



CLINICAL STUDY OF YOGASANA AND PATHYAAHARA IN MANAGEMENT OF MADHUMEHA (DIABETES MELLITUS-2)

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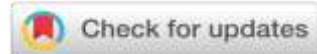
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ABSTRACT

Introduction: About 422 million people worldwide, most of whom reside in low and middle-income nations, have diabetes (metabolic lifestyle disorder), according to the World Health Organisation, contributing to 1.5 million deaths annually. *Aahara* (diet) and *Yoga asanas* are essential for controlling and preventing lifestyle disorders. Thus, this study assessed how *yoga* techniques and the *Aahara* contribute to managing diabetes mellitus. **Methodology:** A **single arm** open randomised clinical study was conducted on 30 clinically diagnosed patients with diabetes mellitus 2 for *Yoga asanas* (*Mandukasana*, *Kurmasana*, *Vakrasana*, and *Ardhamatsyendrasana*) and *Ayurvedic Aahara* plan in the Postgraduate Institute of Ayurved, DSRRAU, Jodhpur. The study evaluates their role in the management of *Prabhoot Mutrata* (Polyuria), *Avila Mutrata* (Urine turbidity), *Pipasadhikya* (Polydipsia), *Kshuda Adhikya* (Polyphagia), *Sweda Adhikya* (The excessive sweating) The, *Dourbalya* The (Weakness The/Tiredness The), The *Alasya* (The Laziness) The, *Atinidra* (Excessive sleep), *Karpada Daha* (Burning sensation in hands and feet) and blood sugar level (i.e. FBS and PPBS, HbA1c). **Result:** The result of the study depicts that *Yoga asanas* and *Ayurvedic Aahara* have significantly helped in reducing the *Prabhoot Mutrata*, *Avila Mutrata*, *Pipasadhikya*, *Kshuda Adhikya*, *Sweda Adhikya*, *Dourbalya*, *Alasya*, *Atinidra*, *Karpada Daha* and blood sugar level. **Conclusion:** *The study concluded that Yoga therapy and the Aahara plan have a role in managing diabetes mellitus by lowering medication dosages, increasing physical and mental alertness, and*

preventing complications. Results should be validated in larger sample sizes and multicentric models to establish it as a well-known treatment.

Keywords: Lifestyle; Diabetes; Natural Treatment; Yoga; DM2, High blood sugar.

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is the most common form of DM, characterised by hyperglycaemia, insulin resistance and relative insulin deficiency¹. According to the International Diabetes Federation (IDF), approximately 537 million adults between the ages of 20 and 79 years had diabetes mellitus in 2021. T2DM is proving to be a global public health burden as this number is expected to rise to 615 million by 2040². By 2030, this would have increased to 552 million³. Ayurveda describes a set of complex clinical disorders with frequent abnormal micturition, collectively called Prameha (Diabetes Mellitus), which correlate in many ways with obesity, metabolic syndrome, and diabetes mellitus⁴. Type 2 DM is analogous to Sthula pramehi (Obese Diabetic), which is also known as Apathyanimitaja Prameha or acquired type of diabetes resulting from a faulty lifestyle⁵. According to Acharya Vagbhata, when a patient's urine turns sweet and resembles honey in any Prameha, and their entire body turns sweet, the condition is called Madhumeha⁶.

One of the 20 subtypes of prameha⁷, Madhumeha, is described as diabetes mellitus 2. Recent improvements in the delivery of healthcare show that insulin and other oral hypoglycaemic medications are ineffective in preventing diabetes complications. Long-term usage of dangerous hypoglycaemic medications has further complicated matters, making it challenging to find the optimal treatment. Environmental and genetic variables interact dynamically in the aetiology of Type 2 diabetes mellitus. It is assumed that the condition arises when a vulnerable genotype is combined with a diabetogenic lifestyle (i.e., high-calorie intake, low-calorie expenditure, obesity). The illness affects many systems and affects more than one, leaving the patient dependent on medication for the remainder of their lives. Yoga is recognised as a form of mind-body medicine that integrates an individual's

