



Review Article

A REVIEW ON ANTI-DIABETIC DIET IN AYURVEDA CLASSICS

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ABSTRACT

Type 2 Diabetes Mellitus (Type 2 DM) is affecting millions of people globally it is estimated that 425 million people (20–79 years of age) suffer from DM. Complications of DM can be simply prevented through lifestyle modifications and dietary interventions with good glycemic control. Aim and Objectives: This literal review is to compile whether standard Ayurveda Classics adequately mention the details of Anti Diabetic Diet (*Padhyapadhyas* in *Pramehi*). Life style modification and dietary interventions are remarkable in the management of Type 2 diabetes mellitus in Ayurvedic literature also. In this article review of Ayurvedic classical literatures is done to compile and analyze diabetic diet and its applications in detail. Materials and Methods: Standard textbooks of Ayurveda especially Bruhathrayis- Soothrasthanas and Chikitsasthanas of Ashtangahrudayam by Vagbhata, Charaka Samhitha by Punarvasu Athreya and Susrutha Samhitha by Lord Dhanwanthari, were analyzed to make conclusions on diabetic diet regimes to control Type II Diabetes Mellitus. Results:-Dietary advises given in Ayurveda classics are in a systematic way from cereals to different food items which can be utilized for diet plan in Type II Diabetes Mellitus with the help of current knowledge of glycemic index and glycemic load. Conclusion: This review article concentrates on the needy and uniform source of information regarding Anti-diabetic diet. On the base of this review conclusions were made on Ayurvedic dietary interventions in diabetes to get better results.

KEYWORDS: Diabetes Mellitus, Ayurvedic diet, *Padhyapadhyas*, Ayurveda Classics.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder resulting from a defect in insulin secretion, insulin action, or both. Insulin deficiency in turn leads to chronic hyperglycemia with disturbances of Macronutrient metabolism.^[1] In International Diabetes Federation (IDF) Atlas guideline report, there are 352 million adults with impaired glucose tolerance is having the risk of developing diabetes in the future^[2]. In 2017, it was estimated that 425 million people (20–79 years of age) suffered from DM, and the number is expected to rise to 629 million by 2045.^[3] Dietary changes and physical inactivity have considerably contributed to the increased incidence of Type II Diabetes Mellitus^[4]. Randomized controlled trial supports healthy diet practices and exercises at least 4 days in a week as an effective strategy for the management and prevention of Type II Diabetes Mellitus.^[5] In Ayurveda, as a system of medicine recommends wholesome and unwholesome dietary habits for a healthy person and for diseased as a part of treatment protocol. Type II Diabetes can be equated to "*Prameha*" explained in almost all classical text books of Ayurveda. In the management

of *Prameha* also *Acharyas* recommends specific dietary advises for the management and prevention. Ayurveda give utmost importance to the dietary measures in the management of most of the disorders. This may be due to the basic concepts of Ayurveda in relation to the *Panchamahabhootha* and *Thridosha* theories. Classical text books of Ayurveda are mainly *Charakasamhitha*, *Susrutha Samhitha* and *Ashtangahrudaya*, almost all the text books in their *Soothrasthana* gives detailed advises on dietary classifications, uses, and their applications in various clinical conditions. In this article an attempt is done to review dietary advises given for the management of *Prameha* called as Type II Diabetes Mellitus.

MATERIALS AND METHODS

Important classical text book of Ayurveda especially *Soothrasthanas* and *Chikitsasthanas* of *Ashtangahrudayam* by *Vagbhata*, *Charaka Samhitha* by *Punarvasu Athreya* and *Susrutha Samhitha* by Lord Dhanwanthari, has taken for the dietary analysis in Type II Diabetes Mellitus. While reviewing the dietary recommendations in diabetes by these classics two analytical approaches were adopted for

better understanding. In the first methodology describes the type of dietary article in different categories which should be consumed by every individual for their better health. In the secondary analysis dietary advises were described in each and every disease context- *Rogaprakaranas* as *Padhya-padhyas*- wholesome and unwholesome diet for a

particular clinical condition. In the present review an attempt is made to thoroughly collect and compile the different advises in relation to food for Type II Diabetes Mellitus. In analysis the basic classifications of diet into cereals, pulses, fats, vegetables, minerals, water etc. were taken as a basic criteria for selection.

