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Original Research Article

Impact of ayurvedic panchakarma along with lifestyle modification in restoring glucose tolerance in type 2 diabetics

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ABSTRACT

Background: Diabetes mellitus is an increasing global concern. There is limited published literature documenting the effectiveness of Ayurveda interventions for this condition. Aim of the study was to evaluate the effect of the comprehensive diabetes care (CDC) program on glycosylated hemoglobin (HbA1c), body mass index (BMI), body weight, abdominal girth, and dependency on conventional medication in patients with diabetes mellitus.

Methods: A retrospective, observational, single centre study was conducted at Madhavbaug clinic, India from August 2021 to March 2023. Patients aged 18 years and above with a diagnosis of diabetes mellitus were included in this study. Follow-up was conducted at day 1, 30, 60, and 90.

Results: A total of 39 patients were assessed, of which 18 (46.2%) patients were male. The mean HbA1c levels at day 1, 30, 60, and 90 for the 12 patients with HbA1c < 6.5 was 6.23±0.24%, 5.75±0.41%, 5.60±0.33%, and 5.65±0.30%, respectively. The mean HbA1c levels at day 1, 30, 60, and 90 for the 22 patients with HbA1c 6.6-9.0 was 7.14±0.48%, 6.46±0.62%, 6.22±0.59%, and 6.12±0.42%, respectively. The mean HbA1c levels at day 1, 30, 60, and 90 for the 3 patients with HbA1c > 9.0 was 10.30±0.45%, 9.10±1.20%, 7.30±1.50%, and 7.15±0.65%, respectively.

Conclusions: Ayurvedic panchakarma along with lifestyle modification is successful in restoring the glucose tolerance in type 2 diabetic patients.

Keywords: Ayurveda, Diabetes mellitus, Lifestyle, Panchakarma

INTRODUCTION

Diabetes mellitus prevalence is steeply increasing. One in 10 adults suffers from this chronic disease, moreover 44% remain undiagnosed. Of the diagnosed individuals, 90% suffer from type 2 diabetes mellitus.¹ In earlier times, diabetes mellitus was diagnosed using biomarkers such as fasting blood sugar levels <126 mg/dl and post-prandial blood sugar levels >140 mg/dl. However, in recent times, the preferred diagnostic test for diabetes mellitus has shifted to HbA1c levels, as it reflects an individual's average blood sugar levels over the preceding 2-3 months. A diagnosis of diabetes mellitus is typically made when HbA1c levels exceed 6.5%, while levels between 5.7%

and 6.5% are indicative of prediabetes.² The complications associated can be categorized as macrovascular complications which includes stroke, myocardial infarction, stroke and peripheral disease and microvascular complications which includes retinopathy, neuropathy and nephropathy. Diabetic foot is another severe complication that can occur and necessitate amputation.³

Diabetes mellitus is currently managed through dietary and lifestyle modifications. If the HbA1c level increase to 7.5% while on medication or if the initial HbA1c is ≥9%, combination therapy with two oral anti-diabetic agents or insulin, may be considered.⁴ However, several individuals have preferences against these oral anti-diabetic drugs

owing to the related side effects, administration mode i.e., injectables, and cost.⁵ Ayurveda is a traditional medicine practiced throughout Asia. The core principles of Ayurveda are herbal-based supplements, yoga exercise, and diet adjustments. A combination of all Ayurvedic system in daily life works to eliminate the contributive factors of disease. Ayurveda has garnered high acceptance in the Indian subcontinent as it aligns well with cultural and health beliefs.⁶ The CDC is a combination of Panchakarma and diet management. The current study intended to evaluate the effect of the CDC program on HbA1c, BMI body weight, abdominal girth, and dependency on conventional medication in patients with diabetes mellitus.

METHODS

Study design and patient selection

This was a retrospective, observational, single centre study conducted at Madhavbaug clinic, India from August 2021 to March 2023. Patients aged 18 years and above with a diagnosis of diabetes mellitus as defined by the American diabetes association (ADA) were included in this study.⁷

Comprehensive diabetes control program

The CDC program is a 3-step procedure, with each session spanning approximately 65-75 mins, following a light breakfast. Snehana, the first step, involves external oleation using Neem oil, massaging hands, legs, shoulders, thorax, abdomen, and the back in a centripetal manner. The massage lasts 15-25 mins, with 15-30 strokes applied to each body part mentioned. Swedana, the second step, is a passive heat therapy. It employs Dashmoola decoction while the patient lies supine in a wooden box, with the neck protruding outside. This therapy lasts 10-15 mins, followed by a 3-4 min relaxation period. The final step, Basti, is a medicated enema involving 100 ml of *Gymnema sylvestre*, *Berberis aristata*, and *Glycyrrhiza glabra*. Administered rectally, the drug is retained for over 15 mins for maximum absorption.

