



“AN IMPACT OF PATHYAAHAR (DEVELOPED MODULE OF WHOLESOME DIET) IN THE MANAGEMENT OF TYPE-2 DIABETES MELLITUS (MADHUMEHA)”

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ABSTRACT

Diabetes mellitus (DM) is leading cause of morbidity and mortality world over. It is estimated that approximately 1% of population suffers from DM. The incidence is rising in the developed countries of the world at the rate of about 10% per year, especially of type 2 DM, due to rising incident of obesity (corpulence) and reduced activity levels. An observational study was conducted on 50 diagnosed patients by prescribing the module of wholesome diet (Pathyaahar) was advised for the period of 30 days, to evaluate the anti-diabetic efficacy of the wholesome diet (Pathyaahar) in the management of type-2 diabetes with special reference to **Madhumeha** in Ayurvedia. All the patients with newly detected diabetes, considered for the study showed mild improvement during the first two visits of the study, which is

statistically significant. Among the selected 50 no of cases 06 got Very good improvement (12%), 18 got Good improvement (36%), 12 showed Mild improvement (24%) and there was Poor improvement in 14 (28%). Since it showed a significant result in declining values in FBS & PPBS in the beginning of the study, there may be definite effect of the diet on

controlling the hyperglycemia. It seems there is a need of regularity in following the diet uncompromisingly and should build more consciousness among the public and create awareness on the importance of the diet & exercise by conducting continuous disease and diet education programmes in the community i.e. rural as well as urban inhabitants through public lectures and distributing IEC materials etc.

KEYWORDS: Madhumeha, Pathyahara, Diet modules, FBS & PPBS.

INTRODUCTION

Madhumeha which has been correlated with Diabetes Mellitus has become a global problem in spite of advances in modern science. DM is a metabolic disorder characterized by abnormal carbohydrate, fat, and protein metabolism, which is clinically diagnosed on the basis of hyperglycaemia. India has been anticipated by WHO as the country with the fastest growing population of Diabetic patients. According to Wild et al. the prevalence of diabetes is predicted to double globally from 171 million in 2000 to 366 million in 2030 with a maximum increase in India.^[1] It is predicted that by 2030 diabetes mellitus may trouble up to 79.4 million individuals in India, while China (42.3 million) and the United States (30.3 million) will also see significant increases in those affected by the disease.^[1,2]

Diabetes mellitus is the medical condition in which there is an accumulation of glucose in the urine and blood of the person. Diabetes has been known since the first century B.C. Egyptian physician Hesy-Ra of the 3rd Dynasty makes the first known mention of diabetes – found on the Ebers Papyrus – and lists remedies to combat the ‘passing of too much urine’.^[3] The word *diabetes* was first recorded in 1425, and in 1675, the Greek *diabainein* meaning “a siphon” excessive urination, *mellitus* “like honey,” was added, to reflect the sweet smell and taste of the patient’s urine. An unrelated and rare disorder, *diabetes insipidus*, is usually caused by a hormone deficiency. The main symptoms will be Polyuria, Polydipsia, Polyphasia and Unexplained weight loss^[4] etc.,

Ayurveda includes diabetes mellitus under the *Prameha* category. *Prameha* are a list of urinary disorders, especially characterised by profuse urination with several abnormal qualities. There are twenty kinds of *Pramehas* in Ayurveda. According to the doshic causes, these *Pramehas* are classified as four *Vata pramehas*, six *Pitta pramehas* and ten *Kapha pramehas*. Out of these, DM is labelled as *Madhumeha* which comes under *Vata*

prameha.^[5&6] It is described as a *maharoga* (major disease)^[7] because of its multifaceted affects in the body and also every cell of the human physiology.

Being the disease Madhumeha mainly caused by unwholesome diet and a sedentary lifestyle, the Ayurvedic physicians had explained Syamaka (Burnuyard millet), Kodrava (kodo millet), Uddalaka (Sastika rice), Wheat (Godhuma), Bengal gram (Chick pea), Adhaki (Pigeon pea) and Kulattha (Horse gram) and these too old are wholesome edibles for those suffering. Besides, meat of wild animals, bitter vegetables, barely products, physical exercise and honey are also useful.^[8&9] A person stick to an Ayurvedic preventive strategy right from the beginning can easily avert this disease or control it if already suffering.

MATERIALS AND METHODS

MATERIALS: This study was open label and observational in 50 numbers of patients/subjects. The strategic diet module was given to the newly detected Type-2 Diabetes patients without any medication.

Method of collection of Wholesome Diet (*Pathyaahar*) module preparation

The specific wholesome diet (*pathyaahar*) was composed from different classical texts and prepared a diet module as per the modern diabetic diet chart for the convenience & need of the present era.