Table 1: Basic classification of Food

| Diet Group in <i>Soothrasthana</i> | <i>Ashtanga Hrudayam</i> (AH) | <i>Charakasamhitha</i> (CHA.) | <i>Susrutha Samhitha</i> (SU) |
|--|--|---|--|
| I. Drava dravyas (liquids) | <ol style="list-style-type: none"> 1. <i>Thoyavargam</i> (Types of Water) 2. <i>Ksheeravargam</i> (Types of Milk) 3. <i>Ikshuvargam</i> (Sugarcane types) 4. <i>Tailavargam</i> (Vegetable oils) 5. <i>Madyavargam</i> (fermented beverages) | | <ol style="list-style-type: none"> 1. <i>Jalavargam</i> (Group of water) 2. <i>Ksheeravargam</i> (Group of milk, curd, buttermilk, <i>Grutham</i>) 3. <i>Tailavargam</i> (Group of oils) 4. <i>Madhuvargam</i> (Group of Honey) 5. <i>Ikshuvargam</i> (Group of Sugarcane) 6. <i>Madyavargam</i> (Group of alcoholic beverages) 7. <i>Muthravargam</i> (group of Urine) |
| 2. Anna swaroopam (Various edibles) | <ol style="list-style-type: none"> 1. <i>Sookadhanyas</i> (Cereals) 2. <i>Sali</i> (white rice) & <i>Vreehi</i> (red) 3. <i>Thruna</i> (millets) <i>Yavam</i> (barley variant), <i>Vamsa jayavam</i> (bamboo seeds) <i>Godhooma</i> (wheat), <i>Nandimukhi</i> (oats/suchi wheat) 4. <i>Simbidhanyas</i> (Pulses) 5. <i>Kruthannavargam</i> (Cooked food items) 6. <i>Mamasavargam</i> (Meat Items & fish) 7. <i>Sakavargam</i> (Vegetables)- <i>Phalasakam</i> (<i>Kusmandam</i>), <i>kandasaakam</i> (stems), <i>Pathrasaakam</i> (leafy), <i>Salanasaakam</i> (spices) 8. <i>Phalavargam</i> (Fruits) & (<i>Sushkaphalavargam</i> (dry fruits) 9. Medications in daily use eg; <i>Rocksalt</i>, <i>Thriphala</i>, <i>Thrikatu</i>, <i>Panchakolam</i>, <i>Panchapanchamoolam</i> 10. <i>Anupanas</i> (After Drinks) | <ol style="list-style-type: none"> 1. <i>Sookadhanyam</i> (Corns with bristles) 2. <i>Samidhanyam</i> (pulses) 3. <i>Mamsavargam</i> (Meat) 4. <i>Saka vargam</i> (vegetables) 5. <i>Phala vargam</i> (Fruits) 6. <i>Haritavargam</i> (Salads) 7. <i>Madyavargam</i> (Wines) 8. <i>Ambuvargam</i> (Water group) 9. <i>Gorasavargam</i> (Milk & Milk products) 10. <i>Ikshuvikaram</i> (Products of sugarcane & Honey) 11. <i>Kruthannam</i> (Food preparations) 12. <i>Aharayoni</i> (Accessory food articles like oils condiments, spices, salts, <i>Ksharam</i>, meat soup, <i>Anupanas</i> /after drinks etc.) | <ol style="list-style-type: none"> 1. <i>Dhanyavargam</i>(Group of cereals) 2. <i>Kudhanyavargam</i> (Millets) 3. <i>Mudgadimashadivargam</i> (Pulses and legumes) 4. <i>Mamsavargam</i> (Group of meat) 5. <i>Phalavargam</i> (Group of fruits) 6. <i>Saakavargam</i> (Group of vegetables) 7. <i>Kandavargam</i> (Group of Tubers) 8. <i>Lavanavarga</i> (Group of Salts) 9. <i>Kruthannavargam</i> (Food preparations) 10. <i>Bhakshyavargam</i> (Hard edibles) 11. <i>Anupanas</i> (After drinks) |

The use of these above mentioned (Table.no.1) food items in a wholesome way which is

advised by classics helps to maintain a person healthy. But certain modifications were advised

according to the daily and seasonal changes (*Dinacharya and Rithucharya*). In the context of diseases (*Vyadhiprakarana*) modifications were done to this general rule of diet accordingly. The reversal of vitiation of *Doshas* were the criteria for modifying the diet. eg:- In *Prameha chikitsa Kapha medohara* management is ideal especially in first stage. In Type II Diabetes Mellitus the different types of *Aharakalpana* mentioned in the classics were

judiciously advised for the management of diabetes. When we review the food articles, certain diet were recommended more, at the same time and sometimes some items were restricted. This modifications are on the base of the involvement of *Doshadooshyas*. The detailed comparison of the different food items in the classics are given below.