The CDC program comprises 6 sessions over 90 days: 4 in the first month, 1 in the second, and 1 in the third. Patients adhere to a dietary regimen of 800-1000 daily calories, consisting of low carbohydrates, moderate proteins, and low fats.

Data collection

Data for patient demographics, anthropometrics, laboratory findings, and medications were collected and analysed from the patients' medical records. On day 1 of the CDC program, a detailed patient history was taken, anthropometric measurements were recorded and the fasting serum HbA1c levels were measured. Details of concomitant standard antidiabetic medication were also recorded. This activity was repeated at follow-ups of day 1, 30, 60, and 90 of the CDC programs.

Statistical analysis

Categorical data are expressed as number (percentage) and continuous data are expressed as mean $\pm$ standard deviation. Paired t test was used to determine the difference between baseline and follow-up at 90 days. $P \leq 0.05$ was considered as statistically significant. R version 3.4.1 software was used to analyse the data.

RESULTS

Patient demographics

The mean age of the study population is 50.79 ± 11.53 years. Males comprised 18 (46.2%) patients of the study population. Mean weight decreased (day 1: 5.65 ± 15.01 kg and day 90: 69.19 ± 13.05 kg, $p=0.00$) at the 90-day follow-up. Similarly, mean BMI decreased (day 1: 29.84 ± 6.82 and day 90: 27.29 ± 5.80 , $p=0.00$) at the 90-day follow-up. Similarly, mean abdominal girth decreased (day 1: 99.67 ± 12.98 cm and day 90: 88.95 ± 11.41 cm, $p=0.00$) at the 90-day follow-up. Demographic details of the study population are shown in Table 1.

HbA1c

The mean HbA1c levels at day 1, 30, 60, and 90 for the 12 patients with HbA1c <6.5 was $6.23 \pm 0.24\%$, $5.75 \pm 0.41\%$, $5.60 \pm 0.33\%$, and $5.65 \pm 0.30\%$, respectively. The mean HbA1c levels at day 1, 30, 60, and 90 for the 22 patients with HbA1c 6.6-9.0 was $7.14 \pm 0.48\%$, $6.46 \pm 0.62\%$, $6.22 \pm 0.59\%$, and $6.12 \pm 0.42\%$, respectively. The mean HbA1c levels at day 1, 30, 60, and 90 for the 3 patients with HbA1c >9.0 was $10.30 \pm 0.45\%$, $9.10 \pm 1.20\%$, $7.30 \pm 1.50\%$, and $7.15 \pm 0.65\%$, respectively. The details are shown in Table 2.

Glucose tolerance test

Of the 14 patients in the <6.5 HbA1c category, on the first attempt, 1 (7.14%) and 13 (92.86%) patients had a negative and impaired result, respectively. On the second attempt, 3 (21.43%) patients had a negative result whereas, 11 (78.6%) patients did not undergo testing. Of the 22 patients in the 6.6-9.0 HbA1c category, on the first attempt, 2 (9.09%), 17 (77.27%), and 3 (13.64%) patients had an impaired, negative, and positive result, respectively. On the second attempt, 3 (13.64%) patients had a negative result whereas, 19 (86.4%) patients did not undergo testing. Of the patients in the >9.0 HbA1c category, 3 (100%) patients had a negative result. On second attempt, 1 (33.3%) patient had a positive result whereas, 2 (66.7%) patients did not undergo testing. The details are given in Table 3.

Diet kits

Prameh was the most common diet kit, followed by Go Bipi, Swasthyam and a combination of Go Bipi + Swasthyam as shown in Table 4.

Medication

On day 1, 16, 6, 4 and 1 patients were on biguanide, dipeptidyl peptidase-4 inhibitor, sulfonylurea, and thiazolidinedione medication.

However, by day 90 all medication were ceased as displayed in Figure 1.

Table 1: Patient demographics.

Variables	Day 1, (n=39)	Day 90, (n=39)	P value
Age (in years)	50.79±11.53		
Males, n (%)	18 (46.2%)		
Weight (kg)	75.65±15.01	69.19±13.05	0.00
BMI (kg/m ²)	29.84±6.82	27.29±5.80	0.00
Abdominal girth (cm)	99.67±12.98	88.95±11.41	0.00

All data are expressed as number (percentage) or mean ± standard deviation

Table 2: Mean HbA1c levels at day 1, 30, 60 and 90 according to HbA1c category.

