



EFFECTS OF PATHYA AHARA AND VIHARA FOR MANAGEMENT OF YOUNGER AND OLDER ADULTS WITH MADHUMEHA (TYPE 2 DM): A CLINICAL COMPARATIVE STUDY

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ABSTRACT

Introduction: *Madhumeha* (Diabetes Mellitus) is the fastest-growing lifestyle disease. *Ayurveda* is one of the most ancient medical sciences which emphasize more on the importance of *Pathya Ahara* and *Vihara* for standards of health, based on scientific principles. **Aim of the study:** Effects of *Pathya Ahara* and *Vihara* for management of younger and older adults with *Madhumeha* (Type 2) in *Ayurveda*. **Method:** The total no. of 40 participants was equally divided into two subgroups in which each group contained 20 participants i.e., group A considered younger adults (30-50 years) and group B included older adults (>50 years) age group in which each participant underwent for *Pathya Ahara* and *Vihara*. The subjective parameters and objective tests were administered. The overall % of relief 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 compared to group B after the intervention. **Conclusion:** The present study reveals *Pathya Ahara* and *Vihara* modification chart should be essential for both younger and older adults with *Madhumeha* (type 2) 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 younger and older adults with *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 health disease in India and World health organization (WHO) had listed it under lifestyle disease [1]. *Ayurveda* is one of the most ancient medical sciences in the world which emphasize the importance of *Pathya Ahara* (dietary) and *Vihara* (lifestyle) based on scientific principles for standards of health [2]. The term "*Madhumeha*" is equated with **diabetes** mellitus, described in *Charak Samhita* which is considered under the broad heading of *Prameha*. *Madhumeha* is used for diabetes means the excretion of honey-like sweet urine. The word *Prameha* means passing of excessive quantity and frequency of urine. There are two major forms of *Madhumeha* in *ayurveda* i.e., *Sahaja Prameha* called type 1 diabetes mellitus and *Apathyanimitaja Prameha* called type 2 mellitus in modern medical science [3]. The worldwide prevalence of diabetes among adults will be 6.4% from 2010 to 2030 and highest in the older adult, a population that is increasing [4]. Recent Indian studies also reported that type 2 DM affects around 422 million individuals in India [5]. According to a published study by WHO, 69.2 million people living with DM in 2015, and around 98 million people in India may have type 2 DM by 2030, [6]. Hence this increasing prevalence of *Madhumeha* is a cause for national concern for both younger and older adults in India and also worldwide. Previous studies reported that improper dietary and lifestyle are one of the causative risk factors for *Madhumeha* [3] and direct or indirect link with the type of food consumed, food habits, eating patterns, and lifestyle [7]. According to a survey about the role of dietary habits in risk factors for disease production, it has been reported that "80% of the top ten killing diseases of the world are due to "*Apathy Ahara*" [8]. *Ayurveda* evidenced that 1/3 part of the human stomach should be full of

food (solid), another 1/3 parts of the stomach should have water, and the remaining 1/3 part of the stomach should be empty for preventing complications of *Madhumeha* [9]. Hence, according to the ayurvedic perspective, the improper dietary habit may increase the risk of *Madumeha*. It was also revealed that *PathyaVihara* plays a very important role to keep the body physically & mentally healthy, strengthening the autonomic nervous system, and controlling stress [9]. It was reported that *Pathya Vihara* principles and it's a practice not only benefit for prevention of *Madhumeha* but also have a positive consequence on *Madhumeha* [9]. Previous studies reveal that *Vihara*-based intervention plans are also safe and cost-effective for the management of younger and older adults with *Madhumeha* [10, 11]. The therapeutic effectiveness of *Pathya Ahara and Pathya Vihara* for the intervention of *Madhumeha* was also reported in various literatures [9, 12]. However, various factors like food combinations, dietary habits, raw materials, mode of food preparations, food timings and type of *Vihara* and its schedule, etc may affect the management of younger and older adults with *Madhumeha*. Hence, it is very necessary to develop easy, smoothly, and effective *PathyaAhara* and *Pathya Vihara* plan so that patient with *Madhumeha* can easily follow in their routine life and the fruitfulness of their life is maintained. Hence, the study was taken with aim of comparing the effects of *Pathya Ahara and Vihara* on the management of the younger and older adult with *Madhumeha* (type 2 DM) in *Ayurveda*.