Table 2: Comparison of Information regarding diabetic diet in Classics

| Diet Group | AH.Chikitsa ^[7] | cha.chikitsa. ^[8] | Su.chikitsa ^[9] |
|--------------------|--|--|--|
| Cereals | Godhooma Yava Jeernasaali Shashtikam | Old Shali, Shashtikam Yava Godhooma | Old shali Shashtikam Yavam Godhuma |
| Millet | Venuyavam Thrunadhanyam-kangu (thina), Kodrava (Varaku), Neevaram (Varinellu), Syamakam (chaama) | Trunadhanyas Venuyavam | Kodravam Uddalakam |
| Diet preparations | Apupa (Idli, puttu, elayada etc.) made of yava. Sakthu (items made of flour like Upma), and Vadyam (kanji) Yava soaked in Thriphala overnight make flour prepared diet with honey and sidhu- alcohol of jumboo fruit | Yavoudana (yava rice) Vadyam (Yava gruel) Apupa (yavaiddli) | Food prepared with above cereals described in Susrutha. Barley soaked in Salasaradiganam/ Aaragwadhadi then converted to flour |
| Pulses Preparation | Mudgam | Mudga Mudgayoosham | Chanaka, Aadhaki, Kuladham, and Mudgam |
| Vegetable | Bitter vegetables Haridra, Dhathri | Thikthasakas | Thikthakashaya vegetables |
| Oils and Honey | Prepared with medicines for Dosha wise Kashayas. Makshikam | Danti, Ingudi, Atasi, sarshapam, Kshoudram and Madhu | Nikumbha, Ingudi, Sarshapa Athasi |
| Buttermilk | Srikukkudam (type of prepared buttermilk) | | |
| Meat items | Desert animals (goat) | Pecker birds animals of acrid land | |
| Anupana | Darvi/Surahwa/Thriphala /Mustha /Boiled in water. Raagam, Shadavam Guluchi/ Amalaka with honey | Chandana with rice water for burning sensation and excessive thirst. | Food and drink processed with honey, Kapidham, Maricham. Grapes, Dadima, Amalaka, Amlavethasa with rock salt |

Main cereal food articles prescribed in *Bruhathrayis* for persons suffering from Diabetes Mellitus are *Puranasali* (*Oryza sativa* Linn.-Old rice), *Shashtikam* (Rice variety matures in about 60 days, it is not having *Guruguna* according to *Charakacharya*, and having *Sthiraguna* (providing strength and relieving fatigue) *Godhooma* (*Triticum aestivum*) and *Yava* (*Hordeumvulgare/* barley). Rice is a health

promoter as well as easily digestible, cool in potency and also diuretic. ("*Padhyalaghavomuthralahima*") *Puranasali* means "*laghusamvatsarodhitam*"- rice after keeping one year. *Godhooma* (wheat) is "*jeevanovathapithahagodhooma*"- wheat is having living property, and it pacifies *Vatha* and *Pitha*. *Yava* (Barley is a type of *Yava*) corrects urinary functions, fat metabolism and *Pitha/ Kapha Dosha* etc.

“Yavamuthramedopithakaphanjanayeth”. *Amalaki* (*Emblica officinalis*) with *Haridra* (*Curcuma longa*) and Honey described as a single remedial measure for diabetes.^[7]

Thrunadhanyas like *Priyanku/ Kangu* (*Setaria italica* or Indian millet- *Thina*) having nourishing property and pacifies *Kapha* as well as *Pitha*. *Kodrava* (*Paspalum scrobiculatum*) having cooling effect and antitoxic property “*koradoosha sparse seethovishapah*,”. Other millets beneficial for managing Diabetes mentioned in the classics are *Neevaram* (*Hygroryza aristata/ bengal wild rice/ varinellu*), *Shyamakam* (*Panicum sumatrense/ local name- chama*) and *Venuyava* (*Bambusaarundinacea/ bamboo seed/ Mulayari*). Bitter vegetables like *Patola* (*Trichosanthes anguina- Snakeguard*, honey, *Soolyangulamamsa* (*Tandoori chicken*) are also beneficial. Preparations of *Uddalaka* (*wild Varaku*), *Chanaka* (*Cicerkabulium*), *Aadhaki* (*Cajanuscajan*), *Kuladha* (*Dolichos biflorus - Muthira*) are of great importance in diabetes. *Ashtangahrudayam Chikitsasthanam* describes “*Panne Vatsakadina*” medicines in *Vatsakadiganam* could be used for preparing food and drinks in patient suffering from diabetic ulcers. Food items prepared of barley is easily digestible, meat of desert animals and birds also beneficial for diabetic patient according to Acharyas.

