, *Utpala*

**6. Flesh:** *Harina mamsa* (Deer flesh), *Shashaka mamsa* (Rabbit), birds like *Kapotha*, *Titira*

**7. Liquor:** *Old sura*

**8. Oils:** Mustard oil (*Sarshapa taila*)

**DISCUSSION:** The Ayurveda inspired holistic approach seems to have unique response promoting *agni* (digestive fire) and *ojas* (immunity) status leading good health & wealth. In nutshell, all Ayurvedic therapies were found to be significantly effective & clinically safe as no adverse event of adverse drug reaction. All therapies & Drugs have following probable mode of action to help reduce diabetes mellitus-

**SILAJITA-** *Ojovardhaka* (immune-modulator), *Pramehaghna* property

**MORINDA CITRIFOLIA-** Decrease triglycerides level, reduce insulin resistance, antioxidant, *anti-dyslipidemia*

**SAPTARANGI** - Antidiabetic effect, decrease in serum creatinine level and body weight.

**AAMLA-** Hypoglycemic effect,

**HARITAKI-** Antidiabetic activity, antioxidant

**VIBHITAKI-** Balancing cholesterol & blood pressure, antibacterial, tissue rejuvenating

**METHIKA-** Nourish & tone the vital organs lower cholesterol & tri-glycerides

**HARIDRA-** Anti-oxidant, blood-purifier, hypo-glycemic, antibacterial

**DARUHARIDRA-** Improve health & functioning of pancreas naturally

**GILOYA-** hypoglycemic effect, immune-modulator, diuretic effect.

**KARVELLAKA-** Antidiabetic, charatine act like insulin peptide shown hypoglycemic activity

**GUDMARA-** Maintain post-prandial blood glucose level

**VIJYASARA-** Rich in flavonoids, strengths the cells and maintain normal glucose level.

**YOGA-** Improves all sorts of metabolism in the body.

**CONCLUSION:** Diabetes mellitus has become a global problem in spite of advance in modern science. Ayurveda consider diabetes mellitus as *kaphaj* diseases in which *medas* (adipose factory) & *ojas* (bio strength) have been described as main factor. *Agni* & *Ama* also play major role in diabetes mellitus. Diabetes is one of the life style disorders so life style management in most important. *Yoga*, *Pranayam*, *Asana* and different varieties of Drug & *Pathya aahara* have excellent result with non toxic, safer quality to manage diabetes mellitus.

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