Importance of education in managing type 2 diabetes during Ramadan

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Approximately 50 million Muslim adults with type 1 diabetes (T1D) and type 2 diabetes (T2D) go without food or drink from sunrise to sunset during the month of Ramadan, despite having a religious exemption.[1] For many Muslim people with diabetes, Ramadan is a religious conviction and the intermittent fasting is a key component of its observance. The EPIDIAR (Epidemiology of Diabetes and Ramadan) study investigated this phenomenon in 12 243 participants from 13 countries and observed that 43% of T1D patients and 79% of T2D patients fast during the month of Ramadan.[2] Fasting during Ramadan potentially affects dietary habits, daily physical activity, sleeping patterns, glycemic control, weight, lipid profile, and food intake. **Figure 1** shows a typical Ramadan day.

The benefits and risks of intermittent fasting in people with T2D are still being explored. The latest findings suggest that fasting T2D patients might be at risk of hypoglycemia with inappropriate continuation of pharmacotherapies; patients with T1D have a 4.7-fold (0.14 vs 0.03 episodes per month) and patients with T2D have a 7.5-fold (0.03 vs 0.004 episodes per month) increased risk of severe hypoglycemia.[1] Some other important potential complications of fasting for these patients are hyperglycemia, diabetic ketoacidosis, dehydration, and thrombosis. Vasan et al conducted a prospective assessment of dietary patterns in Muslim patients in Sweden with T2D who undertook fasting during Ramadan.[3] Patients' compliance with nutritional guidelines was poor, causing an increase in consumption of all dietary components (fat, carbohydrates, and proteins). The authors concluded that these patients needed close monitoring during fasting.

Body composition studies and Ramadan

Unfortunately, most of the body composition studies on Ramadan fasting were done in athletes. A recent systematic review looking at dietary intake, body weight, and lipid parameters in patients with T2D reported no significant improvement in lipid profile during Ramadan fasting.[4] Very few looked at how body composition, especially visceral fat, might change in people with or without diabetes,[5]

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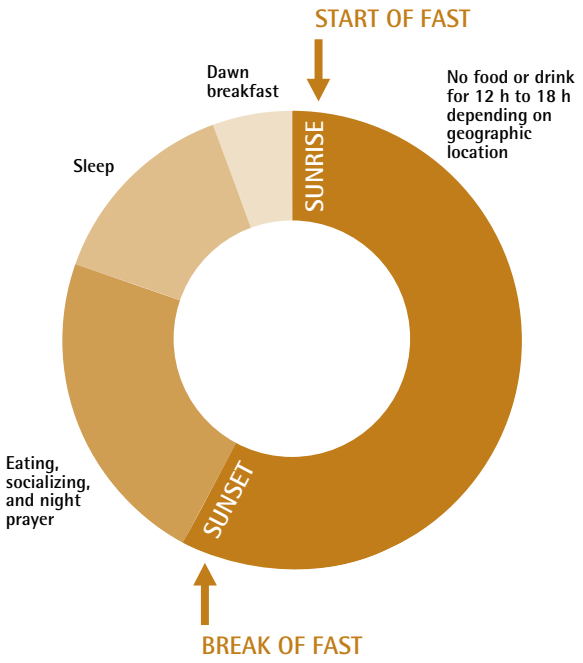
Figure 1. Typical day during Ramadan



or contribute to potential unseen advantages. The main notable benefit was a substantial increase in high-density lipoprotein levels by 30% to 40% in healthy subjects but not in those with diabetes.[4] To the best of our knowledge, no studies showed if intermittent fasting contributed to a shift in fat distribution, potentially improving glycemic control. M'guil et al measured anthropometric and metabolic markers in 120 T2D patients with controlled diabetes on the day before Ramadan, the 15th and 29th days of Ramadan, and 15 days after the end of Ramadan, after providing dietary instructions and oral agent adjustments.[5] They concluded that the intermittent fasting had no substantial effect on energy intake, body mass index, blood pressure, or renal function. They found some fluctuations in lipid, creatinine, uric acid, total protein, bilirubin, and electrolyte levels. In an observational study of 17 people using a 72-hour continuous glucose monitoring system, there was a significant reduction in hyperglycemic events ($P=.04$) and no change in hypoglycemic events during

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Ramadan (P=.21).[6] Although the sample size was small, the authors concluded that Ramadan fasting was safe for patients with well-controlled T2D who were compliant with their pharmacotherapy.[5,7]