METHODS

Objectives of the study

- To evaluate the efficacy of the developed module of wholesome diet (*Pathyaahar*) in the management of Type-2 diabetes mellitus with reference to Madhumeha.
- To develop a module of wholesome diet (*pathyaahar*) for Diabetes Mellitus (Madhumeha).

SOURCE OF DATA

Literary: Literary data was collected from the vedic scriptures, Upanishad, darshan, shastra, Ayurvedic classical texts, Modern texts, Reputed journal, retrospective study conducted on related Works from Universities, internet etc.

Sample: This study was conducted by Dr. S. Danasekaran, during his Master of Health Science in Applied Nutrition, at Annamalai University, Chidambaram. Minimum of 50

patients coming under inclusion criteria approaching OPD; OPD, IPD of different practitioners at Arumbakkam village & Randham village near Arcot and primary health centre of Puthupadi, Kalavai and other referrals was selected for the study.

METHODS OF COLLECTION OF DATA

1. Patient of either sex between the age group of 30-60 years was selected on the basis of diagnostic criteria of Diabetes mellitus.
2. They were assigned to single group.
3. The results of the study will be evaluated statistically.

INCLUSTION CRIETIRIA

1. Patient of either sex between the age group of 30-60 years with the signs and symptoms of Diabetes mellitus were selected for the study.
2. Patients with Fasting blood sugar more than 110mg/dl & below 150mg/dl were selected.
3. Patients with Post Prandial Blood sugar more than 140mg/dl & 200mg/dl were selected.
4. In this study, only fresh, newly detected type-2 DM patients was selected.

EXCLUSION CRITERIA

1. Patients of insulin dependent Diabetes mellitus (IDDM)/Type-1.
2. Patients with Fasting blood sugar above 150mg/dl & Post Prandial Blood sugar more than 200mg/dl.
3. Patients with any complications.

DIAGNOSTIC CRIETERIA

Based on the signs and symptoms of Diabetes Mellitus (Polyuria, Polydipsia, Polyphagia) /Madhumeha and laboratory findings shows FBS>120mg/dl & <150mg/dl, PPBS >140mg/dl & <200mg/dl.

INVESTIGATIONS

1. Fasting Blood Sugar.
2. Post prandial Blood sugar.
3. Urine Sugar.

INTERVENTION

The developed module of Wholesome diet (Pathyaahar) was given to each patient, it includes the list of diets and menu for 5 days, and the patients were advised to repeat the diabetic menu chart for one month after completing each cycle.

Diet chart**DIABETIC DIET CHART: DAY-1****Table 1:**

S.No.	Time	Diet / Recipes
1	Morning : 7.00 - 7.30 AM	Raagi Ganji/Ambalee: 200ml (Raagi atta + Onion + pinch of salt)
2	Breakfast: 8.00-9.00AM	Wheat Upma-200gm (Wheat Coarse powder + Onion + Coriander Leaves), Raw Cucumber pieces
3	Mid afternoon: 11.30-12.00	Elephant apple juice (Bael fruit pulp, Cardamom, pepper)
4	Lunch : 1.00-1.30PM	Chapathi (Wheat + Barley) 2 no's, Vegetable + Pulses sambar, Leafy vegetable Curry ½ Bowl old cooked rice
5	Evening Snacks: 5.00-5.30PM	Ginger Tea 1 cup (sugar less) Wheat biscuits (sugar free) 2no's
6	Dinner: 8.00-8.30PM	Raagi ball (medium size) 1no Vegetable + Pulses sambar, Leafy vegetable Curry ½ Bowl old cooked rice

DIABETIC DIET CHART: DAY-2**Table 2.**

S.No.	Time	Diet/Recipes
1	Morning : 7.00 - 7.30 AM	Oats soup 200ml (Oats, green gram, pepper, pinch of salt)
2	Breakfast: 8.00-9.00AM	Raagi rotti 2 no (Raagi flour, onion, pinch of salt, coriander leaves), Onion chutney.
3	Mid afternoon: 11.30-12.00	Churned Butter milk (fat less) (Butter milk, ginger, garlic, onion, coriander leaves)
4	Lunch : 1.00-1.30PM	Roti 2 no Cucumber salad Leafy vegetable curry, vegetable + pulses sambar ½ Bowl old cooked rice
5	Evening Snacks: 5.00-5.30PM	Corn soup 200 ml (corn flakes, onion, garlic, pepper, pinch of salt)
6	Dinner: 8.00-8.30PM	Raagi ball (medium size) 1no Vegetable + Pulses sambar, Leafy vegetable Curry ½ Bowl old cooked rice

