

Ramadan: An Overview for Primary Care Providers

Considerations when caring for Muslim patients who fast for Ramadan

Brittany Heck, MS4

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Introduction

What is Ramadan?

In the Islamic religion, there are five pillars, or duties, for its practitioners. These include professing one's faith, praying five times a day, making charitable donations, doing the pilgrimage to Mecca, and fasting during Ramadan. Many consider Ramadan to be the most sacred month of the year. It presents an opportunity to strengthen relationships with oneself, with family, and with God.² It promotes renewed spirituality, introspection and discipline, while also encouraging appreciation, compassion, and altruism.^{8,14}

Ramadan occurs in the ninth month of the Islamic calendar, but because it is based on a lunar calendar, which consists of 354 days, the exact timing of Ramadan varies. Those who participate must abstain from food, drink, intimacy, profanity, and other acts that nullify the fast from dawn to sunset. The Quran specifies which acts are impermissible and which groups of people are exempt from the fast.²

Depending on its timing in the year and the location in the world, some patients may be fasting for up to 20 hours. This extended period without food, water, and medications may pose a serious health risk to patients with certain medical conditions. With over 1.6 billion Muslims worldwide, all primary care providers should be aware of the health considerations for their Muslim patients during Ramadan.⁹

The Rules of Ramadan

Overview

Ramadan starts with the first crescent of a new moon and ends with *Eid al-Fitr* (Festival of Breaking Fast). Each day begins with a smaller meal called *suhoor* and then the fast is broken in the evening with a rich, celebratory meal called *iftar*. Sunni Muslims break the fast at sunset when the sun is no longer visible over the horizon, whereas Shias wait until the sky is completely dark. Standard greetings for people celebrating Ramadan include "*Ramadan kareem*" and "*Ramadan Mubarak*," which mean "have a generous Ramadan" and "have a blessed Ramadan," respectively.⁹

Obligations and Exemptions

According to the Quran, fasting is an obligation for all adult Muslims of sound mind and body. Muslim children are introduced to fasting by incremental steps (a few half days to a few full days to all days), and typically begin after puberty or age 10.² Those who cannot safely fast, including travelers, the elderly, the mentally or developmentally disabled, and the acutely or chronically ill, are excused from fasting.⁹ Women who are menstruating or having postpartum bleeding are not permitted to participate in fasting (or prayers) as this is believed to violate their purity and invalidate the fast. Women who are pregnant or breastfeeding may opt in or out of fasting and are encouraged to excuse themselves if they have concerns over their health or their child's.¹³ However, while it provides

these exemptions, those excused are obligated to make up the fast at a later date or feed one poor person for each day missed (this is called paying “*fidiya*”).^{2, 9}

Acts that Do and Do Not Invalidate the Fast

While the Quran clearly elucidates some actions that will render the fast invalid, newer treatments and procedures have caused some controversy among Muslim scholars. In general, anything that enters or exits the body including intentional eating, drinking, or vomiting will invalidate the fast. This includes interventions such as intravenous therapies (IV saline and parenteral nutrition), blood transfusions, and dialysis as they provide nourishment to the body. As previously mentioned, this also includes sexual activity, smoking, oral medications, and even chewing gum. Muslims are additionally encouraged to refrain from gossip and profanity.^{1,4,9}

With other interventions, Muslim scholars disagree due to different understandings of the Islamic texts. For example, the Islamic Fiqh Council, an affiliate of the Muslim World League, issued a fatwa that ear and nasal drops do not break the fast, so long as nothing reaches the stomach. However, different scholars believe these measures do break the fast regardless.¹ Interventions such as oxygen and anesthetics, inhalers and nebulizers, blood draws, rectal suppositories, enemas, bladder irrigation, pessaries, biopsies, intravenous contrast, creams or patches for transdermal administration of medication, and injections that are not alternatives to food and drink (antibiotics, insulin, vaccinations) are generally regarded as permissible while fasting, but it is recommended to postpone these for non-

fasting hours or until after Ramadan if possible. Table 1 summarizes the interventions that do and do not invalidate the fast according to the Islamic Fiqh Council and the Standing Committee for Academic Research and Issuing Fatwas (Fataawa al-Lajnah ad-Daa’imah), an Islamic organization that provides consensus on Islamic jurisprudence.^{1,8}

