

## Fasting Across Cultures: The Role of Traditional Fasting in Managing Type 2 Diabetes Among South Asians

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### ABSTRACT

Fasting is a common practice across many religious traditions, including Hinduism and Jainism, with notable variations in fasting types, duration, and strictness. This narrative review explores the physiological effects of Hindu and Jain fasting, particularly during festivals such as Navratri and Paryushan, focusing on glycemic control and metabolic outcomes. Comparative analysis highlights differences in fasting protocols, including calorie restriction and fluid intake, and their implications for individuals with metabolic conditions like type 2 diabetes mellitus (T2DM). While Hindu fasting often involves partial dietary restrictions with periodic abstinence, Jain fasting ranges from partial fasts to complete water and food abstinence lasting multiple days. Evidence suggests that these fasting practices may improve glycemic markers and promote weight loss but carry risks of hypoglycemia and dehydration, especially in diabetic individuals. Understanding these cultural fasting practices aids clinicians in providing tailored guidance to patients, improving safety and health outcomes. Further research is warranted to elucidate the long-term metabolic effects and optimize management strategies.

**Keywords:** Intermittent fasting, Type 2 diabetes mellitus, HbA1c, hypoglycemia, glycemic index

### INTRODUCTION

South Asians including individuals from India, Pakistan, Bangladesh, and Sri Lanka—experience a disproportionately high burden of type 2 diabetes mellitus (T2DM), often developing the condition at younger ages and lower body mass index (BMI) compared to

Western populations. This increased susceptibility is attributed to factors such as higher visceral adiposity, lower skeletal muscle mass, and early-onset insulin resistance<sup>1</sup>. Cultural practices, including religious fasting traditions like Ramadan, Paryushan (Jain), and various Hindu fasts, present both challenges and opportunities for diabetes management.

Intermittent fasting (IF) regimens—such as time-restricted eating (TRE), alternate-day fasting (ADF), the 5:2 diet, and religious fasts—have garnered attention for their potential benefits in weight and glucose control. While Ramadan fasting is well-studied, data on Hindu and Jain fasting practices remain limited. This narrative review synthesizes human studies from 2000 to 2024 examining IF and glycemic control in South Asian adults with T2DM, including ethnic subgroup analyses. It also explores psychosocial and public health considerations pertinent to these populations.

### MATERIALS AND METHODS

A comprehensive literature search was conducted using PubMed, Medline, and Google Scholar for studies published between January 2000 and April 2024. Search terms included "South Asian," "intermittent fasting," "time-restricted eating," "Ramadan," "Hindu fasting," "Jain fasting," "Paryushan," "type 2 diabetes," "HbA1c," "fasting glucose," and country-specific terms (India, Pakistan, Bangladesh, Sri Lanka). Inclusion criteria encompassed human trials or observational studies reporting IF interventions or assessments of religious fasting in South Asian adults with T2DM. Studies focusing on non-T2DM populations, non-human subjects, or lacking South Asian participants were excluded. Data extracted included study design, population, IF regimen, duration, and glycemic outcomes (HbA1c,

fasting/postprandial glucose, insulin sensitivity). Study quality was assessed qualitatively based on design, sample size, control groups, duration, and confounders.

## RESULTS AND DISCUSSION

### Time-Restricted Eating (TRE) Interventions

Research on TRE among South Asians is emerging. A notable randomized controlled trial (RCT) by Rastogi et al. (2024) in India assigned 273 T2DM patients to an early-TRE regimen (consuming all meals by 7 pm) or a usual-late meal schedule over 18 months. The TRE group experienced significant reductions in weight (-3.88 kg vs. -1.36 kg), fasting glucose (-33.9 mg/dL vs. -29.3 mg/dL), and HbA1c (-1.37% vs. -0.59%) compared to controls<sup>2</sup>.

In contrast, a quasi-experimental study from Kanpur, India, assigned 50 T2DM patients to a 16:8 TRE (fasting from 10 pm to 2 pm) for 12 weeks. Participants experienced significant weight loss; however, changes in blood glucose or HbA1c were not detailed<sup>3</sup>. Other relevant studies on TRE in T2DM have been conducted outside South Asia, such as the RESTART-T2D trial in the U.S., which demonstrated modest HbA1c reductions with an 8-hour TRE window<sup>4</sup>.

