



Role of *Pathya-Ahara* and *Yogic* Practices in the Management of Type- II Diabetes Mellitus.

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ABSTRACT:

Background: Diabetes Mellitus is a metabolic disorder involving inappropriately elevated blood glucose levels. In *Ayurvedic* texts also, different *Acharya* have mentioned about twenty types of *Prameha* and *Madhumeha* is a type of *Vataj Prameha*. *Madhumeha* is correlated with DM because of its characteristic *KshaudrarasaVarnama Kshaudramehi* (the person whose urine has taste and color like *Madhu*), which is similar to glycosuria in Diabetes Mellitus.

Aim: The aim of this article is to describe the role of *Pathya-Ahara* and various *Yogic* practices in the management of Type-II DM.

Materials and Methods: An *Ayurvedic* diet chart was made according to the *Pathya-Ahara* given in various *Samhita* and *Yogic* practices which provide benefit in diabetes according to the classical texts and various studies are described.

Results: With regular practice of *Asana* and *Pranayama* along with *pathya-ahara* one can maintain his/her blood sugar level and if a patient is on Antidiabetic oral medicines or on insulin, their dose may be reduced or stopped.

Discussion: The *Asana* should be practiced according to one's power (*Bala*). The diet chart which is mentioned further in the article is according to Northern Indian culture. This can be modified according to the place.

Keywords: Diabetes Mellitus, *Pathya-Ahara*, *Prameha*, *Mudra*

INTRODUCTION

Diabetes mellitus (DM) comprises a group of metabolic disorders that share the common feature of hyperglycemia¹. DM is currently classified on the basis of the pathogenic process that leads to hyperglycemia. Type 1

DM is characterized by insulin deficiency and a tendency to develop ketosis-it is most commonly caused by autoimmune destruction of the pancreatic islet beta cells. Type 2 DM is a heterogenous group of disorders characterized by variable degrees of insulin resistance,



impaired insulin secretion, and excessive hepatic glucose production- it is strongly associated with obesity. Common presenting symptoms of DM include polyuria, polydipsia, weight loss, fatigue, poor wound healing and paresthesia's. Various risk factors for Type 2 DM are –Family history of diabetes, overweight or obese, physical inactivity, Hypertension (blood pressure $\geq 140/90$ mmHg), HDL cholesterol level < 35 mg/dl and/or a triglyceride level > 250 mg/dl, history of cardiovascular disease. Dietary control and exercise are established treatment modalities in patients with Type 2 diabetes and other life style disorders including obesity, Hypertension and dyslipidemia².

Acharya Charaka has mentioned various *Nidana* of *Prameha* like *Aasyasukham* (excessive sitting), *Swapnasukham* (excessive sleeping), *Gudavaikritam* (eating high sugar rich diet) etc³. These *Nidana* covers the main risk factors of Type 2 DM i.e Sedentary habits and unhealthy dietary habits. In *Charaka Samhita*, *Acharya* has mentioned the importance of *Nidana Parivarjana*⁴ and *Vyayama*⁵ in the management of *Prameha*. It means Type 2 diabetes can be managed if we focus on our daily routine by increasing physical activity and adding *Yogic* practices in our routine. In addition to this, the *Pathya-Ahara*⁶ which is mentioned in our *Samhita* also play a major role in the management of Type 2 Diabetes.

MATERIAL AND METHODS

Type of Review- Narrative Review

Classical textbooks such as *Charaka Samhita*, *Sushruta Samhita* and *Bhaisajya Ratnavali* were reviewed to analyze the role of *Pathya* mentioned in *Prameha* and other *Yogic* textbooks like *Mudra Bandha* and *Pranayama* for the *yogic* practices were reviewed. Different databases such as Pubmed and Google Scholar were searched. Medicine Textbooks like Harrison and Davidson book of medicine were also reviewed.

Classification

“Result of Review”

Prameha is classified aetiologically in to *Sahaja* (Hereditary) that means due to *Matapitabheejadoshakruit* (Chromosomal defect from parents). and *Apathya nimittaja* (Unwholesome things – food and exercise etc)⁷. Ayurvedic diet chart and *yogic* management explained in this article is mainly for *Apayhya Nimittaja Prameha*. Diabetes mellitus nowadays can be compared with *Apathya nimittaja Prameha*.

