



Original Article

Effect of Sahaja Yoga Meditation on Diabetes Distress in Patients with Type 2 Diabetes Mellitus: A Randomized Controlled Trial

Dr. Isha Bhatt¹, Dr. Madhur Rai², Dr. Nitesh Bhatti³, Dr. Sandeep Rai⁴

¹Junior Resident, Department of Medicine, MGM Medical College and Hospital, Kamothe, Navi Mumbai, Maharashtra, India

²Associate Professor, Department of Physiology, MGM Medical College and Hospital, Kamothe, Navi Mumbai, Maharashtra, India

³Senior Resident, Department of Medicine, MGM Medical College and Hospital, Kamothe, Navi Mumbai, Maharashtra, India

⁴Professor, Department of Medicine, MGM Medical College and Hospital, Kamothe, Navi Mumbai, Maharashtra, India

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ABSTRACT

Corresponding Author:

Dr Isha Bhatt,

Email: bhatt.isha14@gmail.com

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Background: Diabetes distress (DD), the emotional burden associated with managing type 2 diabetes mellitus (T2DM), adversely affects treatment adherence and overall well-being. Mind-body interventions such as Sahaja Yoga, which emphasizes mental silence and relaxation, may help alleviate DD. **Objective:** To estimate the prevalence of diabetes distress among patients with T2DM and to evaluate the effectiveness of Sahaja Yoga meditation in reducing DD. **Methods:** This single-center randomized controlled trial was conducted at a tertiary care hospital. A total of 390 patients with T2DM were screened for DD using the 17-item Diabetes Distress Scale (DDS-17). Eighty patients with moderate-to-high DD (score ≥ 2.0) were randomized in a 1:1 ratio to either a three-month Sahaja Yoga meditation program (n = 40) or standard care (n = 40). The primary outcome was the change in DDS-17 total and subscale scores (emotional burden, physician-related, regimen-related, and interpersonal distress) from baseline to three months, analyzed using ANCOVA adjusted for baseline values. **Results:** The mean age of participants was 48.3 ± 8.4 years, with 53.1% males. The prevalence of DD was 29.5% (95% CI: 24.9–34.4%). At three months, the intervention group demonstrated a significant reduction in total DD compared to controls (2.08 ± 0.96 vs. 3.62 ± 1.15 ; $p < 0.001$; Cohen's d = 1.42). Significant improvements were also observed across all subscales, including emotional burden, physician-related distress, regimen-related distress, and interpersonal distress (all $p < 0.001$). **Conclusion:** Diabetes distress affects nearly one-third of patients with T2DM. Sahaja Yoga meditation significantly reduces DD and may serve as an effective, low-cost complementary intervention in diabetes management.

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Keywords: Sahaja Yoga, diabetes distress, type 2 diabetes, meditation, psychological well-being.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) represents a major and rapidly escalating global public health challenge, with significant implications for morbidity, mortality, and healthcare systems worldwide [1]. Beyond its well-recognized metabolic and vascular complications, T2DM is increasingly understood as a condition with substantial psychosocial dimensions that influence disease progression and patient outcomes. The chronic and demanding nature of diabetes self-management—including adherence to medication, dietary restrictions, regular monitoring of blood glucose, and lifestyle modifications—places a considerable psychological burden on affected individuals.

Diabetes distress (DD) refers to the spectrum of emotional and psychological difficulties specifically associated with living with and managing diabetes. It encompasses concerns related to disease management, fear of long-term complications, perceived lack of support, and challenges in interactions with healthcare providers and family members [2,3]. Unlike clinical depression, DD is directly linked to the demands of diabetes care and has been shown to be strongly associated with poor glycemic control, reduced treatment adherence, and diminished quality of life. Global estimates suggest that approximately 18–36% of individuals with T2DM experience moderate to high levels of DD; however, region-specific data, particularly from India, remain limited despite the country's high diabetes burden [4].

Addressing DD is therefore essential for achieving comprehensive diabetes care. Traditional management strategies primarily focus on glycemic control and prevention of complications, often overlooking the psychological well-being of patients. In resource-constrained settings such as India, where access to structured psychological interventions may be limited, there is a growing need for feasible, low-cost, and culturally acceptable approaches to address the emotional aspects of diabetes [5].

Mindfulness-based and mind-body interventions, including yoga and meditation, have gained increasing attention as complementary strategies for improving psychological health in chronic diseases. These interventions are believed to reduce stress, enhance emotional regulation, and improve coping mechanisms, thereby potentially alleviating DD [6]. Among these, Sahaja Yoga is a meditation practice that emphasizes the experience of “mental silence” through self-realization and balancing of subtle energy systems. It is simple to practice, does not require complex physical postures, and can be easily integrated into daily routines. Evidence suggests that Sahaja Yoga may improve emotional stability, reduce anxiety, and enhance overall well-being, indicating its potential utility in managing diabetes-related psychological distress [7].