Nonetheless, although scholars have declared an action as permissible, the patient may not be aware or may not agree. A study of 201 practicing Muslims and 10 religious leaders in Guinea found that religious leaders were 30% more likely to believe an intervention (vaccinations and blood draws) was acceptable than the laymen.³ The lack of consensus among religious scholars and among practitioners as well as the lack of cultural awareness and sensitivity among medical professionals puts Muslim patients at risk of having complications related to the fast. When in doubt, providers may encourage their patients to consult their local religious leader.

Implications for General Practice

Things to Consider in Primary Care

As previously mentioned, Ramadan is one of the most important tenets of Islam. Fasting is a religious duty, a bonding experience with family, and is viewed positively. Breaking the fast is usually accompanied by big familial celebrations.² Moreover, completing missed fasts at another time is more difficult without communal support.^{1,13}

Because of the great religious significance and the considerable associated social pressures, it is

Table 1. Interventions that do and do not invalidate the fast per the Islamic Fiqh Council and the Standing Committee for Academic Research and Issuing Fatwas

Treatments and procedures that do not invalidate fasting*	
Islamic Fiqh Council	
<ul style="list-style-type: none"> • Eye drops • Ear drops • Ear syringing • Nasal sprays • Nasal drops • Sublingual tablets or lozenges (for angina pectoris) • Drilling of teeth (prior to filling) • Extraction or polishing of teeth • Using a toothbrush or miswak • Rinsing, gargling or applying topical treatment in the mouth 	As long as the fasting patient does not feel the taste in the throat or swallow any residue

<ul style="list-style-type: none"> • Injections (subcutaneous, intramuscular and intravenous) • Vaginal pessaries • Douching • Use of speculum • Pelvic exam • Placing Intra Uterine Devices (IUDs) • Urine catheters • Dye injection for diagnostic imaging • Oxygen • Creams, lotions and patches • Nicotine patches that are used for quitting smoking • Endoscopy without an administration of solutions or other substances 	If the treatment or procedure is not urgently needed, it would be recommended to take/schedule it before or after fasting hours
The Standing Committee for Academic Research and Issuing Fatwas	
<ul style="list-style-type: none"> • Involuntary vomiting including morning sickness due to pregnancy • Involuntary nose bleeding • Insulin injections*** • Puffers and oxygen used for asthma treatment**** • Vaccinations (intramuscular route) 	
Treatments and procedures that invalidate fasting **	
Islamic Fiqh Council	
<ul style="list-style-type: none"> • Oral medication during fasting hours • Parenteral nutrition 	
The Standing Committee for Academic Research and Issuing Fatwas	
<ul style="list-style-type: none"> • Deliberate vomiting • Kidney dialysis 	

*The following things do not invalidate fasting according to some Muslim scholars, not committees: blood tests, rectal suppositories, enema, and bleeding from hemorrhoids.^[1,32,34,37]
 The following things invalidate fasting according to some Muslim scholars, not committees: donating blood, blood transfusion, and cupping.^[24] * There is a common misconception among both Muslim patients and PCPs that insulin injections and monitoring blood glucose would invalidate fasting. ^[13,35,38] **** Vaporizers and capsules that are used for asthma treatment invalidate fasting and the patient should make up that day after Ramadan. ^[24]

important for providers to consider that practicing Muslims may choose to fast despite having medical conditions that excuse them from fasting and despite understanding their increased risk of medical complications. Providers should also be cognizant that studies have shown that patients who fast have a greater propensity to self-discontinue medications, decrease glucose monitoring, limit vaccinations and blood sampling, or be otherwise nonadherent to medical advice during Ramadan.^{1, 3}

On the other hand, providers must be mindful that, as with any patient, Muslim patients are unique and may not all approach Ramadan in the same way. Variations in spirituality, religiosity, and personal beliefs will affect patients' health behaviors and their engagement with

medical recommendations.¹ Some patients may decide to continue with the fast despite being exempt from it. Others may be more amenable to breaking the fast for a particular procedure. Many may not know exactly which interventions are permissible and which will break their fast.^{1, 12}

Furthermore, providers could even utilize the discipline involved in partaking in Ramadan and encourage their patients to take the opportunity to make (and maintain) healthy lifestyle changes to lose weight and quit smoking.¹⁴ Studies have shown that, although patients lose weight and lower their total cholesterol and LDL levels while fasting, most return to their pre-Ramadan measurements within a few weeks.^{16, 17} Appointments before and after Ramadan could be helpful in aiding

patients to continue the progress made during this period.