*Samprapthighataka*⁸: (favorable things for disease)

- *Dosha* (humur) – *vata, pitta, kapha*
- *Dushya* – *meda, mamsa, kleda, rakta, vasa, majja, lasika, rasa and ojas*
- *Srotodusti* – *atipravrutti*
- *Agni* – *dhatvagni*
- *Udhhavasthana* – *kostha*
- *Vyaktasthana* – *mootravaha srotas* (urinary tract)

Samprapti (Pathogenesis)⁹

Kapha increase by the etiological factors, reaches various *dushya* like *rasa, rakta* etc., As there is a *shaithilyata* in the body and is being fluid predominant, spread all over the body and gets vitiated, while spreading it gets mixed with *meda, mamsa* and *kleda* (body fluids). Body fluids which got vitiated draw them to the urinary bladder and produces *prameha*; similarly the *Pitta* affects them, *Vata* also brings about vitiation in them and produce *prameha*.

Premonitory symptoms¹⁰

In *Ayurveda* we can find the description of early symptoms of the disease. They are:- (a feeling of burning sensation in the palms and soles) *Hasta pada tala daha*, (accumulation of dirt on the palate, throat, tongue, teeth) *Taalū gala jihva danteshu malotpatti*, (sweetening and clearing of urine) *madhurshuklamutrata*, (excessive thirst) *pipasa*.

Clinical symptoms¹¹

Prabhootha mutrata (Polyuria), *Avila mutrata* (Turbid Urine) and *Medo dushti lakshana* are the main symptoms of *prameha*.

Prognosis¹²

Acharya Charaka describes the prognosis in three categories:-

1. *Sadhya* – Curable: *Kaphaja Prameha* without *Purvarooopa*, *Pittaja prameha* if *meda* is not *dooshit* in it to a great extent, then it is *sadhya*.
2. *Yapya* – Palliable: *Pittaja prameha* is *Yapya*.
3. *Asadhya* – Incurable: *Vataja prameha* is *Asadhya*, *Pittaja* and *Kaphaja prameha* with *Purvarooopa* describes the incurable version of *prameha* along with this, *Sahaja Prameha* and *Madhumeha* both are also *Asadhya*.

Yogic Practices in Type 2 Diabetes Mellitus

Asana (yoga postures)

Asana emphasize the relationship of mind, body and awareness, focusing on the synchronization of breathing

and movement. They involve stretching, twisting movements and relaxation. A *yoga* posture should be performed with stability and comfort. For therapeutic benefits, the poses need to be maintained for approximately 30 seconds to 1 minute, depending on one’s capacity, and the duration may be gradually increased. (**Table -1**)

Pranayama

Pranayama is controlled or regulated yogic breathing practice. The slow breathing technique in *pranayama* causes changes in body physiology by controlling the autonomic nervous system; it regularizes the rate and pattern of breathing and regulates the heart rate and its variability¹⁵. *Pranayama* like *Anuloma viloma*, *Bhramari*, *Bhastrika* and *suryabhedhi* are very useful in diabetes. A diabetic patient should practice each for 10-15 min daily.

Mudra

People with Diabetes should practice *Pashinee Mudra*, *Tadagi Mudra*, *Yoga mudra*, *Bhujangini Mudra* for half an hour.

Shatkarma

People with diabetes should practice *Shankhprakashalana* twice or thrice a year¹⁶. A shorter version of it i.e *Laghu Shankhprakashalana* could be performed weekly or after a gap of 15 days.

Pathya-Ahara In Type 2 Diabetes

According to *Ayurveda* one should start with light diet (*laghubhakshya*, *laghu ahara*)¹⁷ and then gradually increase the quantity of food. It is a rule that one should keep complete attention on the condition of *Agni* i.e. digestion. Diabetes being a disease of deranged metabolism, special attention should be kept on the condition of digestion and metabolism. The role of *ahara* and *vihara* are equally or even more important in diabetes to control blood sugar level and to prevent complications of this disease. In all classics, *ahara dravyas* are described in detail and following are food items which can be given in the diabetes : -

1. **Cereals:** *Kangu*, *Neevara*, *Yava*, *Vainava* (*Bansa chawal*), *Kodo*, *Shyamaka Mukundaka* (a type of *Sathi rice*), *Puraan Godhoom* and *Shali rice* can be taken.
2. **Pulses:** *Mudga* (*Vignaradiata Greengram*), *Chanaka* (*Cicer arietinum* Linn. – Bengal gram), *Kulattha* (*Dolichos biflorus*), *Adhaki* (*Cajanus cajan* - Pigeon pea) etc, can be taken¹⁸.

