



EMPHNET's Research Digest

Effects of Ramadan Fasting on Glycemic Control Among Patients with Type 2 Diabetes: Systematic Review and Meta-analysis of Observational Studies

Introduction

Type 2 diabetes mellitus (T2DM) is a chronic condition that poses a significant public health concern globally due to its increasing prevalence. It is a major cause of blindness, kidney failure, heart attacks, stroke, and lower limb amputation. Accordingly, managing blood sugar levels is essential for people with T2DM, and this often requires lifestyle changes including a healthy diet and regular physical activity, as well as compliance to anti-diabetic medications and close follow-up with physicians.

Fasting in patients with T2DM has long been a controversial issue.

Each year, and for an entire month, the Muslim population practices Ramadan fasting, which involves abstaining from food and drink from sunrise to sunset. Despite the exemption of Muslims with physical illnesses, including T2DM, from fasting, many still choose to

fast, sometimes without medical consultations and even against medical recommendations.

The "[Effects of Ramadan Fasting on Glycemic Control Among Patients with Type 2 Diabetes: Systematic Review and Meta-analysis of Observational Studies](#)" published December 2022 in *Diabetes Therapy*, aimed to investigate the effects of Ramadan fasting on glycemic control among patients with T2DM of various age groups. The meta-analysis study specifically aimed to answer two questions: (1) What are the effects of Ramadan fasting on glycemic control biomarkers such as HbA1c and fasting blood glucose (FBG) in patients with T2DM? (2) How does fasting during Ramadan influence body weight of these patients?

Rigorous Methodology

The study followed a rigorous methodology, its protocol was registered in PROSPERO, the

manuscript followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guidelines, and Risk of Bias was assessed for all studies. Eight databases were searched from 2000 to 2021 for observational studies that assessed glucose parameters (HbA1c and FBG) and body weight before and after Ramadan fasting, in patients with T2DM.

Only studies with a sample size of at least 20 patients, a duration of at least two weeks, and reporting means and standard deviations or sufficient data to calculate them, were included.

Furthermore, studies that did not include young adult patients (12–24 years old) with T2DM were excluded.

Additionally, patients with T2DM and comorbidities, such as chronic illness and/or obesity, were also included in the analyses.

The meta-analysis effect sizes for the tested outcomes were calculated as weighted mean difference (WMD), with their confidence intervals (CI). The two data points were defined as: (1) outcomes collected before fasting were all data collected in the month immediately preceding the month of Ramadan and up to the first few days of Ramadan; (2) outcomes collected after fasting were all data collected at the end of Ramadan and up to 1 month after the cessation of the month of Ramadan.

Twelve studies conducted in Middle Eastern and Asian countries, with a total population of 5554 participants (46% females, age range 18-95 years, mean age 45-55 years), met the inclusion criteria. The quality of the studies ranged between fair (83%) and good (17%). Although young patients with T2DM were enrolled in the 12 selected studies, no studies solely focused on this group.

Conducting a subgroup analysis was not possible due to the limited data available in the included studies.

Improved Glycemic Control Biomarkers

All studies assessed HBA1c, and the pooled analysis demonstrated that HBA1c significantly decreased (glycemic control improved) after Ramadan fasting when compared to the pre-fasting levels (WMD = 0.55 mg/dl, 95% CI 0.33–0.77, $P < 0.00001$, $I^2 = 93\%$).

Five studies assessed FBS, and the pooled analysis similarly showed significant improvement (WMD = 12.42, CI 6.46–18.38, $P < 0.0001$). However, both analyses showed high heterogeneity ($I^2 = 93\%$ and 81% , respectively), indicating between-study variations.

No Effect on Body Weight

Ten studies reported the effect of Ramadan fasting on body weight in individuals with T2DM, and their pooled analyses showed

no difference after Ramadan fasting versus pre-fasting, with no heterogeneity between studies ($I^2=0\%$).

Limitations of the Findings

The findings of this systematic review and meta analysis suggest favorable outcomes of Ramadan fasting on patients with T2DM, including a potential for Ramadan fasting to act as non-pharmacological therapy for T2DM management.

However, healthcare providers should carefully evaluate each patient's individual circumstances before recommending fasting. A limitation that was not highlighted in the paper is the possible negative effect of fasting on patients with T2DM, which includes hypoglycemia, or low blood sugar. A decrease in FBS or HBA1c does not necessarily indicate improvement in glycemic control, as this decrease can be caused by hypoglycemia which is a serious and dangerous complication of fasting in patients with T2DM.

Although this study attempted to investigate the effect of Ramadan fasting on young individuals with T2DM, there was not enough data to conduct subgroup analysis by age groups. The selected studies included participants of various age groups, but none of them specifically focused on young adults with T2DM. This is an important area for future research, as young patients may have unique needs and considerations when it comes to managing T2DM and fasting during Ramadan.

Another limitation of this study is the potential impact of confounding factors on the results. The effect of the number of fasting days, duration of fasting, season of fasting (e.g., summer vs. winter), was not assessed. Additionally, participants may have made changes to their diet or physical activity levels during Ramadan, which could have influenced their glycemic control

outcomes. Future studies should take into account these potential confounders and consider ways to minimize their impact on the results.

In conclusion, this systematic review and meta-analysis suggests that Ramadan fasting may have a positive impact on glycemic control among patients with T2DM. However, further research is needed to better understand the effects of Ramadan fasting on young patients with T2DM and the impact of other factors such as hypoglycemia, diet and physical activity on glycemic control during Ramadan. Healthcare providers should carefully evaluate each patient's individual circumstances before recommending fasting as a non-pharmacological therapy for T2DM management.

Overall, this study has important implications for the Muslim Population in the region with T2DM who choose to fast during Ramadan, as well as for healthcare providers and researchers seeking non-pharmacological approaches to T2DM management.



**The content is solely the responsibility of the authors and does not necessarily represent the official views of GHD|EMPHNET*