# Diabetes Management in Ramadan – A Clinical Review

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Received: May 2020; Accepted: June 2020; Published: July 1, 2020.
Citation: Jazeb Razaq, Shayaan Ahmed Saqib. Diabetes Management in Ramadan – A Clinical Review. World Family Medicine. 2020; 18(7): 50-58 DOI: 10.5742MEWFM.2020.93835

## Abstract

Ramadan is the month of fasting and is considered an integral part of the Islamic faith. Throughout the holy month it is compulsory for all healthy adult Muslims to fast. Individuals can be exempt from fasting if they are unwell or suffer from chronic medical conditions such as diabetes. Despite this, a considerable proportion of diabetic patients disregard medical advice and continue to fast. As a result, patients face potential complications leading to significant management challenges for healthcare professionals. With the increasing global prevalence of diabetes, the rates in the Muslim population are also expected to see a dramatic rise, it is therefore imperative to have clear up-to-date guidance for the management of diabetes during Ramadan.

In this article we aim to summarise the latest guidance and practical recommendations available for best managing diabetic patients who choose to fast during Ramadan.

Key words: Diabetes, Ramadan, Fasting, blood glucose monitoring, hypoglycaemia, hyperglycaemia

## Introduction

Ramadan is the ninth month of the Islamic calendar. Fasting during Ramadan forms one of the five pillars of Islam. The fast involves abstinence from, food, drink, oral medications, smoking and sexual activity from dawn to dusk (1). It is obligatory for all healthy adults to fast. However, fasting is not intended to create excessive hardship and therefore exemptions exist. One such group of individuals who are exempt include those with chronic illnesses such as diabetes for whom fasting may be detrimental to their health. Despite this, many Muslims who could seek exemption choose to fast for cultural, social and religious reasons (2).

It is estimated that there are over a 150 million Muslims with diabetes worldwide, and studies have shown that many of these patients choose to observe fasting during Ramadan (3,4,5).

For countries in the northern hemisphere fasting hours in the summer months can be in excess of 16 hours; this can pose challenges for both patients and healthcare professionals.

The potential risks for diabetic patients who choose to fast in Ramadan include, hypoglycaemia (blood glucose of <70 mg/dL [3.9 mmol/L]), hyperglycaemia (blood glucose of >300 mg/dL [16.7mmol/L]), diabetic ketoacidosis, dehydration and thrombosis (6). In addition to the risk of adverse events patients can also make unsafe choices regarding their diabetes management during this month. They will often not consult with clinicians for advice prior to fasting, arbitrarily change medication doses, timings, frequency and or omit them altogether.

It is therefore important that healthcare professionals are proactive in identifying and engaging with diabetic patients who wish to fast during Ramadan at an early stage. An individualised Ramadan management plan should be discussed and agreed upon, with the aim of providing the best possible care and support to minimise the risk of any complications.

### What does fasting involve?

'Sawm' is the Arabic word for fasting and involves abstinence from all forms of oral intake including food, water and medications during daylight hours. The month of Ramadan is when Muslims around the world observe fasting for a total of 29-30 days. During this month, patients will have only two main meals a day, the first which is the predawn meal called suhoor (sehri) and the second which is called iftar (fatoor) taken at sunset.

### Who is exempt from fasting?

The elderly and frail, acutely unwell adults, individuals with chronic health conditions such as diabetes who are at risk of harm or complications, those with mental health issues and learning disabilities, prepubertal children, pregnant or breast-feeding women are all exempt from fasting.

### What if you cannot fast?

Patients who are exempt from fasting have the option of offering charity or providing food for the poor. If appropriate, the fast may be postponed and made-up at a later date (1). For more detailed advice on these matters, the opinion of a religious scholar can be sought.

## Management of diabetes during Ramadan

### Pre-Ramadan assessment and counselling

The National Institute for Health and Clinical Excellence advocate an individualised approach to diabetes care tailored to the patient`s personal, social and cultural preferences (7).