Treatment during fasting

In terms of medication, dose and timing need to be adjusted during this period to accommodate the dietary and lifestyle changes (insulin and oral hypoglycemic agents).[8] To reduce the risk of hypoglycemia during the day and hyperglycemia at night, T2D patients who fast need to be frequently monitored to determine changes in blood glucose level and to provide necessary adjustments to treatment options. Metformin alone can be used safely during the fast with minimal possibility of severe hypoglycemia; however, consensus recommendations suggest the dosage can be modified such that two-thirds of the total daily dose is taken with the sunset meal and the other one-third is taken before the pre-dawn meal.[1,8] Sulfonylureas should be avoided during Ramadan fasting because of the risk of hypoglycemia.[6] Another option is short-acting insulin secretagogues for patients with postprandial hyperglycemia.[9] Physicians who treat patients with insulin should consider intermediate-acting or long-acting insulin preparations plus short-acting insulin before meals.[1]

Lifestyle interventions and patient education

Currently, most physicians find it acceptable for patients with well-controlled T2D to fast during Ramadan provided they remain vigilant about their health conditions, lifestyle choices (diet and medication), and exercise regimens.[4,10] Ramadan-focused education was shown to be beneficial in empowering those living with diabetes to change their lifestyles during Ramadan.[11] Counseling before the start of Ramadan can increase awareness of adverse effects and proper management of diabetes. Citizens of the United Kingdom with T2D who fasted during Ramadan and participated in a Ramadan Education and Awareness in Diabetes program were more likely to make healthy lifestyle choices and to minimize the risk of hypoglycemic events and weight gain.[12] Those who wanted to fast underwent pre-Ramadan assessment and structured learning for physical activity, meal planning, glucose monitoring, and dosage and timing of medications. The recommendations were for breaking the fast with slow-energy-release foods and minimizing food high in saturated fat; exercising lightly on a regular basis without overexercising in the evenings to avoid hypoglycemia; using blood glucose testing (as it does not break the fast) and testing when unwell; breaking the fast and getting help when recognizing a hypoglycemic event; and seeking medical advice from their general practitioners before Ramadan and making any health adjustments needed.[12] Fatim et al observed a benefit in diabetes control in 96 patients who completed 15 days of Ramadan fasting awareness education.[11] Moreover, Ahmedani et al observed an improvement in the number of acute diabetes complications with active glucose monitoring, alteration of drug dosage and timing, dietary counseling, and patient education in a prospective study of 110 patients. They noted that most hypoglycemic and hyperglycemic episodes occurred before dawn, suggesting a need for more focused education efforts.[13]

Many physicians are not aware of the education that needs to be provided to their patients with diabetes who fast during Ramadan. This might be because they are unaware of existing educational materials for fasting in people with T2D, or because they are unaware that patients intend to fast owing to a communication gap between physicians and patients.[14] In France, a cross-sectional study 3 months before the start of Ramadan evaluated the attitudes of 202 patients and general practitioners toward Ramadan fasting and diabetes. Patients' inadequate education and stringent religious attitudes put them at risk of hypoglycemia during the fast. Moreover, they skipped the pre-dawn meal and some persisted in taking sulfonylureas. More than 27% of patients who experienced hypoglycemia during the day refused to ingest anything orally to correct the hypoglycemia, as it would break their fast. The study also reported that general practitioners' knowledge of fasting was low, which might have led to a lack of patient education or evidence-based advice.[14]

Reflections

In the next 6 years, Ramadan will fall during the months of June and July, the hottest time in most northern-hemisphere countries. Fasting T1D and T2D patients will have to endure very long days until sunset and an increased risk of dehydration. To respect individuals' choices to observe Ramadan fasting, the needs of those living with diabetes need to be considered. Health professionals can play an important role in making their diabetes patients aware of the risks and providing guidelines to minimize any negative effects that might result from the intermittent fasting. Before Ramadan, it is advisable for physicians to ask their Muslim patients with diabetes if they are going to fast to establish a plan for adjustments to their treatment and diet. Some recommendations to offer to patients are to eat healthy food (slow-energy-release foods and foods low in saturated fats), partake in light physical activity during the day but less at night, test blood glucose when needed, break the fast when at risk of hypoglycemic events, and stay in close contact with their physicians before and during Ramadan.

Conclusion

The published literature indicates that there is an

increasing number of T1D and T2D patients who fast during Ramadan. To date, there have only been relatively small studies evaluating metabolic changes in those with or without diabetes during Ramadan. These studies indicate that fasting does have a metabolic effect but it needs to be investigated more definitively in a larger sample of patients. To our knowledge, there have been no studies examining the effect of intermittent fasting in T2D versus controls on visceral fat, nephropathy, retinopathy, and neuropathy appearing after Ramadan. Treatment should be individualized and further studies are needed to explore the potential advantages of incretin-based therapies and insulin pumps during Ramadan. While population studies have indicated a positive effect from patient education, very little has been done to support physicians treating fasting patients with diabetes. Physicians, especially in non-Muslim countries, might have very little knowledge or familiarity with intermittent fasting during Ramadan and its effect on patients. These physicians might err on the side of caution and advise against fasting as a general recommendation. This might result in an unnecessary rift in communication and the patient-physician relationship. Further research can contribute to culturally appropriate best-practice recommendations to support both physicians and patients.

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Competing interests
None declared

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