

EFFECT OF PATHYA AHARA AND VIHARA FOR MANAGEMENT OF MADHUMEHA (TYPE 2 DM) IN AYURVEDA: A CLINICAL STUDY

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<https://doi.org/10.46607/iamj0910052022>

(Published Online: May 2022)

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Article Received: 01/05//2022 - Peer Reviewed: 01/05/2022 - Accepted for Publication: 02/05/2022



ABSTRACT

Introduction: *Madhumeha* is the fastest-growing lifestyle disease. Ayurveda is one of the most ancient medical sciences which emphasizes more on the importance of *Pathya Ahara* and *Vihara* for standards of health, based on scientific principles. **Aim of Study:** Effects of *Pathya Ahara* and *Vihara* for management of *Madhumeha* (Type 2) in ayurveda. **Method:** The total no. of 60 participants was equally divided into three subgroups in which each group containing 20 participants i.e., group A in which participants were taking both *Pathya Ahara* and *Vihara*, and group B in which participants underwent *Pathya Ahara* plan only and group C in which participants underwent for neither *Pathya Ahara* nor *Vihara*. The subjective parameters and objective tests were administered. The overall % of improvement was calculated by the cumulative score of each parameter before and after the treatment by using the formula. **Result:** There was the highest significant improvement seen in group A then compared to group B after intervention and group C showed negligible improvement. **Conclusion:** The present study reveals *Pathya Ahara* and *Vihara* modification chart should be essential for the patients with *Madhumeha* which can be used as a potential standard chart for its management. The present study also provides growing

evidence that *Pathya Ahara* and *Vihara*'s plan may offer a safe and cost-effective intervention for *Madhumeha*. In the future, time interval-based follow-up studies should be carried out to obtain more robust results.

Keywords: Diabetes Mellitus, Madhumeha, Pathya, Ahara, Vihara, Apathya.

INTRODUCTION

Madhumeha (Type 2 Diabetes Mellitus) is the fastest growing disease in India and WHO listed it under lifestyle disease^[1]. Ayurveda is one of the most ancient medical sciences in the world which emphasizes more on the importance of *Pathya Ahara* (diet) and *Vihara* (lifestyle) for standards of health based on scientific principles^[2]. The term “*Madhumeha*” is used for diabetes, described in *Charak Samhita* which is considered under the broad heading of *Prameha*. *Madhumeha* means excretion of sweet urine. The word *Prameha* means passing of excessive urine both in frequency and quantity. There are two major forms of DM in ayurveda i.e., *Sahaja Prameha* called type 1 diabetes and *Apathyanimitaja Prameha* called type 2 DM in modern medical science^[3]. The worldwide prevalence of diabetes among adults will be 6.4% from 2010 to 2030^[4]. A current Indian study also reported that Type 2 DM affects around 422 million individuals in India^[5]. According to WHO, 69.2 million people lived with diabetes in 2015 and by 2030, around 98 million people in India may have type 2 DM^[6]. Hence this increasing prevalence of *Madhumeha* is a cause for national concern in India and also worldwide. Previous studies reported that improper diet and lifestyle are one of the causative factors for *Madhumeha*^[3] and most diseases have a direct or indirect link with the type of food consumed, food habits, and/or lifestyle^[7]. According to a survey about the role of dietary habits in disease production, it has been reported that “80% of the top ten killing diseases of the world are due to *Apathya Ahara*”^[8]. Ayurveda evidence suggested that one-third part of the human stomach should be full of food, another one-third part of the stomach have water, and the remaining one-third part of the stomach should be empty for preventing complications of *Madhumeha*^[9]. Hence, an improper diet may increase the risk of

Madumeha according to the ayurvedic perspective. *Vihara* also plays a very important role in stress control, keeping the body physically and mentally healthy and strengthening the autonomic nervous system as reported^[9]. It was reported that *Vihara* principles and practices not only prevent *Madhumeha* but also have a positive impact on *Madhumeha*^[9]. Previous evidence reveals that *Vihara*-based interventions are safe and cost-effective for the management of *Madhumeha*^[10, 11]. The therapeutic effectiveness of *Ahara and Vihara* for the intervention of *Madhumeha* was also reported in the literature^[9, 12]. However, several factors like the mode of food preparations, food combinations, raw materials, food timings, and the type of *Vihara* and its schedule were affecting the management of *Madhumeha*. Hence, it is necessary to develop an easy, smooth, and effective *Ahara and Vihara* plan in which the patient with *Madhumeha* can easily follow in their daily routine life so that the fruitfulness of human life is to be maintained. Hence, the study was taken with aim of the effects of *Pathya Ahara and Vihara* on the management of *Madhumeha* (type 2 DM) in Ayurveda.