Management of the Muslim Patient during Ramadan

General advice for those who fast

It is recommended that all Muslim patients who wish to fast have a pre-Ramadan medical evaluation ideally 6-8 weeks prior. While patients with chronic medical diseases will understandably require a more in depth consideration of how to minimize their risk while fasting, even relatively healthy patients should be advised on approaches to fasting safely. This includes preventing dehydration by drinking plenty of fluids during non-fast hours and avoiding caffeinated drinks, eating food rich in fiber and low in salt, fat, and sugar, and saving exercise for after *iftar*.¹ It is equally important to discuss with patients the medical indications for breaking the fast and seeking assistance.

Advice on managing medications

Like primary care providers, pharmacists should also be aware of Ramadan and the limitations it imposes on medication regimens. Unfortunately, studies show that pharmacists in non-predominately Muslim countries (specifically the United States, Canada, and Australia) perceive little need to counsel patients on medication changes during Ramadan whereas a majority of their counterparts in countries like Egypt and Saudi Arabia (predominately Muslim) will routinely adjust medication regimens during Ramadan. Some culturally sensitive changes could include changing dosing frequency to once or twice daily, changing to long acting formulations or choosing a different medication administration. Certain medical

conditions have regimens that have been previously suggested and studied for patients during Ramadan.⁷

Advice for common conditions

DIABETES

One of the chronic illnesses that poses the most concern during Ramadan is diabetes. Fasting goes directly against the typical dietary advice for diabetics of eating multiple small meals throughout the day. As such, fasting has been shown to increase the episodes of dehydration, hypoglycemia, hyperglycemia, diabetic ketoacidosis, hyperosmolar hyperglycemia state, and deep vein thrombosis.³ During Ramadan, there is a 4.7 fold increase and a 7.5 fold increase in episodes of severe hypoglycemia for Type 1 and Type 2 diabetics, respectively, and a 5 fold increase in hyperglycemic events in Type 2 diabetics.⁸ This risk is compounded by the fact that many Muslim diabetics will forgo with blood glucose monitoring over concern that doing so invalidates their fast. Nevertheless, 40-50 million patients with diabetes fast during Ramadan. By subtype, about 50% of those with type 1 diabetes and between 80-90% of those with type 2 participate in fasting.^{1,7,9}

The will to fast is not limited to adult diabetics. A study of children with type 1 diabetes found that a majority wanted to fast and 75% were encouraged to do so by their parents. They found fasting acceptable because they would just break the fast if any complications arose, which they did. Throughout Ramadan, 52% of these children had at least one episode of hypoglycemia, 29% had at least one episode of hyperglycemia, and one child was admitted for diabetic ketoacidosis.³ Despite knowing this, children and adults with diabetes continue to be encouraged and to participate in fasting.

Muslim scholars and medical providers recommend against fasting for those with type 1 and uncontrolled type 2 diabetes. It may be safe for patients with controlled type 2 diabetes to participate in fasting as long as they seek medical advice prior.^{3,14} The International Diabetes Federation collaborated with the Diabetes and Ramadan International Alliance (IDF-DAR) to create practical guidelines to aid providers in supporting their Muslim patients with diabetes. These are available to download at their websites.^{6,15} This group also provided specific criteria to stratify diabetic patients into three different risk categories that has been approved by the Mufti of Egypt, the highest religious regulatory authority in Egypt (Table 2).

The highest two risk categories are recommended to abstain from fasting.⁸ That said, providers should be aware that their Muslim patients with diabetes will often choose to fast during Ramadan regardless of recommendations and should educate accordingly.