In India, national health initiatives, including guidelines from the Ministry of AYUSH, advocate the incorporation of yoga as an adjunct in the management of T2DM [8]. However, while general yoga-based interventions have been studied, there is a relative paucity of evidence specifically evaluating the impact of Sahaja Yoga on diabetes distress. This represents an important research gap, particularly given the need for scalable and culturally acceptable interventions in the Indian context. Therefore, the present study was undertaken with the following objectives: (1) to estimate the prevalence of diabetes distress among patients with T2DM attending a tertiary care hospital, and (2) to evaluate the effectiveness of a structured three-month Sahaja Yoga meditation program in reducing diabetes distress. The findings of this study aim to contribute to the growing body of evidence supporting integrative approaches to diabetes management, with a focus on improving both psychological well-being and overall disease outcomes.

MATERIALS AND METHODS

This prospective, single-center randomized controlled trial was conducted at MGM Medical Hospital, Navi Mumbai, India, from August 2022 to December 2023. The study was approved by the Institutional Ethics Committee (Ref: MGM/IEC/2022/056; IEC No: DHR-EC/2022/SC/07/08), and all procedures adhered to the Declaration of Helsinki. Written informed consent was obtained from all participants.

Adults aged 35–65 years with type 2 diabetes mellitus (duration ≥ 2 years) and moderate-to-high diabetes distress (DDS-17 score ≥ 2.0) were included. Patients with type 1 or gestational diabetes, pregnancy, major comorbidities (e.g., recent myocardial infarction, HIV), psychiatric illness, psychotropic drug use, recent major life events, or prior yoga/meditation practice within five years were excluded.

The sample size for prevalence estimation was calculated as 384 using the formula $n = Z^2 P(1 - P)/d^2$ ($Z = 1.96$, $P = 50\%$, $d = 5\%$). For the intervention, 36 participants per group were required based on prior DDS-17 data [9] (80% power, 5% significance), increased to 40 per group ($n=80$) to account for 10% attrition. A total of 390 patients were screened, and 80 eligible participants were randomized.

Participants were allocated (1:1) to intervention ($n=40$) or control ($n=40$) groups using block randomization (block size = 4) with sealed envelopes. The intervention group received three initial 30-minute in-person Sahaja Yoga sessions followed by daily 20-minute online sessions for three months, focusing on mindfulness and mental relaxation. Compliance was monitored through logs. The control group received standard care. Blinding of participants was not feasible; however, outcome assessors were blinded.

Diabetes distress was measured using the 17-item Diabetes Distress Scale (DDS-17) [10], providing total and subscale scores (emotional, physician-related, regimen-related, and interpersonal distress). Scores were categorized as low (< 2.0), moderate (2.0–2.9), and high (≥ 3.0). The tool demonstrated high reliability (Cronbach's $\alpha = 0.958$) [11]. Assessments were conducted at baseline and after three months.

Statistical analysis was performed using IBM SPSS Statistics version 27.0. Continuous variables were expressed as mean \pm SD and categorical variables as frequencies (%). Diabetes distress prevalence was reported with 95% confidence intervals. Group comparisons were performed using chi-square test or independent t-test. Post-intervention outcomes were analyzed using ANCOVA adjusting for baseline values, with effect sizes expressed as Cohen's d . A p -value < 0.05 was considered statistically significant. Intention-to-treat analysis was applied using last observation carried forward for missing data.

RESULTS

A total of 390 patients were screened, of whom 115 (29.5%) were identified as having diabetes distress (DDS-17 ≥ 2.0). Among these, 80 eligible participants were randomized equally into the intervention group ($n = 40$) and control group ($n = 40$). During the study period, five participants were lost to follow-up (three in the intervention group and two in the control group), resulting in an overall attrition rate of 6.25%. However, all randomized participants were included in the final analysis as per the intention-to-treat principle (Figure 1).