Material and Methods

Participants:

To fulfil the objective of this study, a total no. of 40 participants (equally gender distributed) with early diagnosed as *Madhumeha* (Type 2 Diabetes mellitus) i.e., less than 5 yrs. with a young adult age range

from 30-50 years (Mean 40.72; SD 6.24) and older adult age range >50 (Mean 58.83; SD 4.17) were included after obtaining written informed consent. According to Ayurvedic literatures, the participants had clinical features of *Madhumeha* (type 2 DM) in which 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 who have severe diabetic complications, Diabetes due to hormonal changes like Thyrotoxicosis, Cushing syndrome Acromegaly, etc., pregnant women, lactating mothers, drug-induced DM, and Severe systemic disorders were excluded from this study. All necessary pathological investigations i.e., blood and urine examinations were done before a diagnosis of each participant as *Madhumeha* (Type 2 DM).

All the data were collected from Shri Khudadad Doongaji Government *Ayurveda* College Hospital, Raipur (Chhattisgarh), and its several medical camps. Each participant was registered & diagnosis was done by using evidence-based ayurvedic & modern medical tools. The prior permission from a relevant institutional ethics committee was taken before the commencement of the study and they were not paid for participation.

Procedure:

This total no. of 40 participants was equally divided into two subgroups in which each group containing 20 participants i.e. young adult age group was considered as group A and older age adult age group was considered as group B. Both groups of participants were taken both *Pathya Ahara* and *Pathya Vihara Plan* (Appendix A and B) 45 days after diagnosis as type 2 DM. Details of case history and proper assessment were done before diagnosing the patient with *Madhumeha* (type 2 DM). The subjective and objective tests were administered. Under, the subjective test, the grading-based checklist was used in each group of participants before and after treatment for

evaluates the effectiveness of the *Pathya Ahara* and *Pathya Vihara* plans for both groups. This gradation-based subjective checklist had 10 parameters and each parameter has four sub-parameters grading from 0 to 3. Under the objective test, fasting blood sugar (FBS), (Postprandial blood sugar test) PPBS, and urine glucose test was administered before and after the treatment plan. The overall percentage of relief was calculated by the cumulative score of each parameter before and after the treatment by using the formula $BT-AT/BT*100$ 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 used for the purpose of a test of significance before and after the treatment.

There are significant differences seen in group A and group B after intervention 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 *Alasya* 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 for both groups A and B and the least percentage of relief was seen in PPBS for group A and FBS for group B (Table 2).

The mild degree of improvement was highest in group B and marked levels of improvement cases were highest in group A.

Table 1: Statistical Analysis showing the effects of therapy on subjective and objective criteria in *Madhumeha* (Type II DM) for younger (Group A) and older adults (Group B) with Madhumeha (Type 2 DM).

Subjective test findings:									
SN.	Symptoms	Group A				Group B			
		Mean BT	Mean AT	SD	t-value	Mean BT	Mean AT	SD	t-value
1	Prabhuta mutrata	1.85	0.50	0.60	6.68*	1.95	0.74	0.4	5.58*
2	Avila mutrata	1.62	0.54	0.55	4.70*	1.62	0.76	0.60	4.12*
3	Kshudha Adhikya	1.50	0.62	0.70	5.31*	1.67	0.98	0.50	5.25*
4	Pipasa Adhikya	1.45	0.40	0.53	5.43*	1.68	0.64	0.69	6.19*
5	Karapada Daha	1.74	0.53	0.61	6.33*	1.98	0.86	0.80	5.26*
6	Karapada suptata	0.95	0.40	0.71	3.93*	1.15	0.54	0.51	3.45*
7	Mukha- talu shosha	1.56	0.60	0.45	5.56*	1.64	0.75	0.75	3.48*
8	Daurbalya	1.64	0.91	0.56	4.28*	1.70	0.99	0.48	5.69*
9	Alasya	1.31	0.80	0.78	5.98*	1.47	1.20	0.50	5.78*
10	Nidradhikya	1.74	0.65	0.25	5.12*	1.16	0.54	0.31	3.78*
Objective test findings: -									
1	FBS	1.75	1.30	12.62	11.25*	1.67	1.45	5.12	14.71*
2	PPBS	2.38	1.75	13.11	9.56*	2.28	1.87	10.36	12.56*
3	Urine sugar	0.94	0.56	0.45	28.56*	1.31	0.98	0.58	5.26*

