

## Editorial

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# Diabetes and Fasting in Ramadan

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### Summary:

*During Ramadan, Muslims with diabetes are subjected to fasting. Worldwide, seventy-seven per cent of Muslims fast during Ramadan, about 1.8 billion (24% of the global population). They have to fast and control blood glucose as well. To maintain good health, they need to control their blood pressure and lipids and maintain their weight. Every patient with diabetes has to see their physician from one to three months before the start of Ramadan. Physicians need to stratify the risk involving people with diabetes wishing to fast. Some people with diabetes might belong to a risk or very high-risk group. Fasting during Ramadan is of the highest risk for Type 1 diabetes and diabetes with pregnancy. Physicians have to remain vigilant on comorbidities and complications of diabetes. Physicians may help people with diabetes plan their lifestyle, diet, exercise and modify medication if necessary. People with diabetes can test their blood during their daytime fast. They need to do exercises in moderation, avoiding exhaustion. Tablets with a single evening dose are preferred to control diabetes if possible. Analogue basal is the preferred insulin. The diet should be adjusted to keep the daily calorie requirement before Ramadan. It is possible to customize the type of meals honoring the religious attitude and appetite during Ramadan. Fasting is not only a religious ritual; it can potentially have multiple health benefits for people with diabetes, emphasizing the importance of maintaining good health during fasting and the audience's responsibility and commitment.*

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### Introduction:

As 10% of the whole population is diabetic, a large number of Muslims are fasting. Ramadan is one of the five pillars of Islam. Every Muslim must fast under the circumstances that they are physically able to. One month of fasting is a blessing to Muslims from various perspectives. Most Muslims wish to fast during Ramadan, even those who could be exempted, such as the elderly, children and pregnant women. As per EPIDIAR study, 89.8% of Bangladeshi type -2 diabetes persons fast during Ramadan.<sup>1</sup>

### Risk of fasting for people with diabetes:

We can grade the risk by using the parameters. It may be mild, moderate and high.

Higher risk: Type-1 diabetes and pregnancy diabetes are of the highest risk. Likewise, older people can't take care of themselves, and patients having unstable angina or recent MI strokes and TIA are at the highest risk. People who are unaware of hypoglycemia or recent severe hypoglycemia are at higher risk. Similarly, in grade 4 and more advanced

chronic kidney disease, patients on dialysis and those with kidney transplants are at higher risk<sup>2</sup>. Rest is mild or moderate risk who must fast. Those with acute conditions like diarrhea, vomiting, and fever are exempted but must have compensatory fast after recovery at their convenience.

Risk means worsening the disease, detrimental to health conditions, and imposing death. Efforts to control diabetes impose a risk of acute complications. In pregnancy, there is a risk for the mother and baby in the womb. During Ramadan, people fast for 12-13 hours during the day. On the usual days, they fast for 11-12 hours at night. One must be aware of complications, especially hypoglycemia. The doctor is responsible for educating the people with diabetes regarding risk. Patients with diabetes who are willing to fast should attend the diabetic clinic or visit their physician one to three months before starting Ramadan.<sup>3,4</sup> Physicians must assess clinically, investigate accordingly, and stratify risk groups based on their occupation, type of diabetes, level of glycemic control, pharmacological agents including insulin, risk of hypoglycemia and its awareness, risk of other complications,

comorbidities, etc. Physicians have to plan their lifestyle during Ramadan, including diet and exercise, modification of pharmacological agents, and follow-up during Ramadan.

#### **Blood glucose test and monitoring during Ramadan:**

All Islamic intellectuals say blood glucose tests during Ramadan do not break the fast. Every able person must learn self-monitoring blood glucose (SMBG) tests from the fingertip. To appraise the status of control, people with diabetes need to check capillary blood glucose three times<sup>5</sup>, two hours after food, morning and night and afternoon to appreciate hypoglycemia. People with high risk need more frequent testing with maintaining a chart, and blood glucose must be checked during symptoms of hypoglycemia.

**No test:** Some are controlled with diet only, have good A1C beforehand, do not feel bad, and may not need a single prick for the test.