It is advised diabetic patients wishing to fast should have an assessment with their GP or diabetic specialist at least 6- 8 weeks before Ramadan begins. This should be an opportunity to assess and discuss glycaemic control, lipids and blood pressure alongside the risks involved with choosing to fast. Patients should be advised according to their personal circumstances, allowing healthcare professionals to formulate a safe and personalised care plan for each individual.

It is recommended that prior to the commencement of Ramadan, diabetes education should focus on the following key components (8):

- Risk Assessment
- Dietary and fluid advice
- Exercise and smoking advice
- Blood glucose monitoring
- Awareness of complications such as hypo or hyperglycaemia and when to break the fast
- Medication review and adjustment

### Risk assessment

For patients who intend to fast, it is important to quantify the associated risk from fasting. In doing so, particular focus should be given to the following key areas: the type of diabetes, medications being taken, the individual's risk of hypoglycaemia, the presence of complications or comorbidities, social and work circumstances and their previous experience of fasting during Ramadan (9). Based on this information, patients can be categorised as either very high, high, moderate or low risk of adverse events, see Table 1 (8).

**Table 1: Risk stratification for patients with diabetes who fast during Ramadan**
Adapted from Hassanein M et al, 2017 (8)

| Category | Patient Background | Recommendations |
|---|---|---|
| Very High Risk | • Severe hypoglycaemia in the 3 months preceding Ramadan<br>• Diabetic ketoacidosis in the 3 months preceding Ramadan<br>• History of recurrent hypoglycaemia<br>• History of hypoglycaemia with unawareness<br>• Hyperosmolar hyperglycaemic coma in the 3 months preceding Ramadan<br>• Type 1 diabetic - poorly controlled<br>• Acute illness<br>• Chronic kidney disease stage 4 & 5 and those on dialysis<br>• Advanced macrovascular complications<br>• Old age with ill health<br>• Gestational diabetes mellitus treated with insulin or sulphonylureas or pregnancy in pre-existing diabetics | Patients advised NOT to fast due to high risk of harm.<br><br>If patients insist on fasting, they should:<br><br>o Be given detailed structured education<br>o Arrange regular follow up with clinician<br>o Observe close self-monitoring of blood glucose<br>o Adjust medication regimen as advised<br>o Have awareness of hypo & hyperglycaemia and be prepared to break the fast |
| High Risk | • Type 2 diabetic – poor glycaemic control<br>• Type 1 diabetic well controlled<br>• Type 2 diabetic on multiple daily injections or mixed insulin<br>• Diabetic performing intense physical labour<br>• Chronic kidney disease stage 3<br>• Stable macrovascular complications<br>• Treatment with medication that may affect cognitive function<br>• Patients with comorbidities that present additional risk factors<br>• Pregnant type 2 diabetic or gestational diabetes mellitus controlled by diet or metformin alone | |
| Moderate/Low Risk | • Well controlled Type 2 diabetic treated with one or more of the following:<br>o Diet & Lifestyle<br>o Metformin, acarbose, second generation sulphonylureas dipeptidyl peptidase-4 inhibitors, thiazolidinediones, SGLT2 inhibitors or basal insulin | • Patients advised they can fast<br>• Patients should:<br>o Be given detailed structured education<br>o Observe self-monitoring of blood glucose<br>o Adjust medication regimen as advised |

Patients who are deemed to be very high or high risk are advised not to fast. Those that fall into the moderate and low risk categories may fast taking into account the recommendations that are made after discussion with a healthcare professional. This advice has also been reviewed and endorsed by leading religious scholars specialising in Islamic jurisprudence (10,11).

Despite the advice for patients in the two highest risk categories to not fast, most will choose to do so against medical advice and it is important to respect their decision. Healthcare professionals should continue to provide the best possible care, and support patients to fast as safely as possible.