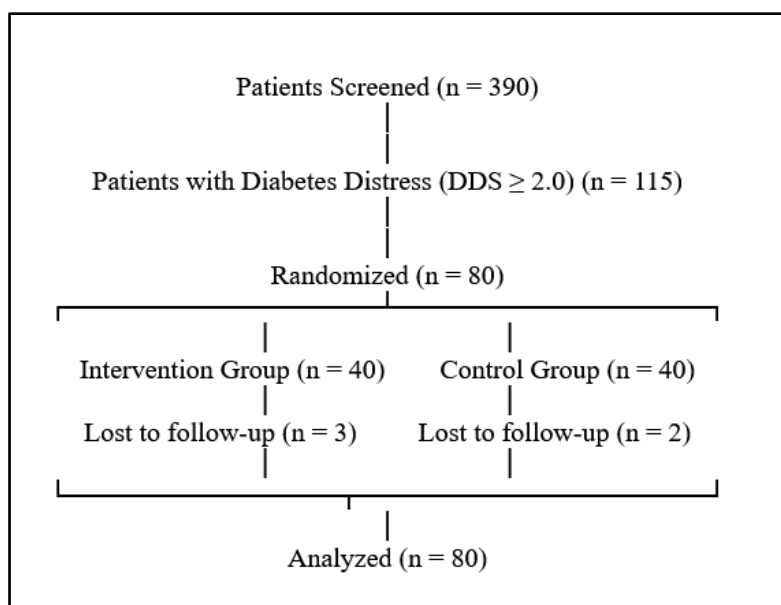


Figure 1: Participant Flowchart

The mean age of the study participants was 48.3 ± 8.4 years, with a slight male predominance (53.1%). The majority of participants were from urban areas (63.8%) and were married (93.8%). The mean duration of diabetes was 4.9 ± 1.2 years. Baseline characteristics were comparable between the intervention and control groups, with no statistically significant differences observed ($p > 0.05$), indicating appropriate randomization (Tables 1 and 2).

Table 1: Sociodemographic Characteristics (N=390)

Variable	Characteristic	n (%) or mean \pm SD
Age (years)	35–45	106 (27.2)
	45–55	166 (42.6)
	55–65	118 (30.3)
Sex	Male	207 (53.1)
	Female	183 (46.9)
Residence	Urban	249 (63.8)
	Rural	141 (36.2)
Marital Status	Married	366 (93.8)
	Unmarried	24 (6.2)
Family Type	Nuclear	253 (64.9)
	Joint	137 (35.1)
Socioeconomic Status	Class I–II	104 (26.7)
	Class III	167 (42.8)
	Class IV–V	119 (30.5)
Occupation	Employed	259 (66.4)
	Unemployed	131 (33.6)
Diabetes Duration (years)		4.9 ± 1.2

Table 2: Baseline Characteristics of Randomized Groups (N=80)

Characteristic	Intervention (n=40)	Control (n=40)	p-value
Age (years)	48.4 ± 8.1	47.4 ± 8.2	0.60
Male, n (%)	24 (60.0)	27 (67.5)	0.48
Diabetes duration (years)	4.2 ± 2.0	4.5 ± 2.1	0.50
DDS-17 Total	3.31 ± 0.98	3.74 ± 1.18	0.34
Emotional burden	3.52 ± 1.37	3.28 ± 0.95	0.37
Physician-related	1.97 ± 0.96	2.06 ± 0.82	0.64
Regimen-related	2.62 ± 1.23	2.54 ± 0.91	0.76

Interpersonal	2.14 ± 0.94	2.39 ± 0.84	0.21
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The overall prevalence of diabetes distress was 29.5% (95% CI: 24.9–34.4%). Among these, 19.7% of participants had severe distress (DDS-17 score >2.9), while 9.7% had moderate distress (score 2.0–2.9). Analysis of DDS-17 subscales revealed that emotional burden was the most prevalent domain (24.4%), followed by regimen-related distress (19.2%), interpersonal distress (15.6%), and physician-related distress (12.8%) (Tables 3 and 4).

Table 3: Prevalence of Diabetes Distress (N=390)

DDS-17 score	n	% (95% CI)
<2.0	275	70.5 (65.7–75.0)
2.0–2.9	38	9.7 (7.0–13.1)
>2.9	77	19.7 (15.9–24.0)

Table 4: DDS-17 Subscale Scores (N=390)

Subscale	Min–Max	Mean ± SD	n* (%)
Emotional burden	1.0–5.8	3.40 ± 1.18	95 (24.4)
Physician-related	1.0–4.3	2.02 ± 0.89	50 (12.8)
Regimen-related	1.0–5.0	2.58 ± 1.07	75 (19.2)
Interpersonal	1.0–4.3	2.17 ± 0.86	61 (15.6)
Total DD	1.0–5.5	3.37 ± 1.13	115 (29.5)