**Once-a-day test:** One with a single dose of OHA may need one test in the latter part of the day.

**Twice a day:** For people with insulin, two doses of OHA may need to be tested 2 hours after meal at night and day.

**Test thrice a day:** Once more for Hypoglycemia identification.

**Food and meals:** A diet should be continued containing approximate calories used to be taken before Ramadan. About 45-60% of total calories should come from carbohydrates, 20-25% from protein and 20-30% from fat. Three main meals viz Iftar (breakfast), midnight after Tarawih (lunch), and sahur(dinner) may be equally divided with two snacks at intervals. Low Glycemic index foods are preferable. Exchange food, choice of items and taste should be respected. One egg with yellow, one sweet fruit and one cup of milk must be ensured daily. Refined sugar and excess fat have to be avoided. Two -to three Liter of fluid throughout the night to be taken. Adequate fiber, fruits, and vegetables are good for health. Three dates contain 41 gm of carbohydrates. It has fibers, minerals and antioxidants like other fruits. Fibers in meals delay carbohydrate absorption, which acts like low Glycemic Index foods. Fibers also soften stool and help to avoid constipation. Drinking tea and coffee is better to avoid this month, specifically at sahur, as these cause polyuria. Ramadan may be the best month to quit smoke.

**Exercise in Diabetes:** The exercise habit should be maintained to help with fitness and glycemic control. All three types of exercise may be done. Cardio increases heart rate. Brisk walking is best. Dancing and gardening are the same. One must avoid exhaustion. Swimming and cycling

are possible. Trade mill bicycle ergometry at home is also better if managed. Muscle strengthening exercises, i.e., standing in one place and doing hand exercises, are better during Ramadan as dehydration is less. Twice a week for ten minutes is good. Tai chi is similar but has yet to become popular in our region. Stretching or yoga is also suitable for health. The duration should be 150 hours per week (minimum), 45 minutes daily.

**Drug treatment for diabetes in Ramadan:** It is elementary to adjust if well controlled from the pre-Ramadan period. Some principles may be adopted to adjust pharmacological agents during Ramadan.

- A non-insulin regimen is preferred in the absence of insulin indication.
- No new regimen or drug during this month
- A single dose or a maximum of two doses of oral medication is preferable (MR XR ER, the combination has made it possible)
- Long-acting insulin, specifically basal analogue basal-bolus analogue, the preferred regimen
- Shared decisions based on patient preferences and financial capacity

**Sulphonyl urea (SU):** The chance of hypoglycemia is maximum. Glibenclamide is to be avoided. A single dose and an evening dose at Iftar are preferred. When with single dose insulin, SU is given in the evening.

**Metformin:** Hypoglycemia does not happen. Combination with SU should be at Iftar.

**DPP4 inhibitors:** Very low potential for hypoglycemia when used singly. Combination with Metformin sometimes causes trouble because of the bigger size of the tablet.

**Gliflozin:** In Newer patients or older, do not initiate with it. It causes diuresis, so extra water intake is to be ensured. So, the first part of the night is an excellent time to take Gliflozin.

**Insulin:** Insulin has the highest capacity to reduce blood glucose and causes hypoglycemia. The morning (breakfast) dose of Insulin has to be taken in the evening (Iftar), and the night dose of insulin has to be taken at sahur with an appropriate dose reduction in people who are on existing pre-Ramadan insulin regimens.

Basal insulin should be continued at the same dose as sahur. NPH (neutral protamine Hagedorn) (single or two doses) is not the preferred pharmacological agent as an insulin regimen at Ramadan. However, in the case of preexisting well-controlled diabetes with NPH, insulin can be continued with a 25-50% dose reduction. Sohur should be reduced by 50% if there are two doses.

**Premixed Insulin:** The iftar dose has to be continued as the pre-Ramadan dose, and the Sahur dose has to be reduced to half. Capillary blood glucose should be monitored, particularly at 10 am (10 mmol/L), to monitor glycemic control and predict hypoglycemia. Take a fingertip random glucose test at 10 am.

**Rapid/short-acting insulin:** Short/rapid with a basal single dose at Iftar is the best option at Ramadan. Lunch dose has to be taken at dinner after tarawih. If the blood glucose before Iftar is 3.9-5, the dose has to be reduced by 2 units; if it is less than 3.9, the dose has to be reduced by 4 units. A dose increment is necessary if glucose is more than 7.2 mmol just before iftar.

All drugs are to be taken at Iftar after drinking water. After completing the Iftar meal, a diabetic should go for maghrib prayer. Adequate water is to be ensured. Insulin can be taken zero to 20 minutes before food. So, waiting for food after injection or tablet is not mandatory.

**GLP-1 agonist (dulaglutide or semaglutide):** It can be continued as the same single weekly dose as before Ramadan. Not to initiate during Ramadan fasting, considering the inevitable side effects of GI upset.