3. **Vegetables:** All types of bitter vegetables (*Tikta shaka*)¹⁹ e.g. *Karela* (*Momordica charantia* - Bitter gourd), *Methi* (*Trigonella foenum-graecum* - Fenugreek), *Patola* (*Vietnamese luffa*, *Vietnamese gourd*, or *Chinese okra*), *Rasona* (*Allium sativum* Linn. – Garlic), *Udumbara* (*Ficus racemosa* - Cluster Fig Tree, *Indian Fig Tree* or *Goolar* (*Gular*) Fig), etc. should be given.

4. **Fruits:** *Jambu* (*Syzygium cumini* - Black berry), *Amalaki* (*Phyllanthus emblica* *Nepalese/Indian gooseberry* or *amla*), *Kapittha* (*Limonia acidissima* - Wood Apple, Elephant Apple, Monkey Fruit or Curd Fruit) , *Kharjura* (*Phoenix sylvestris* –Date Sugar Palm) , *Kamala* (*Nelumbo nucifera* *Indian lotus*, *sacred lotus*, *bean of India*, or *simply lotus*) can be given.

5. **Flesh:** *Harina mamsa* (Deer flesh), *Shashaka mamsa* (Rabbit), birds like *Kapota*, *Titira* etc., can be taken²⁰.

6. **Liquor:** *Purana sura* (old wine) may be given²¹.

7. **Seeds:** *Kamala*, *Utpala* seeds can be allowed to take.

8. **Oils:** *Sarshapa taila* (Mustard oil), should be given.

Suggested Diet for Diabetic Patient

- Soak *methi* seeds (3-5g) in a glass of water previous night and drink it in the morning and also eat soaked *methi* seeds also.
- *Madhu mishrita jal*
- Whole wheat *namkeen daliya/ yava chilla /sooji chilla/Bajra chilla/ Ragi chilla*

Vegetables- *Bhindi/Lauki/ Ghiya/ Palak/ karela/ methi*

Flour for chapatti - [made up of 3/4th part wheat flour and 1/4th part *Yava* flour or of *singhada* flour (water chestnut)] or roti made with *bajra*, *ragi* and *jwaar* flour.

Fruits - *Jamun* (*Syzygium cumini*), *Amla*, *Guava*, *Pear*, *Apple*, *Orange*, *Papaya*, *Kiwi*, *Mango* (avoid over ripe fruits) can be consumed according to the season , sprinkle *trikatu churna / Panchkola churna* over the fruits.

Salad- *Gajar* (Carrot), *Mooli* (Radish) , *Kheera* (Cucumber) Half an hour before meal sprinkle *trikatu churna / Panchkola churna* on it.

Pulses - *Mudga/ Masur/ Chanak/ Arhar/kulatha*

Patient can consume *Cashew*(2-3), *Almond*(2-3), *Walnut*(2-3) or *Peanuts/ chanak* (chickpeas)/*Makhana*(Fox nut) roasted in dry sand(*Balu/ reta*)
Seasonal vegetable soup (in winters)

- *Amla* juice +*haridra*+honey²²
- Cook food with mustard oil.

Food Items to avoid

- Do not consume bakery products, beverages, or any packed food item, junk food (like burger , pizza etc.)

- Don't consume milk, other milk products, tea and coffee.
- Consume jaggery in place of white sugar.
- Avoid non vegetarian diet and fried heavy food items.
- Don't eat food items made from refined flour and refined sugars (like pastries, ice-creams)
- Do not consume potato, peas, corn (if you have to consume potato, first boil it for 3-4 minutes).

Along with diet, *Asana* and *Pranayama* should also be performed for minimum 1 hr and half an hour morning walk is also necessary.