Material and Methods

Participants: To fulfill the objective of this study, a total no. of 60 participants (30 male and 30 female) with early diagnosis as *Madhumeha* (Type 2 Diabetes mellitus) i.e., less than 5 yrs. with an age range from 30-60 (Mean-44.5; SD-5.5) years were included after obtaining written informed consent. The participants having clinical features of *Madhumeha* mentioned in Ayurvedic works of literature, fasting blood sugar (FBS) above 126 mg/dl and below 200 mg/dl and postprandial blood sugar (PPBS) above 200 mg/dl and below 300mg/dl^[13] were included for study. Patients with severe diabetic complications, Pregnant women and lactating mothers, Diabetes due to

hormonal changes like Thyrotoxicosis, Acromegaly, Cushing syndrome, etc., Drug-induced diabetes mellitus, and Severe systemic disorders were excluded from this study. All necessary laboratory examinations i.e., blood and urine examinations were done before a diagnosis of each participant as *Madhumeha* (Type 2 Diabetes mellitus). All the data were collected from Shri Khudadad Doongaji Government Ayurveda College Hospital, Raipur, Chhattisgarh, and several medical camps. Each participant was registered & diagnosis will be made through ayurvedic & modern medical tools. They were not paid for participation and permission from a relevant institutional ethics committee was taken before the commencement of the study.

Procedure:

This total no. of 60 participants was equally divided into three subgroups in which each group contained 20 participants i.e., group A in which participants were taking both *Pathya Ahara* and *Pathya Vihara Plan* (Appendix A and B) and group B in which participants underwent *Pathya Ahara Plan* only (Appendix A) and group C in which participants neither underwent for *Pathya Ahara nor Vihara Plan*. Group A and Group B received *Pathya Ahara* and/or *Vihar* plans were given for 45 days after diagnosis as type 2 DM. Details of case history and assessment were done before diagnosing the patient with type 2 DM. The subjective parameters and objective tests were administered. Under, the subjective test, the grading-based checklist was administered to each participant before and after the treatment plan to evaluate the effectiveness of the *Pathya Ahara* and/or *Vihara* plan in patients with *Madhumeha*. This

checklist has 10 parameters, and each parameter has four sub-parameters from 0 to 3 grading. Under objective tests, FBS, PPBS, and urine sugar tests were administered before and after the treatment plan. The overall % of improvement was calculated by the cumulative score of each parameter before and after the treatment by using the formula $BT-AT/AT*100$ for both subjective and objective tests. In this study the ratings were also given for % of improvement i.e., >75% improvements were considered as marked responded, >50% to 75% improvements were considered as moderately Responded, >25 to 50% improvements were considered as mild responded, and $\leq 25\%$ improvements were considered not responded.

Observations and Results: SPSS (statistical program for social science version 17.0) software was used for the statistical analysis of data. Descriptive statistics i.e., mean, and standard deviations were used. Paired t-test was used to test the significance before and after the treatment. There are significant differences seen in group A and group B after the intervention compared to group C for both subjective and objective tests (Table 1). The highest percentage of relief in *Prabhuta Mutrata* symptoms and the least percentage of relief were seen in *Atinidra* for both groups A and B (Table 2). The objective test findings suggested that the highest percentage of relief was seen in the urine sugar test and the least percentage of relief was seen in FBS for group A and PPBS for group B (Table 2). The mild level improvements of cases were highest in group B and the moderate level of improvement cases was highest in group A. The highest negligible improvement was seen in group C.

Table1. Statistical Analysis showing the effects of therapy on subjective and objective criteria in *Madhumeha* (Type II DM) for group A, group B, and Group C.