DIABETIC DIET CHART: DAY-3**Table 3:**

S.No.	Time	Diet/Recipes
1	Morning : 7.00 - 7.30 AM	Bitter guard soup (bitter guard, moong dal, onion, pepper, pinch of salt)
2	Breakfast: 8.00-9.00AM	Barley Pongal (Barley, moong dal, pepper, pinch of salt))
3	Mid afternoon: 11.30-12.00	Lemon juice (lemon, pepper, ginger, pinch of salt)
4	Lunch : 1.00-1.30PM	Raagi ball (medium size)1no Vegetable + Pulses sambar, Leafy vegetable Curry ½ Bowl old cooked rice
5	Evening Snacks: 5.00-5.30PM	Raagi Ganji/Ambalee 200ml
6	Dinner: 8.00-8.30PM	Chapathi (wheat + barley) 2no Vegetable curry Leafy vegetable + pulses sambar ½ Bowl old cooked rice

DIABETIC DIET CHART: DAY-4**Table 4.**

S.No.	Time	Diet/Recipes
1	Morning : 7.00 - 7.30 AM	Barley soup (coarse powdered barley, ginger, pepper, pinch of salt)
2	Breakfast: 8.00-9.00AM	Dosa 2 no Horse gram chutney Leafy vegetable chutney
3	Mid afternoon: 11.30-12.00	Watermelon juice (watermelon, cardamom, pepper, ginger)
4	Lunch : 1.00-1.30PM	Roti 2 no Cucumber salad Leafy vegetable curry, Vegetable + pulses sambar ½ Bowl old cooked rice
5	Evening Snacks: 5.00-5.30PM	Vegetable soup 200ml (vegetable, pepper, ginger, pinch of salt)
6	Dinner: 8.00-8.30PM	Raagi ball (medium size)1no Vegetable +Pulses sambar, Leafy vegetable Curry ½ Bowl old cooked rice

DIABETIC DIET CHART: DAY-5**Table 5.**

S.No.	Time	Diet/Recipes
1	Morning : 7.00 - 7.30 AM	Vegetable soup 200ml (vegetable, pepper, ginger, pinch of salt)
2	Breakfast: 8.00-9.00AM	Barley upma (coarse powdered barley, onion, coriander leaves, curry leaves)
3	Mid afternoon: 11.30-12.00	Cucumber salad
4	Lunch : 1.00-1.30PM	Chapathi (wheat + barley) 2no Vegetable curry Leafy vegetable + pulses sambar ½ Bowl old cooked rice
5	Evening Snacks: 5.00-5.30PM	Moongdal soup (moong dal, ginger, pepper, pinch of salt)
6	Dinner: 8.00-8.30PM	Raagi ball (medium size) 1no Vegetable + Pulses sambar, Leafy vegetable Curry ½ Bowl old cooked rice

Note: As per the convenience and interest, Roti, Dosa, Raagi ball can be prepare with the following millets i.e. Raagi (finger millet), Sajja (Pearl millet), Korralu (fox tail millet), Kodisa (Barnyard millet) in equal proportion and make it Atta powder (flour).

ASSESSMENT CRITERIA

The assessment was done for 30 days on 50 patients, at the baseline (0th day), 14th day, and 30th day, with the following subjective and objective parameters.

Clinical symptoms: Polyurea (PU) – in 12 hrs, Polyphagia (PP), Polydypsia (PD), Burning foot & Palm (BFP);

ASSESSMENT OF RESULTS

Investigations like FBS and PPBS;

Table 6: Showing the results of Polyurea values of 0day, 14th, 30th days.

Polyurea	Mean	Std.deviation	N
PU1	2.0667	.78492	50
PU 14	1.8667	.43417	50
PU 30	1.8333	.59209	50

Polyurea mean on the 0th day it was 2.0667 which reduced to 1.8667 on 14th day, and still decreased to 1.8333 on 30th day.

Table 7: Showing the results of Polyphagia values of 0day, 14th, 30th days.

Polyphagia	Mean	Std.deviation	N
PP1	1.6667	.54667	50
PP14	1.4333	.50401	50
PP 30	1.5333	.57135	50

Polyphagia mean on the 0th day it was 1.6667 which reduced to 1.4333 on 14th day and slightly raised to 1.5333 on 30th day.

Table 8: Showing the results of Polyurea values of 0day, 14th, 30th days.

Polydypsia	Mean	Std.deviation	N
PD1	1.5667	.67891	50
PD14	1.4667	.50742	50
PD 30	1.3333	.54667	50

Polydypsia mean on the 0th day it was 1.5667 reduced to 1.4667 on 14th day, and still decreased to 1.3333 on 30th day.

Table 09: Showing the results of Mean FBS values of of 0day, 14th, 30th days.

FBS	Mean	Std. deviation	N
0 Day	129.4000	11.88914	50
14 th Day	123.8000	10.43998	50
30 th Day	121.4333	8.71655	50

FBS mean was 129.4000 which reduced to 123.8000 on 14th day, and still decreased to 121.4333 on 30th day.