### 5:2 Intermittent Fasting

Currently, there are no published trials of the 5:2 fasting regimen (5 days of normal eating and 2 days of restricted intake) conducted specifically in South Asian T2DM patients. A recent Chinese RCT demonstrated a 0.5% HbA1c reduction with a 5:2 meal-replacement regimen over 12 months<sup>5</sup>. The absence of similar high-quality trials in South Asians represents a significant knowledge gap.

### Ramadan (Dawn-to-Dusk) Fasting

Multiple studies have evaluated glycemic outcomes during Ramadan in Muslim-majority regions. A meta-analysis of 12 observational studies involving 1,592 patients from the Middle East and Asia found statistically significant post-Ramadan reductions in HbA1c (~0.5%) and fasting glucose (~12 mg/dL) compared to pre-Ramadan levels<sup>6</sup>.

Individual study results vary. For instance, Raza et al. (Pakistan, n=220) observed a modest HbA1c decrease of 0.4% post-Ramadan, with only 3.6% experiencing hypoglycemic episodes<sup>7</sup>. Similarly, a subgroup of Indian and Pakistani patients on insulin glargine 300 U/mL (n=106) reported significant improvements in HbA1c and fasting glucose with minimal hypoglycemia risk<sup>8</sup>.

Conversely, a Sri Lankan study of 120 Muslim T2DM patients found that while weight and waist circumference decreased during Ramadan, average glycemic control worsened substantially, with nearly half experiencing symptomatic hypoglycemia<sup>9</sup>. These conflicting findings may reflect differences in medication adjustments, dietary practices (e.g., high glycemic meals at iftar), and monitoring.

### Hindu Fasting Practices

Hindu fasting practices vary widely, ranging from complete abstinence from food and water to selective dietary restrictions. Common fasts include Ekadashi (twice a month), Navratri (nine days), and weekly fasts dedicated to specific deities. While these practices are culturally significant, there is a paucity of scientific studies examining their impact on glycemic control in T2DM patients. Anecdotal evidence suggests that the variability in fasting duration and dietary restrictions necessitates individualized medical guidance to prevent hypoglycemia or hyperglycemia.

### Jain Fasting Practices

Jain fasting, particularly during the Paryushan festival, involves various forms of dietary restrictions, including complete fasting (no food or water) and partial fasting (limited food intake). A study by Sanchetee et al. (2020) involving 110 healthy volunteers who fasted for durations ranging from 3 to 30 days reported significant decreases in weight and BMI. However, there was a significant increase in fasting plasma glucose levels post-fasting, especially in shorter-duration fasts<sup>10</sup>. Another review highlighted the need for careful glycemic management during Jain fasts, recommending that individuals with diabetes consult healthcare providers for personalized advice<sup>11</sup>.

A comparison of common fasting types and their observed effects on glycemic parameters is summarized in Table 1<sup>4 5 6 10</sup>.

Table 1: Comparative Table of Fasting Types and Glycemic Effects<sup>45610</sup>

	Duration/Frequency	Population Studied	Effect on HbA1c	Effect on Weight	Safety in T2DM Patients
<b>Ramadan Fasting</b>	Daily dawn to sunset, 30 days	Muslim populations	↓ 0.3–0.6%	↓ 1–2 kg	Safe with adjustments

<b>Time-Restricted Eating</b>	8–10 hour eating window daily	Western Indian +	↓ 0.5–1.0%	↓ 2–4 kg	Generally safe
<b>5:2 Intermittent Fasting</b>	2 days/week very low calorie intake	Western populations	↓ 0.4–0.8%	↓ 3–5 kg	Moderate risk
<b>Hindu Fasting (Navratri)</b>	9 days, limited intake or TRE-like	Indian population	Variable	Mild ↓ or no change	Risk if diabetic
<b>Jain Fasting (Paryushan)</b>	1–8+ days, some no food/water	Jain practitioners	Sparse data	↓ 2–3 kg (short term)	Risk of hypo/glycemia

### Mechanisms of Glycemic Improvement

Several mechanisms may explain the observed improvements in glycemic control with intermittent fasting (IF). These include reduced hepatic glucose production, improved insulin sensitivity, and weight loss<sup>4</sup>. Time-restricted eating (TRE) aligns food intake with circadian rhythms, potentially optimizing insulin secretion and glucose metabolism<sup>4</sup>. Moreover, prolonged fasting intervals reduce postprandial glucose excursions and may enhance  $\beta$ -cell function<sup>2</sup>.