Diabetic patients who wish to fast should definitely meet with their physician prior to Ramadan. Clinicians can then assess their risk, modify medications as needed, and educate on safe fasting practices.^{1,8} First and foremost, providers should explain the warning signs for the common complications, such as hypoglycemia and diabetic ketoacidosis, and stress the importance of breaking the fast and seeking medical attention should they

Table 2. IDF-DAR risk categories and recommendations for patient with diabetes who fast during Ramadan

Risk category and religious opinion on fasting*	Patient characteristics	Comments
Category 1: very high risk Listen to medical advice MUST NOT fast	One or more of the following: <ul style="list-style-type: none"> Severe hypoglycemia within the 3 months prior to Ramadan^b Unexplained DKA within the 3 months prior to Ramadan Hyperosmolar hyperglycemic coma within the 3 months prior to Ramadan History of recurrent hypoglycemia History of hypoglycemia unawareness Poorly controlled T1DM Acute illness Pregnancy in pre-existing diabetes, or GDM treated with insulin or SUs Chronic dialysis or CKD stage 4 & 5 Advanced macrovascular complications Old age with ill health 	If patients insist on fasting, then they should: <ul style="list-style-type: none"> Receive structured education Be followed by a qualified diabetes team Check their blood glucose regularly (SMBG) Adjust medication dose as per recommendations Be prepared to break the fast in case of hypo- or hyperglycemia Be prepared to stop the fast in case of frequent hypo- or hyperglycemia or worsening of other related medical conditions
Category 2: high risk Listen to medical advice Should NOT fast	One or more of the following: <ul style="list-style-type: none"> T2DM with sustained poor glycemic control^c Well-controlled T1DM Well-controlled T2DM on MDI or mixed insulin Pregnant T2DM or GDM controlled by diet only or metformin CKD stage 3 Stable macrovascular complications Patients with comorbid conditions that present additional risk factors People with diabetes performing intense physical labor Treatment with drugs that may affect cognitive function 	Same as above
Category 3: moderate/low risk Listen to medical advice Decision to use licence not to fast based on discretion of medical opinion and ability of the individual to tolerate fast	Well-controlled T2DM treated with one or more of the following: <ul style="list-style-type: none"> Lifestyle therapy Metformin Acarbose Thiazolidinediones Second-generation SUs Incretin-based therapy (DPP-4 inhibitors or GLP-1 RAs) SGLT2 inhibitors Basal insulin 	Patients who fast should: <ul style="list-style-type: none"> Receive structured education Check their blood glucose regularly (SMBG) Adjust medication dose as per recommendations

CKD: Chronic kidney disease, DAR: Diabetes and Ramadan International Alliance, DKA: Diabetic ketoacidosis, DPP-4: Dipeptidyl peptidase-4, GDM: Gestational diabetes mellitus, GLP-1 RA: Glucagon-like peptide-1 receptor agonist, IDF: International Diabetes Federation, MDI: Multiple dose insulin, SGLT2: Sodium-glucose co-transporter-2, SMBG: Self-monitoring of blood glucose, SU: Sulphonylurea, T1DM: Type 1 diabetes mellitus, T2DM: Type 2 diabetes mellitus. *In all categories: people with diabetes should follow medical opinion if the advice is not to fast due to high probability of harm. ^bHypoglycemia that is not due to accidental error in insulin dose. ^cThe level of glycemic control is to be agreed upon between doctor and patient according to a multitude of factors

have symptoms. Blood glucose values less than 70 or greater than 300 are indications for breaking the fast. Providers should also explain that blood glucose monitoring does not break the fast and should encourage patients to continue to check regularly throughout the day.^{1,14} Figure 1 depicts how often type 2 diabetics should check their glucose levels.⁸ In between sunset and dawn, people with diabetes should eat well-portioned, nutritious meals for *iftar* and *suhoor* to avoid hyperglycemia and should additionally eat two to three small meals in between these.¹

Ramadan-focused diabetes educational programs have been shown to be effective in significantly reducing the incidence of hypoglycemic events.⁸ The IDF-DAR created Ramadan-specific nutrition therapy for different countries and in different languages for patient and provider use that are available online.¹⁵