Subjective test findings:													
SN.	Symptoms	Group A				Group B				Group C			
		Mean BT	Mean AT	SD	t-value	Mean BT	Mean AT	SD	t-value	Mean BT	Mean AT	SD	t-value
1	Prabhuta	1.55	0.55	0.79	5.68*	1.11	0.35	0.64	5.25*	1.50	0.95	0.60	4.07*

	mutrata												
2	Avila mutrata	1.22	0.55	0.75	3.90*	1.05	0.60	0.60	3.33*	1.10	0.85	0.44	2.57
3	Kshudha Adhika	1.05	0.60	0.60	3.33*	1.20	0.80	0.50	3.56*	0.90	0.75	0.37	1.83
4	Pipasa Adhika	1.35	0.60	0.63	5.14*	1.55	0.60	0.69	6.19*	1.20	0.95	0.77	1.56
5	Karapada Daha	1.00	0.55	0.51	3.33*	0.80	0.50	0.80	1.67	0.60	0.50	0.31	1.45
6	Karapada suptata	0.85	0.50	0.81	1.93	1.10	0.65	0.51	3.94*	0.90	0.80	0.65	0.70
7	Mukha- talu shosha	1.20	0.40	0.76	4.66*	1.10	0.50	0.75	3.56*	1.00	0.90	0.59	1.14
8	Daurbalya	1.00	0.40	0.59	4.48*	1.75	1.10	0.48	5.94*	1.35	0.95	0.51	3.94*
9	Alasya	1.05	0.40	0.48	5.94*	1.30	0.90	0.50	5.56*	1.85	0.70	0.49	1.37
10	Nidradhikya	0.70	0.55	0.08	1.83	0.80	0.70	0.31	1.45	0.80	0.55	0.37	1.83
Objective Test													
1	FBS	1.72	1.43	18.16	12.67%*	1.60	1.41	5.48	15.22*	1.54	1.49	11.39	1.81
2	PPBS	2.28	1.83	16.17	8.20%*	2.26	1.96	12.03	11.03*	2.13	2.14	21.07	0.53
3	Urine sugar	0.80	0.40	0.38	38.46%*	0.80	0.40	0.86	4.66*	0.83	0.55	0.41	2.97*

*Indicate p-value <.01 SD: Standard Deviation

Table 2: Indicated % of relief for group A, group B, and Group C.

Subjective test findings:				
S. N	Symptoms	Group A	Group B	Group C
1	Prabhuta mutrata	68.96 %	63.53 %	36.36 %
2	Avila mutrata	56.52 %	42.85%	15.78 %
3	Kshudha Adhikya	42.10 %	45.83 %	16.66 %
4	Pipasa Adhikya	57.69 %	51.72 %	9.52%
5	Kara pada Daha	54.54 %	40 %	25 %
6	Kara pada suptata	68.18 %	39.13 %	13.63 %
7	Daurbalya	66.66 %	37.5 %	25.92 %
8	Mukha talu shosha	66.66 %	41.66 %	29.16 %
9	Alasya	59.09 %	41.66 %	14.28 %
10	Nidradhikya	28.57 %	28.57 %	16.16 %
Objective test findings				
1	FBS	16.85%	11.93%	2.98%
2	PPBS	19.55%	8.20%	6.10%
3	Urine sugar	38.46%	31.25%	24.13%