Simbidhanyas like *Mudga* (*Vignaradiata* or green gram), *Aadaki* (*Cajanuscajan* or Red gram), *Kuladham* (*Dolichos biflorus/ horse gram*) etc. also beneficial vegetable proteins according to Acharyas. *Mudgayoosha* (green pea soup) advised and it is a wonderful remedy for controlling blood sugar in normal^[8]. Studies highlights certain fibers set back the absorption of carbohydrates resulting reduced postprandial hyperglycemia may be for the reason that plant fibers downgrade plasma glucose concentrations and reduce glycosuria. Hence high-fiber foods might be useful while dealing with Diabetes Mellitus. *Acharya Charaka* emphasizes habitual consumption of *Amalaka*, *Mudga*, *Yava*, *Sushkasakthu* (corn) prevents the diseases of *Kapha* dominant pathology. Fruits like Grapes, *Dadima* (pomegranate), *Amalaka* (*Emblica officinalis*), *Amlavethasa* (*Solena amplexicaulis*) with rock salt as fresh juice also advised by Acharya Susrutha.^[9]

Acharya Susrutha and Charaka also recommended oils like *Sarshapa* (*Brassica nigra/ mustard*), *Danti* (*Nikumba -Baliospernummontanum*), *Ingudi* (*Balanitisegyptica*), and *Atasi* (*Linum usitatissimum*). *Yava/ Barley* should be the chief food item for diabetic patients with the properties of reducing urine, mitigating *Pitha*, *Kapha* as well as *Meda* and bestowing strength.^[10] *Yava*

would be immersed in anti-diabetic decoctions especially *Thriphalakhwatha* overnight, then dried and repeated 3-7 times and prepare food items like *Apupa* (steamed items like iddli, elayada etc.), *Sakthu* (refreshing items like Avalose, upma, chappathi, puttu, payasam), *Vadyam* (gruels or modakam), *Dhaana*, *Laja*, *Mantham*, etc. Refreshing Chappathi with barley consumed by pasting honey on it for *Pramehi*. *Yogarathnakara* also advises *Saali*, *Yava* etc, are always salutary wholesome diet for Diabetic patients accepted by almost all acharyas.^[11] Susrutha also advises Grapes, *Dadima*, *Amalaka*, *Amlavethasa* and rock salt.

RESULTS AND DISCUSSION

The results are showed in the Table no. 2. *Yava* (Barley), *Godhooma* (wheat), *Puranasali* (brown old rice one year old) were covered well by Bruhathrayis and are consumed as per the digestive power or *Agni*. Brown rice (*Rakthasali*), its anti-diabetic effect may be due to the higher amounts of phytic acid, and dietary fiber polyphenols, and oil having minimum cooking time and degree of gelatinization. Epidemiological studies strongly support those intakes of whole grain foods protect against the development of type II diabetes mellitus (T2DM) than its flours.^[12] Wheat bran is a rich source of potassium, and wholegrain is a good source of vitamins and minerals, its rich source of fiber controlling blood sugar and also play an important role in glucose metabolism.^[13] Oats (*Avena sativa*), a variety of wheat (*Nandimukhi*), is having β -glucan rich source of protein, minerals, lipids, a mixed-linkage polysaccharide, dietary fiber, etc. having different pharmacological activities like immunomodulatory, anti-diabetic antioxidant, anti-inflammatory, and anti-cholesterolaemic. Researches reveal a significant effect of oats meal on glucose control and lipid profiles in type 2 diabetic patients.^[14]