physical, mental and spiritual components to improve aspects of health, mainly stress-related illnesses. With meditation, yoga can help restore health, reduce stress, and effectively maintain blood sugar levels. Blood glucose levels are raised by stress, facilitated by meditation, which also lowers blood glucose levels. Fatty acid levels also drop with continued yoga practice. Asana, as well as Pranayama, reduce the overactivity of the central and autonomic nervous systems. Yogic asana stretches and strains internal organs and endocrine glands, primarily increasing blood and oxygen supply to the body's affected parts. This improves the efficiency and functioning of the affected parts and the body's endocrine system. The present study is conducted to evaluate the effectiveness of the Yogasana and Pathyaahara in the management of DM-2 and the preparation of dietary & yoga modules for patients of DM-2.

MATERIALS AND METHOD

Study Type: Single group, open randomised clinical study.

Ethical clearance: The present study was approved by IEC via letter number - DSRRAU/UPGIAS&R IEC/20-21/413 dated 12/06/22.

CTRI Registration: CTRI No. - CTRI/2022/11/047201 registered on 11/11/2022

Selection of Subjects: Thirty patients diagnosed with diabetes mellitus two were chosen for the study from the outpatients of the Postgraduate Institute of Ayurved, Jodhpur. This study included 19 males and 11 Females.

Inclusion Criteria

Patients aged between 20 and 64 years, regardless of caste, sex, etc. Patients having the clinical features of Madhumeha. Diagnosed case of diabetes mellitus 2/Madhumeha. Patients having RBS level 200-280 mg/dl. Patients having FBS level 100-180 mg/dl. Pa-

tients having PPBS level 140-220 mg/dl. Patients are willing to sign the consent form.

Exclusion Criteria

Patients aged below 20 and above 64 years and not diagnosed by a physician. Patients having liver disease, thyrotoxicosis, retinopathy, nephropathy, or any serious medical condition. Any other type of diabetes type 1. Pregnant and nursing women. Contraindication of Yogasana.

After taking written informed consent, all the participants were trained by yoga experts and subjected to regular practice [Table 1] under supervision for three months. The yoga was practised daily in the morning and evening on an empty stomach according to standard principles and techniques regarding posture and movements.

Table 1: Yogasana Module and Ayurvedic Aahara module for research trial

S.NO.	Yogasana Name	Round/Duration *	Timing
1.	Mandukasana	5/10 minutes	Morning & evening
2.	Kurmasana	5/10 minutes	Morning & evening
3.	Vakrasana	5/10 minutes	Morning & evening
4.	Ardhamatsyendrasana	5/10 minutes	Morning & evening

*The Yogasana was done 5 rounds empty stomach in the morning and evening initially 30 sec holds in final pose increases the time up to 1 minute.

S. No.	Timing	Food items	Quantity
1.	Early morning (6-7am)	Bhuna Jau ka paani(roasted barley) Or dry fruits#	1/2glass(150-200ml) 5-10 pieces
2.	Breakfast (8.30-9.30am)	Vegetable * and Dal** Chapatti*** Or jau sattu(with water)	1 bowl & 1 bowl. 1-2 bowl 1 bowl
3.	Mid-morning (11.30-12.00)	Fruits ****(2 or 3 types/Seasonal)	1 bowl**
4.	Lunch (1.30-2.00pm)	Vegetable and Dal Chapatti Rice##	1 bowl & 1 bowl. 1-2 1 bowl
5.	Evening (4.30-5.00pm)	Salad	1 plate
6.	Dinner (7.00-8.00pm)	Vegetable Chapatti	1 bowl 3-4

***Chapatti : Whole wheat roti, raagi roti, use of barley and whole wheat,

*Vegetable-green leafy vegetable gourd, pumpkin. brinjal, parwal, bitter gourd, carrot, radish cabbage, cauliflower.