**Tablet and injections combined:** The dose has to be adjusted to keep blood glucose 6.7 to 8 mmol/L in case of combined Insulin and secretagogue intake.

#### **Comorbidities in People with Diabetes in Ramadan:**

Most people with T2DM have high blood pressure and high cholesterol, and many of them are overweight, which is to be taken care of during management.

**Hypertension:** Antihypertensive drugs are to be divided if needed, and a major portion in the evening. Diuretics should be taken in the evening if those cannot be omitted. Night dip of pressure is natural, which should be kept in mind. Postural hypotension is not uncommon and should be avoided. Dose and drugs should be selected accordingly. Drugs for cardiovascular disease can be adjusted in single or two doses.

**Ramadan in the elderly:** Those who can't move on their own, have dementia and frailty and need special attention are at high risk of acute complications, including hypoglycemia. DAR global survey found that elderly people are comparatively more eager to fast, and they are more prone to develop hypoglycaemia.<sup>6</sup> The dose and schedule of sulphonyl urea and insulin are to be changed and adjusted. Beta-blockers, Salicylates, Warfarin, and TCAs should be changed or omitted. Many of the elderly diabetics have the disease of hypoglycemia unawareness. They may refrain from fasting.

#### **Ramadan and complications of diabetes:**

Excess carbohydrate intake, lesser active work, sleep disturbances, inadequate water intake, and omission or maladjustment of essential medications increase the risk of atherosclerotic diseases during Ramadan. These factors are avoidable. Patients with chronic kidney disease (CKD) and kidney transplant patients should often monitor creatinine and electrolytes; there are no changes in eGFR and blood biochemistry.<sup>7</sup>

#### **Acute emergencies of diabetes during Ramadan fasting: Hypoglycemia:**

**Mild hypoglycemia** when the patient can manage himself (BG 3-3.9 mmol/L; 54-70 mg/dL). The patient feels hungry and becomes tremulous and sweaty. This urges the patient to take sugar without waiting for anybody (doctor/relatives).

**Severe hypoglycemia:** Patients become unconscious and cannot manage themselves. The incidence of hypoglycemia is 1.5 times during Ramadan. [EPIDIAR] Reasons for hypoglycemia during Ramadan include inappropriate adjustment of the drug, inadequate meals during Iftar and sahur, inappropriate adjustments in drug schedules during the period of Iftar or sahur and comorbidities with hepatic and liver dysfunction.

**Hyperglycemia:** Higher blood glucose in the range of > 16.7 mmol/L (300 mg) in fasting Ramadan is not infrequent and a big problem. Unusual omission or reduction of tablets or injections for fear of hypoglycemia is the main reason. Heavy meals and excess and unaccustomed sweet eating also cause Hyperglycemia, which may be manifested as diabetic Ketoacidosis or as a hyperosmolar state. Both this condition needs treatments with hospitalization. In a fasting state, insulin is diminished in the body. There is excess ketone body production in the body, which may lead to ketoacidosis.

**Dehydration:** Less water intake and excess work, high-temperature, high humidity, and high blood glucose all may lead to dehydration. Extreme dehydration increases the concentration of blood coagulation factors in the blood, resulting in thrombus formation. Dehydration compels breaking fast. During Ramadan, adequate drinking water is to be ensured. Drinks containing caffeine may be abstained.

**Health benefits of fasting in Ramadan:** Cholesterol, specifically LDL, is minimized during Ramadan, which is beneficial for heart and heart disease. The hunger hormone ghrelin is decreased in Ramadan, which is weight-friendly. American studies say the brain renovates its protein during fasting. Neurotropic hormones in the brain increase. The brain becomes active and lively. The brain remains contented with mental peace in Ramadan fasting. Stress hormones

remain settled in Ramadan as there is less stress. Whole-day fasting keeps the stomach empty. The body burns toxins. Fasting uses and burns fat. So fat and fat-related nonessential substances are reduced. Fasting can help restrain from smoking & drinking alcohol and caffeine. Diabetes compels someone to be disciplined. Ramadan fasting may be a good rehearsal of refurbished discipline. Ramadan can eliminate distress and depression by bringing mental peace through observation of the teachings of Islam and the Quran in this best month.

### Conclusion:

Ramadan fasting is one of the five pillars of Islam. Diabetes does not exempt someone from fasting. We should learn that fasting is possible in most chronic diseases. Doctors, patients and those involved in care must learn how to reschedule daily food, drugs, work and exercise of usual day time into a Ramadan fasting period of one month. Practice and learning should be started one to three months before the ensuing days of fasting.

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