**Dietary and fluid advice**

The month of Ramadan is a time for self-control and discipline and this is something that should be reflected in an individual's dietary habits. Patients should aim to eat a healthy balanced diet with adequate hydration. They should refrain from eating foods rich in fat and sugar as this can lead to weight gain and postprandial hyperglycaemia. The daily caloric intake should be divided between the evening meal of iftar and early morning meal of suhoor. Portion sizes should be moderate and aim to include 45–50% carbohydrate, 20–30% protein and <35% fat (12).

Suhoor should be taken as late as possible, ideally just before sunrise rather than midnight in order to minimise the risk of hypoglycaemia. It is suggested that complex carbohydrates with a low glycaemic index which release energy slowly are ideal before and after fasting. One or two small snacks such as fruit, nuts, or vegetables may be consumed between the meals.

As there is a risk of dehydration with prolonged fasting, it is recommended that fluid intake is increased during non-fasting hours. Beverages should include sugar free fluids, decaffeinated drinks and water. A practical summary of dietary and cooking advice is provided in Table 2 (page 54).

**Exercise and smoking advice**

Regular levels of light and moderate exercise and activity should be maintained. However, excessive or rigorous exercise should be avoided, especially in the few hours before the iftar meal due to the increased risk of hypoglycaemia and or dehydration. If a patient participates in the extra prayers of Taraweeh (which take place after breaking the fast), this should be considered as part of their daily exercise as it involves a series of movements such as standing, bowing and kneeling.

As smoking is prohibited whilst fasting, Ramadan provides an ideal opportunity to focus on smoking reduction and cessation. Patients who smoke should be directed to specialist smoking cessation services at the earliest opportunity (13,14).

**Blood glucose monitoring**

Patients should be educated that blood glucose monitoring through finger prick testing does not break the fast (15). It is vital patients who are fasting are provided with the means to check their capillary blood sugars on a regular basis. Patients are encouraged to check their blood sugars immediately after opening their fast, if they feel unwell and or have symptoms of hypo or hyperglycaemia.

The frequency of self-monitoring blood glucose levels will depend on a number of factors such as type of diabetes, the medications the patient is taking and their level of risk (Table 1). For those in the low to moderate risk group this can mean monitoring their blood glucose two or three times a day. High and very high-risk groups should check their blood glucose five to six times a day (16,17). Table 3 (page 54) shows the recommended frequency with which to check blood glucose levels whilst fasting in Ramadan.

Patients who are taking medications that can cause hypoglycaemia such as insulin and sulphonylureas are advised to check their blood sugars more frequently. Self-monitoring of blood glucose is also useful in those patients who are willing and able to adjust their diabetes treatment, such as insulin dose titration (17,18).

**Awareness of complications and when to break the fast**

Patients need to be educated on the signs and symptoms of dehydration, hypoglycaemia and hyperglycaemia. They should break their fast if any such complication or acute illness occurs and seek the advice of a healthcare professional. A summary is provided in Table 4 (page 55).

**Medication review and adjustment**

During Ramadan, diabetic patients who are observing the fast are expected to take their medication between iftar and suhoor. The type of medication being taken can increase the risk of adverse events and complications. It is therefore important healthcare professionals are proactive in engaging with patients early on to conduct a detailed individualised medication review. The review will aim to highlight the need to adjust the dose, frequency and or timings of the medication.

Table 5 and 6 (pages 56 and 57) provide a summary of recommendations for oral diabetic medication and insulin respectively.