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

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

Subjective test findings:			
S. N	Symptoms	Group A	Group B
1	Prabhuta mutrata	72.97 %	62.05 %
2	Avila mutrata	66.66 %	53.08%
3	Kshudha Adhikya	58.66 %	41.31 %
4	Pipasa Adhikya	72.41 %	61.90%
5	Kara pada Daha	69.54 %	56.56%
6	Kara pada suptata	57.89 %	53.04 %
7	Daurbalya	61.53%	54.26 %
8	Mukha talu shosha	44.51%	41.76%
9	Alasya	38.93 %	33.33 %
10	Nidradhikya	62.64 %	53.44 %
Objective test findings			
1	FBS	25.71%	13.17%
2	PPBS	23.24%	17.98%
3	Urine sugar	40.42%	35.11%

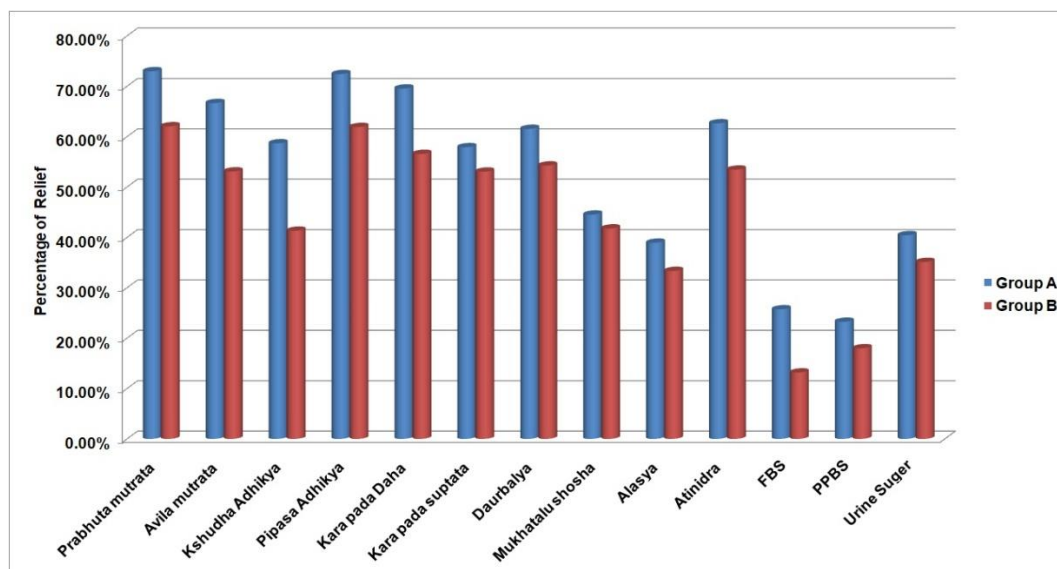


Figure 1: Indicated % of relief in each subjective and objective test for both younger and older adults with Madhumeha (Type 2 DM).

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

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

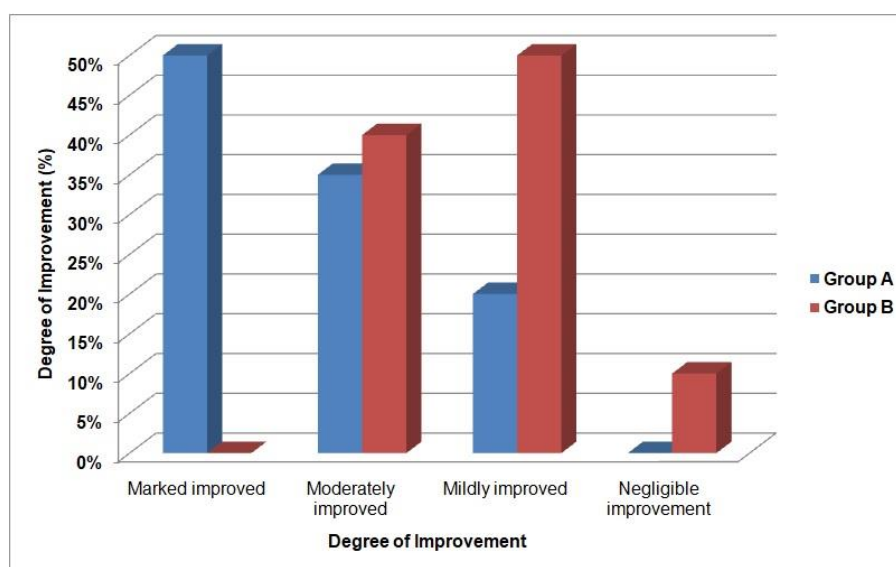


Figure 2: Indicated degree of improvement in groups A and B.