DISCUSSION

Probable Mode of Action of *Asana* in the management of diabetes

Asana with forward bends massage and pressurize the pancreas and stimulate the secretion of insulin. A study showed that yoga postures had a positive effect on glucose utilization and fat redistribution in individuals with type 2 diabetes²³. In patients with diabetes, pancreatic cells may be regenerated and β -cell sensitivity may be increased by the alternating abdominal contractions and relaxations involved in yoga practice. Improved blood supply to muscles may enhance insulin receptor expression in the muscles, causing increased glucose uptake²⁴. Out of these *asana*, *Pawanmuktasana* massages the abdomen and digestive organs and is therefore very effective in removing wind and constipation²⁵. *Ardhamatsyendrasana* also massages the abdominal organs²⁶. *Halasana* promotes the production of insulin by the pancreas²⁷. *Dhanurasana* tones the pancreas and balances their secretions. It is useful for the management of diabetes²⁸. Regular practice of *trikonasana* will help to reduce waistline fat.

Probable Mode of Action of *Pranayama* in the Management of Diabetes

Anulom vilom, *shitkari* and *bhramari Pranayama* increase cerebral blood flow and oxygenation, thereby improving the neuronal activities of the brain, including those present in the limbic areas, hypothalamus, and medulla, as well as improving sympathetic outflow²⁹. *Anulom vilom pranayama* has been shown helpful in improving components of health-related fitness (i.e., cardiorespiratory abundance, flexibility, and percentage of body fat)³⁰. The vibrations created in *bhramari pranayama* have a soothing and calming effect on the mind and could play a vital role in improving both mental and physical health³¹. *Suryabhedhi Pranayama* is believed to have a sympathetic stimulating effect and may be recommended in people with

diabetes³². *Bhastrika pranayama* is very powerful and energetic *pranayama* called as "the breath of fire." It helps in the regulation of the pituitary, Pineal and adrenal glands, which play an important part in the regulation of metabolism³³.

Probable Mode of action of *Mudra*

Pashinee Mudra brings balance and tranquility to the nervous system and massages the abdominal organs³⁴. *Tadagi mudra* relieves tension from the diaphragm and pelvic floor, tones the abdominal organs and stimulates blood circulation to them³⁵. *Bhujangini Mudra* tones the whole stomach, removes stagnant wind and helps alleviate abdominal disorders³⁶. *Yoga Mudra* massages the abdominal organs³⁷. These all put pressure on the abdomen and massages the abdominal organs and increase blood circulation to the organs. These also stimulate Pancreas which lead to the production of insulin. *Mayo Mudra* and *Surya Mudra* are also beneficial in diabetes. *Surya Mudra* activates the fiery energy within the body to boost metabolism.

Probable Mode of Action of *Shankhprakashalana*

It is a purificatory process of the body including Gastro-intestinal tract, thus it eliminates vitiated *dosha* along with *mala*, from the body. As we know that *Prameha* is a *tridoshaja vikaara*. *Shankhprakashalana* removes *vata* by *shuddhi of Pakwashya*, *pitta* by *shuddhi of Pachyamanashya* and *kapha* by *shuddhi of amashya*³⁸.

Probable Mode of Action of *Pathya-Ahara* in Diabetes

Acharaya Sushruta and *Vagbhata* have similar opinion regarding etiological factors that *Apathya Nimittaja Prameha* may be due to intake of more foods, which aggravates *Kapha*, *Meda* and *Mutra*. So, a diabetic patient should not consume any food which increase *kapha*, *meda* and *mutra*. The diet which form excessive *Kapha*, *Meda*, *Kleda*, and *Mutra* can be compared with the foods which are heavy to digest like fatty foods and the foods which are made up of refined flour, refined sugars the food which is having high glycemic load. These should be avoided.

1. *Methi* seeds are *vatanulomika*, *Agnideepaka*, *Vatahara*, *Shothaghna*, *Mriduvirechaka*. In *Madhumeha*, *Vata* and *kapha* are involved and *methi* balances both *Vata* and *kapha*. *Methi* (Fenugreek) seeds also contain high fibre are useful for diabetics. It contains mucilaginous fibre and trigonelline-an

alkaloid known to reduce blood sugar level³⁹. Fenugreek seeds also lower the levels of serum lipids such as cholesterol and triglyceride.

