



Original Research Article

IMMEDIATE PSYCHOPHYSIOLOGICAL EFFECTS OF A TEMPLE VISIT ON AUTONOMIC FUNCTION AND PERCEIVED STRESS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background: Psychological stress and autonomic dysfunction are common among patients with type 2 diabetes mellitus and contribute to poor cardiovascular and metabolic outcomes. Spiritual practices such as temple visits may promote relaxation and improve autonomic regulation; however, evidence regarding their immediate psychophysiological effects in patients with type 2 diabetes mellitus remains limited. **Objective:** To evaluate the immediate psychophysiological effects of a temple visit on autonomic parameters and perceived stress among patients with type 2 diabetes mellitus.

Materials and Methods: A prospective single-group pre-post observational study was conducted among patients with type 2 diabetes mellitus. Systolic and diastolic blood pressure, pulse rate, respiratory rate and perceived stress (PSS-10) were assessed immediately before entering the temple and after completion of the temple visit. Pre- and post-visit measurements were compared using paired statistical tests, with $p < 0.05$ considered statistically significant.

Results: The temple visit was associated with significant reductions in all measured outcomes. Mean blood pressure decreased from 114.7 to 103.2 mmHg, pulse rate from 100.2 to 87.3 beats/min and respiratory rate from 14.9 to 12.5 breaths/min. The mean perceived stress score declined from 26.4 to 19.7, representing a reduction of 25.4%. These findings indicate an immediate improvement in autonomic function and psychological well-being following the temple visit.

Conclusion: A temple visit produced favourable immediate changes in cardiovascular and respiratory parameters together with a marked reduction in perceived stress among patients with type 2 diabetes mellitus. Spiritual practices may serve as a simple, culturally acceptable complementary approach to enhance psychological well-being and autonomic regulation alongside standard diabetes management. Further controlled studies with larger sample sizes are warranted to confirm these findings.

Keywords: Type 2 diabetes mellitus, Temple visit, Spirituality, Perceived stress, Blood pressure, Pulse rate, Respiratory rate, Autonomic function, Complementary therapy, Mind-body medicine.

INTRODUCTION

Diabetes mellitus is one of the common and highly concerning non-communicable diseases throughout the world. The prevalence of diabetes is rising in India due to drastic lifestyle changes. High levels of stress, lack of physical activity and unhealthy food habits make the condition worsen. Autonomic dysfunction is commonly observed in patients with Diabetes mellitus. Further, all these metabolic disturbances along with autonomic dysfunction lead to cardiovascular complications.^[1,2] As the autonomic nervous system plays a vital role in homeostasis by regulating the respiratory, cardiovascular, metabolic and endocrine functions, chronic diabetes may impair homeostasis and reduce the quality of life of the individual.^[3,4] Excessive stress, which is unavoidable and inherent in the current lifestyle, aggravates disturbances in glucose metabolism. Activation of the sympathetic system and the hypothalamic-pituitary-adrenal axis raises blood glucose levels. Chronic, untreated stress further leads to insulin resistance and poor treatment adherence. Hence, interventions that reduce stress may improve treatment outcomes in diabetic patients.^[5,6]

According to the Agama Shastras, the temples are described as consecrated spaces where devotees can experience inner peace and spiritual well-being.^[7] In Skanda Purana, it was explained that visiting a temple reduces sorrow and makes the individual free from mental sickness and offers immense peace.^[8] Individuals experience sensory and behavioural changes during a temple visit that include walking inside the temple without shoes, circumambulation, visiting the deity, experiencing a calm environment in the temple, listening to or chanting mantras, listening to the sound of bells, and even sitting calmly or meditating or social interaction and charity. All these activities regulate the autonomic balance and reduce psychological stress. Physical, mental and spiritual well-being, followed by the pilgrimage to the sacred temples also highlighted in the Skanda Purana.^[8] Padma Purana and Varaha Purana also stated similar beneficial effects followed by the visiting the temples.^[9,10] Though these effects are reported subjectively, there are no research studies that have explored these effects scientifically.^[11,12] It is well known that spiritual practices like chanting or listening to mantras, meditation, Yoga offers immense beneficial effects and improve overall quality of life. Increased vagal activity was observed following these spiritual practices.^[13-17] As the temple visit includes most of these spiritual practices, it can be hypothesised that visiting a temple may produce measurable changes in the psychological and autonomic parameters. However, the studies evaluating these changes scientifically are limited. Hence, the present study was undertaken to explore the immediate beneficial effects of visiting the temple.