DISCUSSION

The Comparative study of the effect of *Pathya Ahara* and *Vihara* on the management of the younger and older adult with *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 *Vihara* plan for both groups A and B for all the symptoms (Table 1). The highest percentage of relief was seen for all the symptoms in the younger adult group compared to older adults (Table 2). It may be due to improved glycemic control after taking *Pathya Ahara* and *Vihara Plan* for younger adults compared to older adult. *Ayurvedic* literatures revealed that *Apathya Ahara* has low dietary fibres and high glycemic loads [2]. Hence, it may assume that dietetic incompatibilities may increase *kaphadosha*, which can be predisposing etiological factors of *Madhumeha* as reported [2]. In this study grains i.e., chana, etc., pulses i.e., yava (barley mudga, etc, vegetables i.e., Karvellaka (bitter gourd) shobhanjanan (drumstick), etc and fruits such as orange, Jambu (Jamun), etc were included as *Pathya Ahara* (Appendix A). Previous studies reported that above mentioned *Pathya Ahara* has low-GI (glycemic index) as carbohydrates are not broken down quickly by the body into glucose and control blood glucose levels [2, 14]. It was also revealed that *Pathya Ahara* included nutritional substances like minerals, vitamins, dietary fibres, and antioxidants [2, 14]. Hence, it has a positive effect on both metabolic activity and physiological function for patients with *Madhumeha*. It may be assumed that this positive impact was more in younger adults compared to older adults (age-induced diabetes) with *Madhumeha*. In this present study, *Triphala* power was also included for intervention for both the groups with *Madhumeha* as ayurvedic evidenced that *Triphala* consists of three equal proportions of dried fruits i.e., *T. chebula*, *T. bellerica*, and *E. officinalis* which have hypoglycaemic nutrient qualities [15, 16].

In this present study, thirty minutes of walking in the morning & evening and 6-8 rounds of *Surya Namaskara* (sun salutation) were also recommended as

Pathya Vihara for both groups. Under *Apathya Vihara*, each group of participants was instructed to avoid *Divasvapna* (day sleeping), *Asayasukha* (habituation to sitting on soft cushions for long periods), and *Swapanasukh/ Atinidra* (prolonged sleeping). Under *Charaka Samhita*, it was revealed that anxiety, grief, anger, worry, and other related stress-producing factors may lead to predisposal risk factors of *Madhumeha* which can be prevented by *Pathya Vihara* [9]. Hence, younger adults showed significant improvement after intervention through *Pathya Ahara* and *Pathya Vihara* compared to the group of older adults. The objective findings of the present study suggested that there was a significant improvement for all objective tests in both younger and older adults but more in younger adults compared to older adults (Table 1). Objective test findings also revealed that the highest percentage of relief for younger adults then compared to older adults (Table 2). It may be assumed that dietary-related irregularities were controlled by providing *Pathya Ahara* and lifestyle-related irregularities were controlled by the *Pathya Vihara* plan resulting in better control of carbohydrate and lipid metabolism in young adults compared to older adults. In the present study, marked improvement was seen only in younger adults compared to older adults. Mild to moderate improvement cases was 55% for younger adults & 90% for older adults and 10% cases showed negligible improvement for older adults only. (Figure 2). Hence, these findings suggested that marked improvement was greater in younger adults than older adults. In addition, mild to moderate improvement was also greater in young adults than compared in older adults. No younger adults were reported as a negligible improvement. Overall pathya ahara and vihara plan have a more positive impact on younger adults than compared to older adults with *Madhumeha* (Type 2 DM).

CONCLUSION

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

should be very essential for the intervention of patients 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 the younger and older adult with *Madhumeha*. The present study also provides growing evidence that *Pathya Ahara* and *Vihara's* plan may offer a safe and cost-effective intervention for younger and older adults with *Madhumeha* (type 2 DM). In addition, It may conclude that Ayurvedic lifestyle guidelines (*PathyaVihara plan*) of adopting a healthy dietary pattern (*Pathya Ahara*) together with physical activity are valuable tools for the management of the younger and older adult with *Madhumeha*. In the future, time interval-based follow-up studies should be carried out to obtain more robust findings.

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