2. *Madhu* has *lekhana* properties, it helps in balancing *Kapha* which is mainly involved in *Madhumeha*.
3. *Daliya* is *Vata* and *Pittashamaka*.
4. *Bajra* has *ruksha guna*, *ushana veerya* and *katu vipaka* and also have *agnideepana* properties. These all properties of *bajra* helps in pacifying *Kapha dosha*.
5. *Yava* is *ruksha* and *kaphashamaka*. Mixing of *yava* flour with *Godhum* is *khaphanashaka* and *aptarpaka*.
6. *Ragi* has *laghu guna* and is *tridoshashamak in nature*. So, it is easy to digest and balance *tridosha*.
7. *Jwaar* has *Laghu* and *ruksha guna* and it is *kaphashamaka* and *kledahara*.
8. *Jamun* has *laghu*, *ruksha guna* and *katu vipaka* which helps in balancing *kapha* that is mainly involved in *Madhumeha*.
9. *Amla* has *Tridosahara* properties, so it balances all the three *dosha*. *Madhumeha* is a *vata* predominant *tridoshaja vyadhi*.
10. *Guava* is *tridoshashamaka* in nature as well as *Pectin*, dietary fibre in *guava* improves glucose tolerance by delaying the intestinal absorption of glucose.
11. *Kaccha Papita* (*Papaya*) has *deepana* and *pachana* properties and is *kapha-vata shamaka* in nature. *Orange* is *hridya*, *rochaka* and *vatahamaka*.
12. *Carrot (Gajar)* has *kapha-vatahara* and *deepana* properties. *Radish (Moolak)* is *katu* and *tikta* in *rasa* and *tridoshashamaka* in nature.
13. *Mudga* and *Masur* both have *Laghu* and *ruksha guna*
14. *Arhar* is *Kapha pitta shamaka*, *Chanaka* has *laghu* and *ruksha* properties and *Acharya Sushruta* has mentioned that by mixing *ghee* in it make it *tridoshashamaka*.
15. *Kulatha* is *Kapha* and *vata shamaka* in nature.
16. *Shalgam* (*Turnip*) is *laghu* and *tridoshashamaka* and has *deepana* properties.
17. *Karela* has *tikta rasa* and has *laghu* and *deepana* properties.
18. *Patola* is *laghu* and has *deepana* and *pachana* properties. It is *tridoshashamaka* in nature.
19. *Vrintaka* (*Brinjal*) is *laghu*, *medohara*, *deepana* and *Kapha-Vata shamaka* in nature.
20. *Cashew*, *Almonds* and *Walnuts* are *balya* and *Vatanashaka*.
21. *Makhana* is *Balya*.

22. *Sarshapa Taila* is *Laghu* and has *Katu, Tikta Rasa*.

CONCLUSION

The *Asana* described earlier should be practiced according to one's power (*Bala*). The diet chart which is mentioned earlier is according to Northern Indian culture. This can be modified according to the place.

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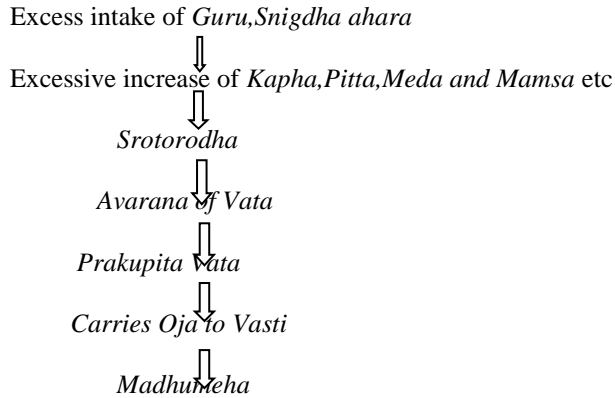
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Flow Chart of *Samprapati*



(Table-1) Name and duration of various *asana*¹³

S.No.	Name	Duration
1	<i>Surya Namaskar</i>	3-7 turns of each, each pose being maintained for 10 seconds
2	<i>Tadasana</i>	30 seconds to one minute, adding half minute per week
3	<i>Trikonasana</i>	30 seconds for each side, adding half minute per week
4	<i>Padmasana</i>	30 seconds to one minute, adding half minute per week
5	<i>Pashimottanasana</i>	30 seconds for each side, adding half minute per week
6	<i>Ardhamatsyendrasana</i>	30 seconds for each side, adding half minute per week
7	<i>Pawanmuktasana</i>	30 seconds for each side, adding half minute per week
8	<i>Dhanurasana</i>	3-7 turns of each, each pose being maintained for 10 seconds
9	<i>Halasana</i>	Beginners should hold the pose for 15 seconds, gradually adding a few seconds per week until it can be held for one minute ^[14]