HbA1c, (n=37)	Day 1, (7.10±1.12)	Day 30, (6.44±0.62)	Day 60, (6.18±0.59)	Day 90, (6.13±0.42)
<6.5, (n=12)	6.23±0.24	5.75±0.41	5.60±0.33	5.65±0.30
6.6-9.0, (n=22)	7.14±0.48	6.46±0.62	6.22±0.59	6.12±0.42
>9.0, (n=3)	10.30±0.45	9.10±1.20	7.30±1.50	7.15±0.65

All data are expressed as number (percentage) or mean ± standard deviation.

Table 3: Glucose tolerance test.

HbA1c classification	First attempt, N (%)	Second attempt, N (%)
<6.5, (n=14)		
Impaired	1 (7.14)	-
Negative	13 (92.86)	3 (21.43)
Not done	-	11 (78.6)
6.6-9.0, (n=22)		
Impaired	2 (9.09)	-
Negative	17 (77.27)	3 (13.64)
Positive	3 (13.64)	-
Not done	-	19 (86.4)
>9.0 (n=3)		
Negative	3 (100)	-
Positive	-	1 (33.3)
Not done	-	2 (66.7)

All data are expressed as number (percentage).

Table 4: Diet kits.

Diet	Patient count
Prameh	23
Go Bipi	5
Swasthyam	3
Go Bipi, Prameh	3
Prameh, Swasthyam	2
Reverse	1
Sanrise breakfast	1

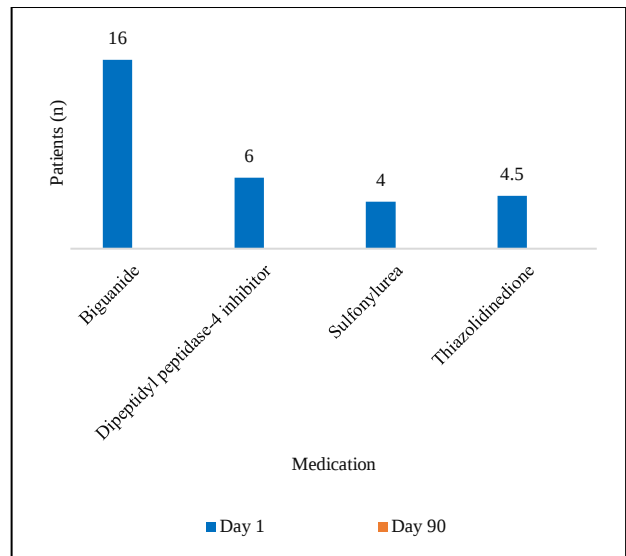


Figure 1: Medication.

DISCUSSION

Ayurvedic medicine serves as a potential alternative therapeutic option for the management of type II diabetes mellitus since many herbal drugs have been found to significantly lower blood glucose levels in clinical studies.⁸ The current study sought to evaluate the effect of the CDC program on mean HbA1c levels at the 90-day follow-up. The current study observed a decrease in mean HbA1c levels from 10.30±0.45% to 5.65±0.30% at the 90-day follow-up. This is in agreement with earlier similar studies that have documented decrease in mean HbA1c levels from 8.27±0.96% to 7.1±1.30%, 8.80±0.93% to 6.98±1.73%, 9.02±1.79% to 6.86±1.24%, 8.64±0.93% to 7.00±1.73%, 5.79±0.51%, 8.7% to 7.0, and from 7.87±1.90% to 5.79±0.51% after 90 days.⁹⁻¹⁵ Moreover, a study demonstrated that after 90 days of CDC treatment, the number of patients with controlled diabetes increased from 0 to 20 for those with diabetes for less than 2 years, from 0 to 18 for those with diabetes for 2-10 years, and from 0 to 21 for those with diabetes for more than 10 years.¹³

The CDC program combines Panchakarma and diet management to reverse diabetes. The probable mechanisms by which the CDC might benefit patients with diabetes mellitus is: (a) reducing glucose production in the liver by hampering sympathetic stimulation on gluconeogenesis and (b) reducing the shear stress of vascular endothelium by promoting water loss via sweating. This may help in reducing vascular

complications significantly.⁹ Several studies have documented improvement in critical parameters including reduction in dependency on conventional allopathic antidiabetic medications at the end of the study period.

Limitations

Small sample size, retrospective design, and short-term follow up are a few limitations of the present study. Larger studies with a longer follow-up could provide further insights.

CONCLUSION

Ayurvedic panchakarma along with lifestyle modification is successful in restoring the glucose tolerance in type 2 diabetic patients.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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