**Table 2. Dietary and cooking advice for patients with diabetes who fast during Ramadan** (12)

| Foods to Avoid | Alternative |
|---|---|
| Ghee (clarified butter), samosas, pakoras, paratha, fried dumplings, fried kebabs, pastries, puri, chevera, katlamas, oily meat curries. | Rapeseed oil, olive oil, chickpeas, hummus, baked samosa, boiled dumplings, grilled kebabs, wholegrain cereals, granary bread, brown rice, chapatti, beans, pulses, vegetables, salads, grilled red meat and chicken. |
| Sugary desserts, traditional sweets eg: Jalebis, Gulab Jamun, Rasgulla, Baklawa, Kanafeh, Umm Ali | Fresh fruit e.g: dates, apples, bananas etc, dried fruit and nuts e.g: apricots, figs, raisins, prunes, almonds, cashews, pistachio, walnuts etc. |
| **Cooking Methods to Avoid** | **Alternative** |
| Deep frying, using excessive oil | Shallow fry, bake, boil, grill or air fry food. |

**Table 3. Recommended frequency of blood glucose monitoring for patients during Ramadan depending on their risk stratification**
Adapted from Hassanein M et al, 2014(16) and 2016 (17)

**High risk group: NB These patients should be advised against fasting during Ramadan, however if they insist on fasting blood glucose monitoring should be done at the following times.**

1. Before suhoor
2. 2 hours after suhoor
3. Midday
4. Before iftar
5. 2 hours after iftar
6. If symptoms of feeling unwell, hypoglycaemia or hyperglycaemia

**Low risk group: Recommended times for blood glucose monitoring**

1. Before suhoor
2. Midday
3. Before/After iftar
4. If symptoms of feeling unwell, hypoglycaemia or hyperglycaemia

**Table 4. Recognising possible complications and when to end the fast**
Adapted from: Hassanein M et al, 2016 (17)

| Patient should end their fast immediately if any of the following occur: |
|---|
| **Hypoglycaemia - (blood glucose of <70 mg/dL [3.9 mmol/L])** |
| Symptoms include:<br>• Shaking<br>• Sweating<br>• Palpitations<br>• Hunger<br>• Headache<br>• Lack of concentration, confusion, irrational behaviour, loss of consciousness |
| **Hyperglycaemia - (blood glucose of >300 mg/dL [16.7mmol/L])** |
| Symptoms include:<br>• Extreme thirst<br>• Increased urinary frequency<br>• Hunger<br>• Fatigue<br>• Confusion<br>• Nausea/vomiting<br>• Abdominal pain |
| **Dehydration** |
| Symptoms include:<br>• Extreme dry mouth and thirst<br>• Fatigue<br>• Drowsiness<br>• Difficulty urinating<br>• Increased breathing and pulse rate<br>• Ketones in the urine<br>• Lack of concentration |
| **Acute illness** |
| Symptoms include (not an extensive list):<br>• Fever<br>• Diarrhoea or vomiting<br>• Disorientated, limb weakness<br>• Dizziness or collapse<br>• Chest pain<br>• Shortness of breath |

**Table 5. Recommended changes to oral diabetic medications**
Adapted from Hassanein M et al, 2017 (19). Al-Arouj M et al, 2010 (20)

| | Medication | Direction | Recommendation |
|---|---|---|---|
| Oral diabetic medication | Biguanides<br>e.g. Metformin–Immediate Release | OD: Daily dose remains unchanged | Take at iftar. |
| | | BD: Daily dose remains unchanged | Take at iftar and suhoor. |
| | | TDS: Daily dose remains unchanged | Morning dose after suhoor, combine afternoon & evening dose at Iftar. |
| | Metformin–Modified release | Daily dose remains unchanged | Take at Iftar. |
| | Acarbose | | No dose modification |
| | Thiazolidinediones / Glitazones<br>e.g. Pioglitazone, Rosiglitazone | | No dose modification. Dose can be taken with iftar or suhoor. |
| | Meglitinides<br>e.g. Repaglinide | | Reduce TDS dose to BD, to be taken with iftar and suhoor. |
| | Glucagon-like peptide-1 receptor agonists<br>e.g. Exenatide & Liraglutide | Continue with maintenance dose | No dose modification is needed |
| | Dipeptidyl peptidase-4 inhibitors<br>e.g Sitagliptin, Vildagliptin, and Saxagliptin | | No dose modification is needed |
| | Sulfonylureas (SU)<br>e.g. Glibenclamide*, Gliclazide, and Glimepiride<br>*Glibendamide should be avoided<br>Switch to newer SU (Gliclazide, Glimepiride) where possible | OD | Take at iftar.<br>Dose may be reduced in patients with good glycemic control. |
| | | BD | Take at iftar and suhoor.<br>Iftar dose remains unchanged<br>Suhoor dose may be reduced in patients with good glycemic control. |
| | Sodium-glucose cotransporter 2 inhibitors<br>e.g. Dapagliflozin, and Canagliflozin | | Take at iftar. No dose modification is needed<br>Increase hydration. Avoid in the elderly, patients with renal impairment, hypotension or in those taking diuretics. |