Aim and objectives: The present study was undertaken to observe the effect of effect of a temple visit on autonomic function and perceived stress in patients with type 2 diabetes mellitus.

MATERIALS AND METHODS

Study Design: The present study was a Prospective, single-group pre–post observational study.

Study Setting: The study was conducted at a Hindu temple after obtaining the ethical clearance and permission from the authorities. Participants were assessed at entrance area of the temple to ensure uniformity in data collection. The study was carried out for a period of 8 months from November 2025 to June 2026.

Study Participants: A total of 182 known cases of type 2 diabetes mellitus were recruited in the study after obtaining the written informed consent. The following criteria were followed for recruiting the participants.

Inclusion Criteria: Male and female participants within the age group of 40-70 years, known case of diabetes and under the medication, who were ambulatory and capable of completing the temple visit independently were part of the study.

Exclusion Criteria: Participants with acute illness, fever or severe pain, recent history of myocardial infarction or stroke, diagnose with psychiatric disorders, pregnant women were excluded from the study.

Study Procedure: Baseline values including the demographic information, including age, gender, height, weight were recorded. The physiological parameters were recorded after allowing the participants to relax for five minutes in sitting posture. Systolic blood pressure, diastolic blood pressure, pulse rate were measured using automated digital blood pressure monitor (Omron HEM-7120, Omron Healthcare Co., Ltd., Kyoto, Japan). Respiratory rate was recorded manually.^[18] Stress scores were recorded using perceived stress scale.^[19] After recording the baseline parameters, the participants entered the temple and performed their customary religious practices according to their personal beliefs without any instructions or interference from the investigators. Immediately after exiting the temple, the participants were allowed to rest for five minutes. After rest, the systolic blood pressure, diastolic blood pressure, pulse rate, respiratory rate, and perceived stress score were reassessed. All the procedures were undertaken by trained research assistant.

Ethical consideration: The study protocol was approved by the institutional human ethics committee. Voluntary, written informed consent was obtained from all the participants.

Statistical Analysis: The data are expressed as mean, SD and SE. The means were analysed using Student's paired t-test. A probability of 0.05 or less was considered statistically significant. SigmaPlot

14,5 version was used for the statistical analysis (Systat Software Inc., San Jose, USA).

RESULTS

The mean age of the participants was 55.1 ± 0.7 years. Mean BMI was 22.4 ± 0.1 . Male 64 (35.2%) and female 118 (64.8%) participants out of total 182 study participants. The data on systolic blood pressure, diastolic blood pressure, pulse rate, respiratory rate, and perceived stress scale are presented in Table 1. The systolic blood pressure before and after the visit were 153.3 and 145.1 (mmHg), respectively. There was a 5.3% reduction in the systolic blood pressure after the visit ($P <$

0.001). The diastolic blood pressure before and after the visit were 114.7 and 103.2 (mmHg), respectively. There was a 10.3% reduction in the diastolic blood pressure after the visit ($P < 0.001$). The pulse rate before and after the visit were 100.2 and 87.3, respectively. There was a 12.87% reduction in the pulse rate after the visit ($P < 0.001$). The respiratory rate before and after the visits were 14.9 and 12.5, respectively. There was a 16.11% reduction in the respiratory rate after the visit ($P < 0.001$). The perceived stress score before and after the visits were 26.4 and 19.7, respectively. There was a 25.38% reduction in the perceived stress score after the visit ($P < 0.001$).

Table 1: Comparative analysis of before and after the temple visit.

S.No.	Parameter	Test	Mean	SD	SE	Statistics
1	Systolic blood pressure (mmHg)	Before	153.3	7.8	0.6	t = 20.840
		After	145.1	6.6	0.5	P < 0.001
2	Diastolic blood pressure (mmHg)	Before	114.7	4.4	0.3	t = 27.200
		After	103.2	6.0	0.4	P < 0.001
3	Pulse rate (beats/min)	Before	100.2	3.8	0.2	t = 32.860
		After	87.3	3.8	0.2	P < 0.001
4	Respiration (breaths/min)	Before	14.9	1.5	0.1	t = 27.907
		After	12.5	1.0	0.07	P < 0.001
5	Perceived stress scale (score)	Before	26.4	2.3	0.1	t = 34.744
		After	19.7	2.7	0.2	P < 0.001
n = 182						
The 't' and 'P' values are from Student's paired t-test.						