Table 2 outlines the hormonal adaptations during fasting that contribute to glycemic improvement in type 2 diabetes<sup>4</sup>.

Table 2: Hormonal Changes Observed During Fasting in T2DM<sup>4</sup>

Hormone	Change During Fasting	Metabolic Impact
Insulin	↓ (Reduced secretion)	Improves insulin sensitivity
Glucagon	↑	Promotes hepatic glucose production (initially)
Ghrelin	↑ pre-meal	May improve insulin secretion rhythm
Adiponectin	↑	Enhances glucose uptake in muscle and liver
Leptin	↓	Improves appetite regulation

### Cultural Considerations and Safety

South Asians often fast for religious reasons, but medical oversight is limited. Ramadan fasting, while structured, varies in meal quality and quantity. Some participants compensate for fasting with calorie-dense meals during iftar, mitigating metabolic benefits<sup>6</sup>. Moreover, medication adjustment is essential to prevent hypoglycemia or hyperglycemia, especially with insulin or sulfonylureas<sup>7</sup>.

Hindu fasting is diverse, with variable durations and dietary restrictions. While some fasts may resemble TRE, others involve only fruit, milk, or complete abstinence. Jain fasting during Paryushan can extend to prolonged periods of no food or water, posing significant risks for diabetic patients. Evidence suggests fasting may reduce weight and BMI in healthy individuals, but may worsen glycemia in diabetics, especially without adequate monitoring<sup>10 11</sup>.

There is a lack of formal guidance tailored for Hindu and Jain diabetics. Education regarding safe fasting, meal planning, glucose monitoring, and medication titration is essential to prevent complications. Mobile apps and telemedicine can support real-time monitoring during fasting periods.

### Research Gaps

Although the benefits of Ramadan fasting in T2DM are well documented<sup>6</sup>, rigorous trials on Hindu and Jain fasting traditions are lacking. The few studies that exist are observational or include healthy individuals<sup>10</sup>. There is also limited representation of South Asians in large TRE or IF trials conducted in Western countries. Given their unique metabolic profile and cultural behaviors, dedicated RCTs in South Asians are warranted.

Furthermore, most studies focus on short-term glycemic changes. Longitudinal studies assessing microvascular and macrovascular outcomes with sustained IF regimens are needed. There is also a need to compare different IF types (e.g., TRE vs. 5:2 diet) head-to-head in South Asian populations.

## Practical Recommendations

For clinicians caring for South Asian diabetics interested in fasting:

- **Pre-fasting evaluation:** Assess glycemic control, comorbidities, and medications.
- **Individualized planning:** Modify meal timing, calorie intake, and drugs.
- **Education:** Instruct patients on symptoms of hypoglycemia and the importance of glucose monitoring.
- **Technology:** Encourage use of CGMs or glucometers during fasting days.
- **Community outreach:** Partner with religious leaders to disseminate health information during fasting festivals.

## CONCLUSION

Intermittent fasting, including time-restricted eating and religious fasting during Ramadan, may offer modest glycemic benefits for South Asian adults with type 2 diabetes. However, outcomes vary depending on fasting regimen, adherence, dietary practices, and medication adjustments. While Ramadan fasting is relatively well studied, Hindu and Jain fasting remain under-investigated, especially in diabetic populations.

Healthcare providers must proactively engage with fasting patients to tailor safe, evidence-based diabetes management plans. Future research should prioritize culturally inclusive trials, especially for underrepresented practices like Navratri and Paryushan fasting, to better inform clinical guidelines for this high-risk population.

## Conflict of Interest

The author(s) declare no conflict of interest.

## Abbreviations

HbA1c: Glycated Hemoglobin A1c; T2DM: Type 2 Diabetes Mellitus; TRE: Time-Restricted Eating; SU: Sulfonylurea; BMI: Body Mass Index.

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