**Table 6. Recommended changes to Insulin dosing during Ramadan**
Adapted from Hassanein M et al, 2017 (19)

| | Type of Insulin | Direction | Recommendation |
|---|---|---|---|
| Insulin | Long or intermediate acting basal insulin e.g. NPH/Detemir/Glargine | OD | Take at iftar. Reduce dose by 15–30%. |
| | | BD | Take usual morning dose at iftar. Reduce evening dose by 50% and take at suhoor. |
| | Rapid or short-acting prandial/bolus insulin | | Take normal dose at iftar. Omit lunch time dose. Reduce suhoor dose by 25–50%. |
| | Premixed insulin | OD | Take normal dose at iftar. |
| | | BD | Take usual morning dose at Iftar. Reduce evening dose by 25–50% and take at suhoor. |
| | | TDS | Omit afternoon dose. Adjust iftar and suhoor doses. |

## Summary

In summary, low and moderate risk diabetic patients can participate in fasting during Ramadan but should do so with appropriate precautions. Those who are categorised as high or very high-risk are usually advised not to fast, however if they wish to do so, their decision must be respected. All diabetic patients should seek medical advice prior to commencing fasting, in order to optimise their diabetic control, adjust diabetic medication as well as discuss dietary and monitoring requirements during Ramadan. The role of the healthcare professional is to ensure that the diabetic patient is able to fast as safely as possible by means of education and guidance. The patient should be made aware of the symptoms of potential complications during fasting with diabetes, including advice on when they should break the fast on medical grounds.

## References

1. The Quran. 2:183-185. Available at: https://quran.com/2/183-185
2. The International Diabetes Federation. Diabetes and Ramadan. Last updated 8th April 2020. Available at: https://www.idf.org/our-activities/education/diabetes-and-ramadan.html
3. Ghani F. Most Muslims say they fast during Ramadan. 2013; Available at: http://www. pewresearch.org/fact-tank/2013/07/09/global-median-of-93-of-muslims-say-they-fast-duringramadan/
4. Babineaux SM, Toaima D, Boye KS, Zagar A, Tahbaz A, Jabbar A, et al. Multi-country retrospective observational study of the management and outcomes of patients with type 2 diabetes during Ramadan in 2010 (CREED) Diabet Med. 2015;32:819–28. Available at: doi:10.1111/dme.12685
5. Salti I, Be'nard E, Detournay B, Bianchi-Biscay M, Le Brigand C, Voinet C, et al. A population-based study of diabetes and its characteristics during the fasting month of Ramadan in 13 countries: results of the epidemiology of diabetes and Ramadan 1422/2001 (EPIDIAR) study. Diabetes Care. 2004;27:2306-11. Available at: doi:10.2337/diacare.27.10.2306