** (1bowl=100gm approx.)

##brown rice

#nuts-walnut, legumes- beans, peas,

****Fruits- apple, guava, oranges, jamun, mausumbi, amla, pomegranate,

Oils-mustard oil, sunflower oil, safflower oil, peanut oil, soya oil, olive oil.

Low fat dairy products such as milk & cheese, butter milk,

In all the participants, fasting (FBS) and post-prandial blood sugar (PPBS) were estimated before and after (three months) of yoga training. The results were pre-

sented as percentages, mean and standard deviation (SD). A paired Student t-test was used to estimate the difference in means calculated before and after yoga training in the same group. For subjective parameters,

a nonparametric Wilcoxon matched pairs signed ranked test was used, and results were calculated. A p-value of <0.0001 was considered statistically significant.

Assessment Parameters

The assessment of results was made by adopting the methods of scoring questionnaires and the signs and symptoms of DM2 such as *Prabhoot Mutrata*, *Avila Mutrata*, *Pipasadhikya*, *Kshuda Adhikya*, *Sweda Adhikya*, *Dourbalya*, *Alasya*, *Atinidra*, *Karpada Daha* and objective parameters such as blood sugar level (i.e. FBS, PPB and HbA1c).

1) Prabhoot Mutrata		
Grade	Urine Frequency in Day	Urine Frequency in Night
0	3-4 times	0-1 times
1	5-6 times	2-3 times
2	7-8 times	4-5 times
3	>8 times	>5 times
2) Avila Mutrata		
Grade	Turbidity	Specific gravity/albumin protein
0	Cristal clear fluid	1020-1025/Nil
1	Hazy with Slight turbidity	1026-1030/+
2	Turbidity present but words can be read through the tube	1031-1035/++
3	More turbidity and words can't be read	>1035/+++
3) Pipasadhikya		
Grade	Feeling of Thirst	Quantity of water intake
0	Normal	1-2 litre/day
1	Increased, frequency of drinking can be controlled	2-3 litre/day
2	Increased, frequency of drinking can't be controlled	3-4 litre/day
3	Very much increased with frequent intake of water	>4 litre/day
4) Kshuda Adhikya		
Grade	Quantity of Food /Day	
0	2-3 chapati	
1	4-5 chapati	
2	5-6 chapati	
3	>7 chapati	
5) Sweda Adhikya		
Grade	Sweda	
3	Perspiration without exertion	
2	Heavy perspiration after exertion	
1	Mild perspiration after exertion	
0	Normal perspiration	
6) Dourbalya		
Grade	Routine activity	Weakness
0	Normal	No feeling of weakness
1	Normal	Without feeling of weakness can do exercise

2	Disturbed	With feeling of weakness can do exercise
3	Disturbed	Can't do exercise
7) <i>Alasya</i>		
Grade	<i>Alasya</i>	
0	Normally active	
1	Doing work but late initiation	
2	Doesn't have desire, work under compulsion	
3	Do not want to do work, no initiation	
8) <i>Atinidra</i>		
Grade	Sleeping hours/Day	
0	<8 hrs.	
1	8-10 hrs.	
2	10-12 hrs.	
3	>12 hrs.	
9) <i>Karpada Daha</i>		
Grade	<i>Daha</i>	
0	Absent	
1	Occasional	
2	Continuous	
3	Continuous & required medication	

RESULTS

Demographical Profile

Age-wise, the fifth and sixth decades had the highest proportion of patients, i.e., 10 (33.33%) (41–50 yrs.) And 9 (30%) (51-60 yrs.). The majority of patients, 19, or 63.33% of all patients, were men. In this study, 28 patients, or 93.33%, were married. Most participants in the survey, or 90%, were from the middle class. Twenty-five patients, or 83.33%, were from urban areas.