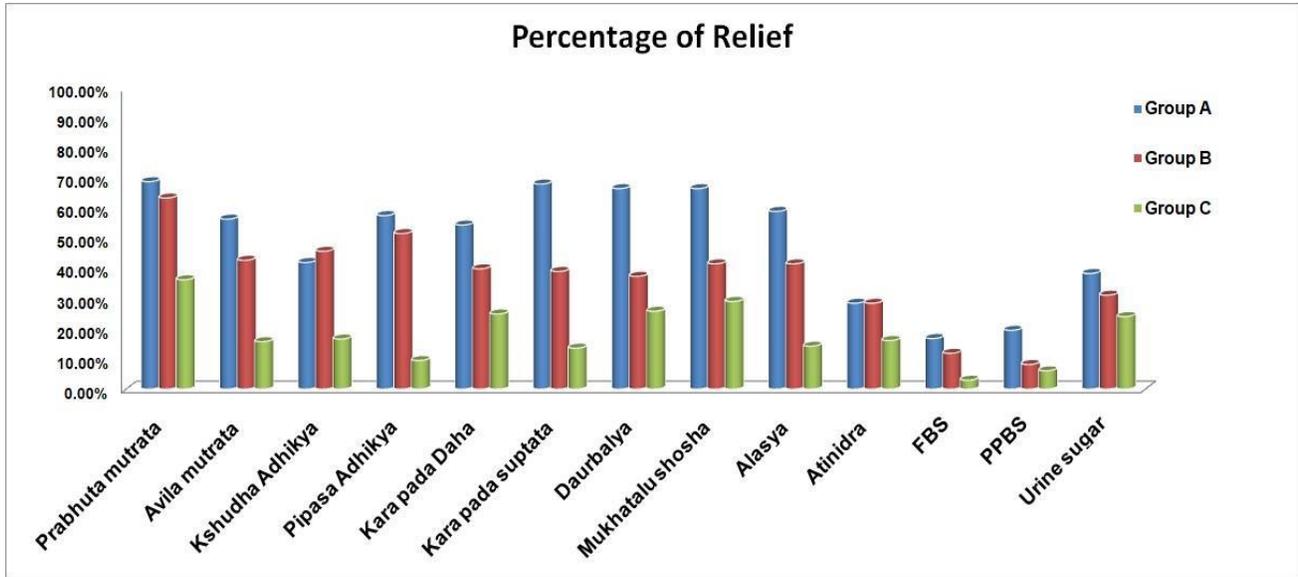


Figure 1. Indicated % of relief in each subjective and objective test across groups.

Table 3: Indicated degree of improvement across groups A, B, and C.

SN.	Degree of improvement	Group A (n=20)	Group B (n=20)	Group C (n=20)
1	Marked improved (> 75% improvement)	15% (n=3)	0% (n=0)	0% (n=0)
2	Moderately improved (> 50% to 75% improvement)	40% (n=8)	35% (n=7)	10% (n=2)
3	Mildly improved (> 25 to 50% improvement)	45% (n=9)	55% (n=11)	45% (n=9)
4	Not Responded/ Negligible improvement (< 25%)	0% (n=0)	10% (n=2)	45% (n=9)

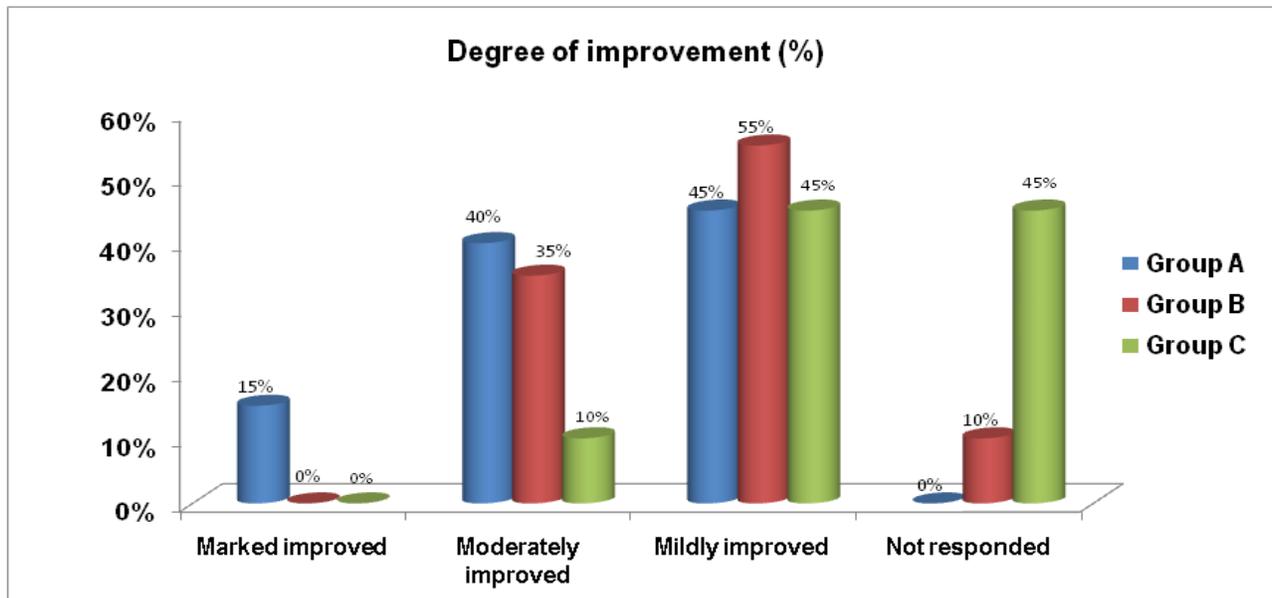


Figure 2: Indicated degree of improvement across groups A, B, and C.