6. Al-Arouj M, Bouguerra R, Buse J, Hafez S, Hassanein M, Ibrahim MA, et al. American Diabetes Association. Recommendations for management of diabetes during Ramadan. Diabetes Care. 2005;28:2305-11. Available at: doi:10.2337/diacare.28.9.2305
7. The National Institute for Health and Care Excellence (NICE) guideline [NG28]. Type 2 diabetes in adults: management. Published: 02 December 2015. Last updated: 28th August 2019. Available at: https://www.nice.org.uk/guidance/ng28
8. Hassanein M, Al-Arouj M, Hamdy O, Bebakar W, Jabbar A, Al-Madani A, et al. Diabetes and Ramadan: Practical guidelines. Diabetes Research and Clinical practice 2017;126:303-316. Available at: doi: https://doi.org/10.1016/j.diabres.2017.03.003
9. Al-Arouj M. Risk stratification of Ramadan fasting in person with diabetes. J Pak Med Assoc 2015;65:S18-21.
10. Hassanein M, El-Sayed A, Tayeb K, Omar M, Basit A. Chapter 5, Diabetes and Ramadan: A Medico-religious Perspective. Diabetes and Ramadan: Practical Guidelines. International Diabetes Federation (IDF), in collaboration with the Diabetes and Ramadan (DAR) International Alliance. Published: April 2016. Available at: https://www.idf.org/e-library/guidelines/87-diabetes-and-ramadan-practical-25.html
11. Beshyah SA. Fasting during the month of Ramadan for people with diabetes: Medicine and Fiqh united at last. Ibnosina J Med Biomed Sci 2009;1:58-60.
12. Hamdy O, Yusof B, Reda W, Slim I, Jamoussi H, Omar M. Chapter 7, The Ramadan Nutrition Plan (RNP) for Patients with Diabetes. Diabetes and Ramadan: Practical Guidelines International Diabetes Federation (IDF), in collaboration with the Diabetes and Ramadan (DAR) International Alliance. Published: April 2016. Available at: https://www.idf.org/e-library/guidelines/87-diabetes-and-ramadan-practical-25.html
13. Muhammad Ali Karamat, Ateeq Syed, Wasim Hanif. Review of diabetes management and guidelines during Ramadan. J R Soc Med. 2010 Apr 1;103(4): 139–147. Available at: doi:10.1258/jrsm.2010.090254
14. Mughal F. Smoking reduction during Ramadan. Br J Gen Pract 2017. Available at: doi: https://doi.org/10.3399/bjgp17X691061
15. Masood S, Sheikh M, Masood Y, Hakeem R, Shera A. Beliefs of people with diabetes about skin prick during Ramadan fasting. Diabetes Care 2014;37:e68-9. Available at: doi:10.2337/dc13-2277
16. Hassanein M, Belhadj M, Abdallah K, Bhattacharya AD, Singh AK, Tayeb K, et al. Management of Type 2 diabetes in Ramadan: Low-ratio premix insulin working group practical advice. Indian J Endocr Metab 2014;18:794-9. Available at: http://www.ijem.in/text.asp?2014/18/6/794/140242
17. Hassanein M, Ahmedani M. Chapter 6, Pre-Ramadan education. Diabetes and Ramadan: Practical Guidelines International Diabetes Federation (IDF), in collaboration with the Diabetes and Ramadan (DAR) International Alliance. Published: April 2016. Available at: https://www.idf.org/e-library/guidelines/87-diabetes-and-ramadan-practical-25.html
18. Hui E, Bravis V, Hassanein M, Hanif W, Malik R, Chowdhury TA, et al. Management of people with diabetes wanting to fast during Ramadan. BMJ 2010;340:c3053. Available at: doi:10.1136/bmj.c3053
19. Hassanein M, Al-Arouj M, Ben-Nakhi A, Al-Madani A, Shaltout I, Alawadi F, et al. Chapter 8, Management of Diabetes during Ramadan. Diabetes and Ramadan: Practical Guidelines International Diabetes Federation (IDF), in collaboration with the Diabetes and Ramadan (DAR) International Alliance. Published: April 2016. Available at: https://www.idf.org/e-library/guidelines/87-diabetes-and-ramadan-practical-25.html
20. Al-Arouj M, Assaad-Khalil S, Buse J, et al. Recommendations for management of diabetes during Ramadan: Update 2010. Diabetes Care 2010;33:1895-902. Available at: doi:10.2337/dc10-0896