Table 10: Showing the results of Mean PPBS values of of 0day, 14th, 30th days.

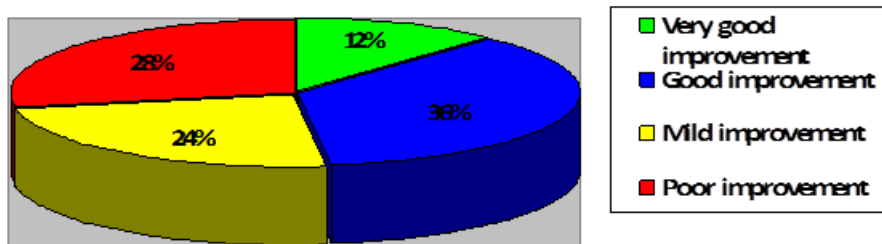
PPBS	Mean	Std. deviation	N
0 Day	166.0667	10.90692	50
14 th Day	154.4333	11.72878	50
30 th Day	151.2000	20.30186	50

PPBS mean was 166.0667 which reduced to 154.4333 on 14th day, and still decreased to 151.2000 on 30th day.

The Overall results of the study assessed on the basis of subjective and Objective symptoms and graded as Very good improvement, Good improvement, Mild improvement and Poor improvement and the results are given below:

Table 11: Showing the distribution of overall results.

GRADES	RESULTS	PERCENTAGE (%)
Very good improvement	06	12
Good improvement	18	36
Mild improvement	12	24
Poor improvement	14	28
Total	50	100

**Figure: Distribution of overall results.**

Among the 50 no of patients 06 cases got very good improvement (12%), 18 got Good improvements (36%), 12 got Mild improvement (24%) and there was Poor improvement in 14 cases (28%).

DISCUSSION AND CONCLUSION

Wholesome diet is the prime cause for the growth and development of the body, on the contrary, unwholesome diet causes several diseases. Caraka emphasizes that the ideal diet rebuilds the worn out systems, nourishes the *Dhatus* (tissues) and maintains the equilibrium of the body constituents. Irrational diet acts otherwise, producing diseases.^[10]

Some studies have also found that the insulin sensitivity and beta cell functions (insulin secreting cells of pancreas) can be normalized by restricting diet.^[11] The role of *ahar* and *vihar* are equally or even more important in diabetes to control blood sugar level as well as to prevent complications of this disease.^[12&13] Ayurveda recommends lifestyle remedies that include limiting foods that are high in sugar and simple carbohydrates, but eating smaller portion and variety of whole grain foods, complex carbohydrates and vegetables in addition to usage of herbal remedies.

Diet is the foundation of all therapeutic regimens for type 2 diabetes. Proper dietary choices are important for all people with diabetes. The doctor explains, "Per day calorie intake should be between 1,500-1,800 calories with a proportion of 60:20:20 between carbohydrates, fats and proteins, respectively".^[14] It is also adds that a diabetes diet should "have at least two

seasonal fruits and three vegetables in a diet plan." Unfortunately, dietary habits are the most difficult to change. Therefore, dietary management must be an ongoing process that seeks to improve compliance through continuous education and monitoring of progress report. The tremendous development in the modern medicine has made a revolution in health care system. In spite of so many latest advancements, still the science has not yet succeeded in all aspects of medicine. There is a continuous flow of newer discoveries are happening all over the world. In the path of research, the ancient sciences are also moving along with the main stream.

The study "An impact of the Developed Module of Wholesome Diet (*Pathyaahar*) In the Management of Type-2 Diabetes Mellitus with Special Reference to *Madhumeha*", was undertaken to gather the scattered information of *Pathyaahar* defined in *madhumeha*, and to make a module of *pathya* to evaluate its anti-diabetic efficacy by FBS and PPBS. In this study total 50 patients under a single group were incidentally selected by confirming clinical features, Urine routine, FBS & PPBS. The developed module of the wholesome diet (*pathyaahar*) was advised to all patients. And the assessment was done regularly on the 0th day, 14th day and 30th day. The scores of polyuria, polyphagia, polydysia, burning foot and palm, FBS and PPBS was collected before, during and after the treatment were subjected to statistical analysis, the result was significant according to the mean value, also the overall assessment on the basis of the general observations in terms of standard data base shows significant result. By observing the initial decrease of the assessment parameters, it can be concluded that, the *pathyaahar* mentioned in *Madhumeha* has got the property hypoglycemic activity and thus prevents the hyperglycemia.

LIMITATION OF STUDY

Being it was limited number and a limited period of study, it is difficult to generalize the hypothesis that changes in dietary modules alone will give good results in prevention and control of Diabetes Mellitus. It needs a larger sample studies and a constant adherence to the developed dietary modules for a longer period to establish the impact of *pathyaahar*.

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