Clinical Profile

Among the patients, the following were the most common complaints: 29 patients (96.66%) had Prab-

hoot Mutrata, 27 patients (90.00%) had Avila Mutrata,

Additional symptoms - 25 (83.33%) patients were suffering from Pipasadhikya, 22 patients (73.33%) had objections of Kshuda Adhikya, 22 patients (73.33%) had sustained of Sweda Adhikya, 25 patients (83.33%) had grievances of Alasya, 25 patients (83.33%) had Dourbalya, 14 patients (46.66%) had Atinidra, 17 patients (56.66%) had objections of Karpada Daha.

Interrogation regarding treatment history revealed that the maximum number of patients had taken allopathic medication.

Table: Effect of Therapy on Subjective Parameters and Objective Parameters

Variable	% Relief	SD±	SE±	P value	Significance
<i>Prabhoot Mutrata</i>	68.23	0.6789	0.124	<0.0001	S*
<i>Avila Mutrata</i>	55.32	0.7184	0.1312	<0.0001	S
<i>Pipasadhikya</i>	61.11	0.8449	0.1543	<0.0001	S
<i>Kshuda Adhikya</i>	49.01	1.179	0.7761	<0.0001	S

Sweda Adhikya	47.35	0.8137	0.1486	0.0006	S
Dourbalya	46.79	0.6397	0.1168	<0.0001	S
Alasya	46.79	0.6397	0.1168	<0.0001	S
Atinidra	50.02	1.184	0.2162	0.0043	S
Karpada Daha	54.54	0.7701	0.1406	0.0004	S
FBS	67.174	0.7311	0.1335	<0.0001	S
PPBS	60.80	0.7768	0.1418	<0.0001	S
HbA1c	39.39	0.5713	0.1043	<0.0001	S

* Significance

DISCUSSION

The prevailing protocol that is effective was used to prescribe yoga practice. This protocol is efficient for the patient regarding expenses, time, and effort. Yoga leads to parasympathetic activation, which reduces stress and improves insulin sensitivity, glucose tolerance, lipid metabolism, and overall metabolic and psychological improvements.^{7,8}

Yogasana, which we have taken in the study, is Mandukasana and Vakrasana, practised regularly to enhance the blood supply to the abdominal organs, including the pancreas. This eliminates metabolic disorders and diabetes mellitus, strengthening an individual's quality of life. Nine and the participant's depression status, FBS, RBS, and PPBS levels significantly improved.¹⁰ *Ardha Matsyendrasana* can effectively reduce blood glucose levels in patients with T2DM¹¹.

The observations suggest that the performance of asanas led to increased sensitivity of the B cells of the pancreas to the glucose signal. The increased sensitivity is sustained for a long time, resulting in a progressive long-term effect of asanas. The study is significant because it has, for the first time, attempted to probe the mechanism by which yogasanas reduce blood sugar. In the present study, there was a substantial fall in the fasting blood glucose levels in the group. These findings are similar to those reported by articles in the bibliography with serial numbers.¹²

Blood sugar levels were kept within the desired range by following an ayurvedic aahara.¹³ A thorough analytical analysis found that Most have *Kashaya Ras*

and *Ruksha Guna*, *Kaphapitta*, and some are *Tridosha Shamaka*, *Kledhar* and *Soshak*. So, we encouraged smaller meal portions throughout the day and added a variety of whole grain, fruit, and vegetable foods each day. Millets with a high soluble dietary fibre content improve glucose tolerance by reducing the amount of glucose absorbed and the rate at which the stomach empties after a meal.¹⁴

CONCLUSION

The results of the present study demonstrated that the *Yogasana* and *Ayurvedic Aahara* effectively reduce blood glucose levels in patients with T2DM. This strategy might be taken into consideration in DM2 research in the future. There was no control group; the sample size was too small to draw a generalised conclusion, so this can be used in multicentre trials to establish the treatment. A comparative study could be done to check the effectiveness of *Yogasana* and *Ayurvedic Aahara* separately.

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