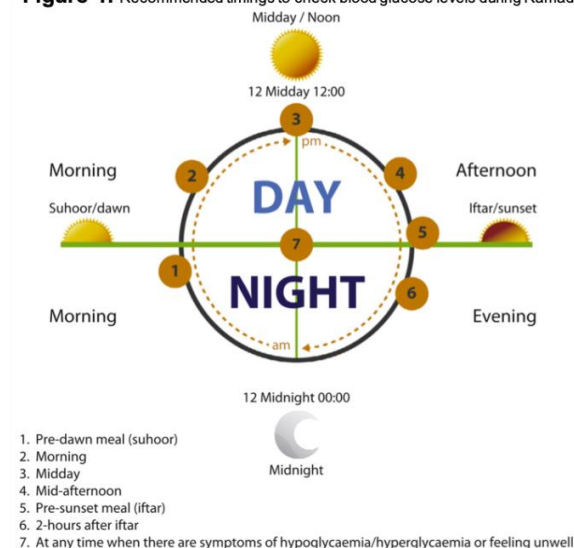
Diabetic medication regimens will often need adjustments to account for the altered dietary habits. Metformin can be dosed twice a day, with a third of the total daily dose taken at the predawn meal and two thirds taken at the larger evening meal. Sulfonylureas that are dosed twice

daily may need the predawn dose reduced to avoid hypoglycemia with less food consumed throughout the day. Other oral agents can be given once daily with the evening meal. Thiazolidinediones, DPP-4 inhibitors, and short acting oral insulin secretagogues do not require adjustment as they carry a low risk of hypoglycemia. Patients on long acting insulin should decrease their total dose by 20%.^{8,9} With thoughtful medication and lifestyle adjustments, patients with diabetes can reduce the risk of complications while fasting during Ramadan, as long as providers remember to be sensitive to the cultural context of their Muslim patients.

PREGNANCY AND BREASTFEEDING

Providers should recommend against fasting in pregnant and breastfeeding women for the safety of both the woman and her child.⁹ The data on the effects of fasting during Ramadan on mother and child is conflicted. For the mother, there has been found to be an increased risk of hyperemesis gravidarum and increased maternal cortisol level when fasting. An increase in urinary tract infections is also common for fasting mothers due to insufficient fluid intake. For the fetus, most studies show that the risk of low birth weight, intrauterine growth restriction, and preterm birth is not statistically higher in pregnant women who fast.¹¹ One study found that fasting mothers actually had a lower rate of Cesarean section. Another study found a reduction in fetal biophysical profiles in fasting mothers. One interesting finding came from a study that followed children into adulthood and found that Muslim adults who had their fetal period during Ramadan were thinner and shorter than Muslim adults who did not. This difference was not seen in non-Muslim

Figure 1. Recommended timings to check blood glucose levels during Ramadan fasting



adults.^{11,16} As for breastfeeding, fasting has been shown to decrease breastmilk supply, requiring mothers to use more formula.^{1,11}

However, studies show 70-90% of pregnant women observe the fast.⁸ Some may feel obligated to fast due to personal spiritual reasons or even social pressure from family that may be difficult to understand from those outside of the culture.¹³ There are also differences to consider between each patient. American-born Muslims have been shown to be less likely to fast than their foreign-born counterparts. Additionally multiparous mothers are more likely to fast compared to primigravidas.¹¹ The bottom line is if a pregnant or breastfeeding woman wishes to participate in Ramadan, that is her choice and providers should be supportive and give patients appropriate advice. Recommendations include stressing adequate hydration, consumption of nutritious foods during non-fasting hours, and precautions against excessive daytime activity. Women should also be advised of warning signs to look for that should prompt breaking the fast and seeking medical attention such as decreased fetal movement, extreme fatigue or dizziness and severe nausea with vomiting.^{3,10,11}

