

Effect of Pre- Ramadan Risk Assessment and Education on Fasting- Related Patient Outcomes in Ambulant Adults Living with Diabetes Mellitus: A Multi-Center Case Control Study

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Abstract

Background: Diabetes Mellitus (DM) is associated with increased risk of dehydration, hyperglycemia, thrombosis and hypoglycemia in patients who fast during the month of Ramadan. However, this risk is not universal, and therefore pre- Ramadan risk stratification and education of all People Living With Diabetes (PLWD) is recommended to achieve safe fasting.

Objectives: This study aimed to describe the differences among fasting related patient outcomes based on two groups: those that received the pre-Ramadan risk stratification and patient education versus those that did not.

Methods: Retrospective un-matched, case-control study, at three health-care facilities, included adult Muslims with a diagnosis of DM who attended the facilities from February 2022 (pre- Ramadan) to July 2022 (post- Ramadan). Cases were individuals who attended the clinics pre- Ramadan and received pre- Ramadan risk stratification and education, fasted in Ramadan and followed up post- Ramadan for post- Ramadan evaluation of outcomes. Controls were individuals who did not attend the clinic before Ramadan but attended post-Ramadan.

Results: Eighty eight participants completed both the pre and post Ramadan evaluation, amongst whom, 59 (67%) fasted during Ramadan (cases), versus a total of 81 controls. Fifty two point five percent of cases were in the moderate-high risk categories, 18.6% of the cases and controls (combined) had daytime hypoglycaemia, mostly between 3.00 pm and Maghrib time and 1/3rd of

these participants had to break their fast. Seventeen point nine percent had a hyperglycaemic episode, 1/3rd of which occurred during both eating and fasting hours, and 20% of them broke their fast; only one patient required admission for hyperglycaemia. Median HbA1C was 8.5% [IQR 2.4]. There was no significant difference in type of diabetes, fast breaking during Ramadan, number of days fasted post- Ramadan, hypoglycaemic and hyperglycaemic outcomes, medication use, glycaemic control, diabetes related comorbidities and complications amongst the cases (n=59) and controls (n=81). However, cases had significantly higher rates of Self-Monitoring of Blood Glucose (SMBG) (98.3% vs 75.3%, $p < 0.001$) and pre-Ramadan diabetes education compared to controls. We found that almost a quarter of the controls had also received pre- Ramadan diabetes education.

Conclusion: In this pioneer study in our region, we found a higher frequency of SMBG in those that received pre- Ramadan risk stratification and education, and a lower threshold of breaking the fast due to hyperglycaemia in all participants that had received any form of pre- Ramadan diabetes education. We recommend pre- Ramadan screening and education for all patients with diabetes, and larger, prospective studies, with structured diabetes education programs to further evaluate the gaps in our study.

Key words: Diabetes Mellitus (DM), Pre- Ramadan risk assessment, Fasting-related patient outcomes