Studies on *Yava* suggest that barley seeds hydro alcoholic extract, has a role in diabetic control in long term consumption, and this effect might be due to its high soluble fiber β -glucan, helpful in decreasing post prandial glucose level in blood, may decrease the risk of coronary heart disease, with high anti-oxidant activity useful in metabolic syndrome.^[15] Barley is a rich source of magnesium; acts as a co-factor for about 300 enzymes, including those take part in glucose metabolism and insulin secretion.^[16] *Yava* reduces *Kapha* and *Medas* and control urine output and friendly with all *Dhatus*, neither decrease or increase them are particularly mentioned for the diet of *Prameharogi*.^[17] Soluble fiber in oats also (Johansson et al. 2008) have physiological benefits in lowering plasma cholesterol and reducing

postprandial glycemic responses.^[18] *Yava* (barley) contains much protein and minerals than wheat, but it is *Rukshaguna*, continuous usage must be restricted in *Madhumeha*. The analysis highlights dietary articles for diabetic management mentioned according to *Guru* and *Laghu* properties of *Dravyas* as per Ayurveda.^[19] The United States Department of Agriculture (USDA) guidelines suggest always filling plate with a balanced diet.^[20] *Puranasaali*, *Shashtika*, *Yava*, *Thrunadhanyas*, *Mudga*, bitter vegetables processed with *Sarshapa*, *Ingudi* and *Atasi* oil, described by all *Aacharyas*.^[21] Bamboo seeds, *Oats/Soochi Godhooma*- waned grain of wheat) usually used by the diabetic patients may be because of the properties like *Kashayamadhurarasa*, *Laghuguna* and *Seethaveerya* (cold in potency).^[22] *Thina/foxtail millet*, used as a food article for *Pramehi*. Research results showed that there is a significant improvement in insulin sensitivity and insulin resistance, resulting from foxtail millet intervention.^[23]

Almost all pulses provide protein, high fibre, possess antioxidant effects and have a low glycemic index, making them particularly beneficial for diabetes by maintaining healthy blood glucose and insulin levels in control.^[24] *Padola* (*Trichosanthes anguina*) Cucurbitaceae family exhibited significant hypoglycaemic activity by stimulating insulin release from pancreatic beta cells (Adiga S et al., 2010). Bitter vegetables exhibited significant hypoglycemic activity by potentiating of pancreatic secretion of insulin mechanism (Fernandes NCP et al., 2007).^[25] Honey and prepared buttermilk or *Thakra* is the best for controlling sugar level in optimum to refresh the patient as well as reducing polyphagia. It may be because of the presence of Lactic acid in buttermilk helps to improve pancreas function and helpful in diabetes. Buttermilk also contains probiotics which improves gut motility and digestion and it contains vitamins, potassium, calcium, phosphorus and fat free.^[25] Research studies on *Solenaamplexicolia* (*Amlavethasa*) showed antioxidant and anti-diabetic property, with the presence of vitamin C it also shows moderate in vitro thrombolytic activity, lipid peroxidation inhibition property and stress-protective activity.^[26] Flower as well as inflorescence stalk of *M. balbisiana* Colla (banana) possess significant anti-diabetic, anti-hyperlipidemic, and antioxidant activities.^[27]

Researches reveal hypoglycemic effect of *Sarshapa* oil attributed to stimulation of glycogen synthesis thereby increase in hepatic glycogen.^[28] Phytochemicals in whole grain cereals like Lignan reduce CVD, Phytic acid minimizes Glycemic index and Phenolic acid works as antioxidant. Protein diets

are an essential part of a diabetes menu plan. All *Kapha medamuthrahara* diets and medicines like *Triphlachoornam* are advised for diabetes by Acharyas along with exercises for tackling diabetic Mellitus in first stage itself. *Medhika* (*Trigonella foenum-graecum* Linn) fabaceae. family, having rich fibre and its Crude ethanol extract of seed exhibited significant hypoglycemic activity by promoting insulin secretion (Asmenab M et al., 2009). Effective dietary education really prevents the onset of diabetes and its complications.

CONCLUSION

Text books analyzed here are only the most popular ones- *Bruhathrayis*. The wholesome food articles advised in Ayurveda classics keeps a person healthy. Modification of diet pattern is the *Padhyapadhyas* mentioned by Acharyas for different disease conditions. Reviewed textual references regarding diabetic diet concluded that ancient knowledge regarding food will be helpful in controlling Diabetes Mellitus/ *Prameha* in a better way. From these information must to formulate a diabetic diet protocol in Ayurveda for preventing as well as managing a diabetic patient.

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