DISCUSSION

The present study evaluated the immediate psychophysiological effects of a temple visit among patients with type 2 diabetes mellitus by assessing changes in blood pressure, pulse rate, respiratory rate and perceived stress. The findings demonstrated significant reductions in all measured parameters following the temple visit, suggesting that participation in a brief religious activity may produce an acute relaxation response accompanied by favourable autonomic modulation and reduced psychological stress. These observations support the growing body of evidence indicating that spiritual practices can positively influence both mental and physiological health in individuals with chronic diseases such as diabetes mellitus.^[20,21] Type 2 diabetes mellitus is frequently associated with chronic psychological stress and autonomic nervous system dysfunction, characterised by increased sympathetic activity and reduced parasympathetic tone.^[22] Persistent activation of the sympathetic nervous system contributes to elevated blood pressure, increased heart rate, impaired glucose metabolism and heightened cardiovascular risk.^[23] Therefore, interventions capable of reducing sympathetic overactivity may provide additional benefits beyond conventional pharmacological management.

In the present study, systolic and diastolic blood pressure showed an immediate decline following the temple visit. Although the duration of exposure was

relatively short, this reduction may be explained by activation of the parasympathetic nervous system and suppression of sympathetic discharge during spiritual engagement. Religious environments often promote mental calmness through prayer, chanting, ritual participation and a sense of surrender, all of which may reduce hypothalamic–pituitary–adrenal axis activation and circulating stress hormones.^[24,25] Previous studies evaluating meditation, prayer and other mind–body interventions have similarly reported modest reductions in blood pressure through improved autonomic balance.^[26,27]

A notable reduction in pulse rate was also observed after the temple visit. Heart rate is a sensitive indicator of autonomic activity, and a lower resting pulse generally reflects enhanced vagal modulation. Exposure to a peaceful spiritual environment may decrease emotional arousal and anxiety, thereby reducing sympathetic stimulation of the sinoatrial node.^[28] Similar observations have been reported following mindfulness meditation, devotional practices and yoga-based relaxation techniques, which are known to improve cardiovascular autonomic regulation.^[29,30]

Respiratory rate decreased substantially after the temple visit, suggesting a more relaxed physiological state. Calm and spontaneous slowing of respiration is commonly associated with reduced psychological tension and increased parasympathetic activity. During temple visits, many individuals engage in silent prayer, rhythmic chanting or quiet contemplation, all of which may

encourage slower and more regular breathing patterns. Slow breathing has been shown to improve baroreflex sensitivity, reduce sympathetic activity and enhance cardiovagal function.^[31] The observed reduction in respiratory rate therefore complements the changes noted in pulse rate and blood pressure. The greatest improvement was observed in perceived stress scores, which declined by approximately one-fourth after the temple visit. Psychological stress is an important contributor to poor glycaemic control, unhealthy lifestyle behaviours and reduced quality of life among individuals with diabetes.^[32] Religious practices provide emotional comfort, hope, optimism and social connectedness, thereby improving an individual's ability to cope with chronic illness.^[33] The immediate reduction in perceived stress observed in the present study highlights the potential psychological benefits of spiritual engagement even after a single temple visit. The findings should be interpreted in light of certain limitations. The study employed a single-group pre-post design without a control group, making it difficult to exclude the influence of rest, environmental factors or expectancy effects. Only immediate responses were assessed, and long-term physiological benefits remain uncertain. Furthermore, objective measures of autonomic function such as heart rate variability and biochemical stress markers were not evaluated. Future randomised controlled studies incorporating these measures and longer follow-up periods are warranted to establish causality and determine the sustained clinical significance of temple-based spiritual practices in diabetes care. Overall, the present findings indicate that a temple visit may serve as a simple, culturally acceptable and cost-effective complementary approach for reducing stress and improving autonomic regulation among patients with type 2 diabetes mellitus. While it should not replace standard medical treatment, incorporating spiritual well-being into holistic diabetes management may contribute to improved cardiovascular and psychological health.^[34,35]

CONCLUSION

A temple visit produced immediate reductions in blood pressure, pulse rate, respiratory rate and perceived stress in patients with type 2 diabetes mellitus. These findings suggest that spiritual practices may improve autonomic balance and psychological well-being, supporting their role as a simple, culturally acceptable complementary approach to holistic diabetes management.

Conflicts of interest: None declared

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