Following the three-month intervention, participants in the Sahaja Yoga group demonstrated a statistically significant reduction in diabetes distress compared to the control group, as assessed by ANCOVA adjusted for baseline scores. The mean total DDS-17 score was significantly lower in the intervention group (2.08 ± 0.96) compared to the control group (3.62 ± 1.15) ($p < 0.001$), with a large effect size (Cohen’s $d = 1.42$). Similar significant reductions were observed across all subscales: emotional burden (2.08 ± 0.51 vs. 3.17 ± 0.89; $p < 0.001$; $d = 1.53$), physician-related distress (1.46 ± 0.55 vs. 2.14 ± 0.67; $p < 0.001$; $d = 1.11$), regimen-related distress (1.76 ± 0.67 vs. 2.58 ± 0.77; $p < 0.001$; $d = 1.15$), and interpersonal distress (1.64 ± 0.53 vs. 2.56 ± 0.76; $p < 0.001$; $d = 1.38$). These findings indicate a substantial and consistent improvement in diabetes distress among participants receiving the Sahaja Yoga intervention (Table 5).

Table 5: Post-Intervention DDS-17 scores (N=80)

Subscale	Intervention (n=40)	Control (n=40)	p-value*	Cohen’s d
Total DD	2.08 ± 0.96	3.62 ± 1.15	<0.001	1.42
Emotional burden	2.08 ± 0.51	3.17 ± 0.89	<0.001	1.53
Physician-related	1.46 ± 0.55	2.14 ± 0.67	<0.001	1.11
Regimen-related	1.76 ± 0.67	2.58 ± 0.77	<0.001	1.15
Interpersonal	1.64 ± 0.53	2.56 ± 0.76	<0.001	1.38

*ANCOVA, adjusted for baseline scores.

DISCUSSION

This trial revealed a 29.5% DD prevalence among T2DM patients, aligning with global ranges of 18–36% [4]. Emotional burden was most prevalent (24.4%), reflecting fears about disease progression, consistent with 25–45% rates elsewhere [12–14]. Physician-related distress was lowest (12.8%), likely due to urban healthcare access, unlike 20–35% in underserved settings [13,14]. Regimen-related (19.2%) and interpersonal distress (15.6%) indicate persistent self-management and social challenges [12,15]. These findings highlight DD’s burden in India, necessitating scalable interventions.

Sahaja Yoga meditation significantly reduced DD across all domains ($p < 0.001$, Cohen’s $d = 1.11–1.53$), extending evidence on yoga-based approaches [6,16]. Its mental silence component, fostering alert calm, likely alleviated emotional burden by reducing anxiety. Research shows Sahaja Yoga lowers anxiety and enhances quality of life in chronic conditions [17], mirroring our results. Similarly, reductions in work stress and depressed mood support its emotional benefits [18], suggesting a mechanism for DD relief through parasympathetic activation [7].

Psychological resilience also improved, addressing regimen-related and interpersonal distress. Studies report Sahaja Yoga mitigates depressive symptoms and boosts cognitive function in depression [19], relevant to T2DM patients facing self-

management demands. These cognitive gains likely enhanced adherence, reducing regimen-related distress. Short-term Sahaja Yoga training also modulates brain activity in executive control networks, correlating with well-being [20], supporting our interpersonal distress findings where social cognition is key.

Neurophysiological effects provide further insight. Sahaja Yoga increases theta and alpha EEG activity, indicating relaxed attention [21], which may improve focus for regimen-related tasks. Stress reduction in clinical cohorts suggests autonomic balance as a pathway [22], aligning without outcomes. Long-term practice is linked to greater grey matter volume in emotional and attentional regions [23], potentially explaining sustained interpersonal distress reductions. These neural changes underscore Sahaja Yoga's role in fostering brain health in T2DM.

Compared to psychological interventions (Hedges' $g = 0.6$) [24], Sahaja Yoga's larger effect sizes highlight its efficacy. Its accessibility and low-cost suit India's healthcare constraints, unlike targeted therapies [16]. However, limitations include the hospital-based setting, limiting generalizability, and the three-month duration, which may not capture sustained effects. Lack of blinding risks bias, and online session compliance varied. Future trials should test Sahaja Yoga in community settings, use active controls, and explore EEG or neuroimaging to confirm neural mechanisms [20,21,23], enhancing its integration into T2DM care.

Limitations: The single-center design may not reflect community DD patterns. The three-month duration limits long-term insights, and unblinded participants may report biased outcomes. Variable online compliance could affect results. Larger, multicenter trials with extended follow-up and active controls are needed.

CONCLUSION

DD affects nearly one-third of T2DM patients, driven by emotional burden. Sahaja Yoga meditation significantly reduces DD, offering a scalable, low-cost intervention. Providers should consider its integration into T2DM management, with further research to confirm long-term benefits and neural mechanisms.

Conflict of Interest: *The authors declare no conflict of interest.*

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