DISCUSSION

The effect of *Pathya Ahara* and *Vihara* on the management of *Madhumeha* (type 2 DM) in ayurveda was the aim of the current study. The subjective findings of a recent study suggested that there was significant improvement before and after the *Pathya Ahara* and/or *Vihara* plan for both groups A and B for all the symptoms except *Nidradhikya* (Table 1). The highest percentage of relief was seen in all the symptoms for Group A compared to group B except for *Nidradhikya* (Table 2). Group A and group B showed greater percentages of relief compared to group C (Table 2). It may be due to improved glycaemic control after taking *Pathya Ahara* and/or *Vihara Plan*. Ayurvedic works of literature reported that *Apathya Ahara* may have low fibers and high glycaemic loads [2]. Hence, it may assume that *Apathya Ahara* may increase *kapha dosha*, which can be predisposing ayurvedic etiological factors for diabetes as reported [2]. In this study grains i.e., yava (barley), chana, etc., pulses i.e., mudga, etc, vegetables i.e., shobhanjanan (drumstick), Karvellaka (bitter gourd), etc and fruits such as Jambu (Jamun), orange, etc were included as *Pathya Ahara* (Appendix A). Previous studies also reveal that above mentioned *Pathya Ahara* have a low glycemic index (GI) as carbohydrates are not broken down easily and control blood glucose level [2,14]. It was also reported that *Pathya Ahara* provides nutritional substances like vitamins, dietary fibers, minerals, and antioxidants [2, 14]. Hence, it has a positive impact on metabolic activity and physiological function for patients with *Madhumeha*. In the current study, Triphala power was also included in the management of *Madhumeha* as ayurvedic works of the literature reveal that Triphala is made of equal amounts of dried fruits of *T. chebula*, *T. bellerica*, and *E. Officinalis* which have hypoglycaemic qualities [15, 16]. In this present study, 30 minutes of walking in the morning & evening and 6-8 rounds of *Surya Namaskara* (sun salutation) were also recommended as *Pathya Vihara* for group A. Under *Apathya Vihara*, each participant was

instructed to avoid *Asayasukha* (habituation to sitting on soft cushions for long periods), *Divasvapna* (day sleeping), and *Swapanasukh/ Atinidra* (prolonged sleeping). Under *Charaka Samhita*, it was reported that anxiety, anger, grief, worry, and other similar stress-producing factors may lead to the development of *Madhumeha* which were controlled by *Pathya Vihara*[9]. Hence, group A showed significant improvement after intervention through *Pathya Ahara* plus *Pathya Vihara* compared to group B. The objective findings of the current study suggest that there was significant improvement before and after the *Pathya Ahara* and/or *Vihara* plan for both groups A and B for all objective tests such as FBS, PPBS, and urine sugar test (Table 1). The objective test showed the highest percentage of relief for group A than Group B and the least percentage of relief for group C (Table 2). It may be assumed that dietary irregularities were controlled by providing *Pathya Ahara* and lifestyle irregularities were controlled by providing the *Pathya Vihara* plan resulting in good control of carbohydrate and lipid metabolism. In the current study, the marked improvement seen only in Group A compared to Group B and Group C. 100% of cases were mild to marked improvement after *Pathya Ahara* and *Vihara* for group A. 90% of cases were showed mild to moderate improvement and 10% cases were showed negligible improvement for Group B. Only 55% of cases were mild to moderate improvement and 45% of cases showed no improvement for Group C (Figure 2). Hence, these findings suggested that the group who was under *Pathya Ahara* and *Vihara* plan showed better improvement compared to those groups who underwent for *Pathya Ahara* plan only. Negligible improvements were seen in groups that did not receive either *Pathya Ahara* or *Pathya Vihara* plan.

CONCLUSION

Diabetes mellitus is becoming the fastest growing disease in India, a cause for national concern. The present study reveals that the ayurvedic-based *Pathya Ahara* (diet) and *Vihara* (lifestyle) modifications

chart should be essential for the patient with *Madhumeha* which can be used as a potential standard chart for its management. Hence, a brief lifestyle intervention-based program should be followed for the prevention and management of *Madhumeha*. The present study also provides growing evidence that *Pathya Ahara* and *Vihara's* plan may offer a safe and cost-effective intervention for *Madhumeha* (type 2) In the future; time interval-based follow-up studies should be carried out to obtain more robust findings.

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Source of Support: Nil

Conflict of Interest: None Declared

How to cite this URL: Shrikant Sahu & Araddhna Khande: Effect Of Pathya Ahara And Vihara For Management Of Madhumeha (Type 2 Dm) In Ayurveda: A Clinical Study. International Ayurvedic Medical Journal {online} 2022 {cited May 2022} Available from: http://www.iamj.in/posts/images/upload/1159_1164.pdf