Advice by organ system

CARDIOVASCULAR

Multiple systematic reviews and meta-analyses have shown that participating in Ramadan does not increase the risk of developing acute cardiovascular (CV) events. In addition, it is generally safe for people with most CV diseases to fast. Patients with controlled high blood pressure should meet with their primary care providers before Ramadan to review medications and adjust as needed. Long acting anti-

hypertensive medications taken once daily with a meal is the best strategy. Diuretics are not recommended, given the risk of dehydration. Studies have proven patients on oral anticoagulants like warfarin may continue these medications safely while fasting. Muslim scholars have deemed permissible nitroglycerin tablets placed under the tongue for treatment of angina pectoris. Those with dyslipidemia who have been stable on a statin may continue without complication, but statins should not be started right before Ramadan. On the other hand, individuals with uncontrolled hypertension, unstable angina, decompensated heart failure, recent cardiac surgery or myocardial infarction should not fast. As always, physicians should recommend a low salt, low fat, healthy diet, even during Ramadan.^{1,10}

GASTROINTESTINAL

In general, for gastrointestinal (GI) diseases, it depends on the patient and on the disease. Individuals with active peptic ulcers are recommended to not fast, but those with nonactive ulcers stably on proton pump inhibitors can fast safely. People with inflammatory bowel diseases or chronic hepatitis are also cleared to fast. Medications for diseases like *H. pylori* may be postponed until after Ramadan to ensure proper adherence or may be dosed differently to account for fasting restrictions.^{1,16}

Providers should be aware that fasting patients commonly complain of new onset dyspepsia with symptoms including bloating, indigestion, and heartburn. This is especially prevalent in patients who eat excessive amounts or extremely rich meals for *iftar* and *suhoor*. Recommendations to eat moderately and avoid trigger foods should help symptoms.¹

RENAL

There is a paucity of studies on the effect of fasting on patients with chronic kidney disease. A few indicate that the fluid restriction involved in fasting may be harmful to the kidney.¹ Other studies have shown an increase in the incidence of kidney stones during Ramadan, but the evidence is inconclusive. A 2014 systematic review involved studies of patients with CKD on hemodialysis, peritoneal dialysis (PD), and pharmacological treatment and showed no severe effects while fasting as long as they followed dietary and therapeutic recommendations and did not have other comorbidities like diabetes. Since dialysis provides a type of nourishment to the body, it invalidates the fasting if done during fasting hours. Therefore, dialysis patients who wish to fast may choose to fast on non-dialysis days or choose between two regimens of PD: modified continuous ambulatory PD (three exchanges during the night with icodextrin infusion) or continuous cycling peritoneal dialysis (one exchange over the night). If the creatinine increases by 30% above the baseline, patients should break the fast. Moreover, patients should be educated on warning symptoms such as an increase in weight, swelling, shortness of breath or weakness and avoid high-potassium, high phosphorous foods when breaking fast.⁵

Patients with a prior kidney transplant who have stable graft function may fast without concern for complication. Studies show that there is no difference in levels of creatinine, urea, uric acid, sodium, potassium, or bicarbonate in the urine between pre- and post-Ramadan. Furthermore, immunosuppressant medications can be divided into twice daily dosing.¹

The general recommendation for patients with renal issues is to drink sufficient amounts of water during non-fasting hours to pass about two liters of urine in a 24-hour cycle to reduce adverse events. Patients with a history of urolithiasis may also limit intake of vitamin C, sodium, and oxalate.^{1,10}

Conclusion

The goal of healthcare providers should always be to provide holistic, compassionate care. Primary care providers especially are presented with the duty to care for their patients within their greater socioeconomic, religious, geographic, and cultural context. For most Muslim patients, a basic understanding of the tenets and importance of Ramadan could be very meaningful and instrumental in building rapport and in creating a shared mental model. This could help in maintaining the patient's health goals by maximizing adherence to medications and lifestyle modifications.

It is important that the providers consider the impact of fasting during Ramadan when making the plan for their patient. Clinicians should discuss their reservations on fasting with patients who have certain medical conditions and suggest they honor Ramadan in other ways, but understand that patients may still choose to participate in Ramadan. As such, providers can then suggest appropriate medications and regimens to maximize adherence, advise patients to hydrate and eat recommended foods, and educate them on what symptoms to look for that should prompt them to break the fast. Above all, providers should empower their Muslim patients with the confidence and knowledge to optimize their fasting with shared decision making.¹⁴

Resources

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