MIGRATION patterns show that diversity in our society is set to increase. So, healthcare professionals should be informed about religious practices of individuals that can affect chronic conditions and be able to advise these patients appropriately.

There are approximately 1.6 million Muslims in the UK and next month, many will be observing Ramadan by fasting (sawm), which is one of the five fundamental pillars of Islam. Fasting occurs in the ninth month of the Islamic calendar (Hijra), which is lunar. The Islamic year is 354 days so Ramadan occurs 10 to 11 days earlier each year.

Each period of fasting lasts from dawn to dusk and varies in length depending on the season and the follower's location. In the UK a fast can last from between 10 and 19 hours. Sawm means “abstention from”, and during fasting an individual must refrain from eating, drinking, smoking, sexual activity, consuming oral medicines and using intravenous fluids. Between dusk and dawn the restrictions are removed. The meals consumed at dawn and dusk are known in Arabic as sahur and iftar, respectively.

Ramadan will last for 28 to 30 days.

Who is affected?
Ramadan should be observed by all healthy, responsible and sane Muslims. However, the Koran, the holy book that is followed by Muslims, states fasting should be avoided if it is considered to be detrimental to an individual's health. Those who are considered exempt from fasting are:

- The frail and elderly
- Children
- Those who cannot understand the purpose of fasting (ie, those with learning difficulties or who have severe mental health problems)
- Those who have a chronic condition where fasting would be detrimental to their health

The last bullet point can raise questions in terms of when there is a risk to health. For example, would fasting be detrimental to patients with cardiovascular disease? There are a few studies that may be of use. A 13-year review of a stroke database found no increases in the number of hospital admissions due to stroke during Ramadan. Another study in an Islamic country (where most of the population fast) showed that during Ramadan there was no increase in the number of hospital admissions for acute coronary syndrome.

Individuals with stable cardiac disease and who wish to fast should experience minimal adverse effects. However, the fact that Ramadan falls in different seasons can have a bearing on study results, due to the differing length of fasts. Other variables that can affect study results — in addition to more common factors such as differences in study design and sample size — include dietary habits in different countries and the ethnicity and demographics of study participants. Recommendations are, therefore, often based on expert opinion.

Fasting can have a detrimental effect on renal tubules. Patients with chronic kidney disease who wish to fast should have a full review one or two months before Ramadan.

In the UK a fast can last from between 10 and 19 hours.

Although the Koran exempts people with certain conditions from fasting, many Muslims will still feel obliged to fast.

Some patients alter their drug dosage regimens themselves, leading to adverse consequences.

Patients with diabetes who wish to fast should have a full review one or two months before Ramadan.

KEY POINTS

- In the UK a fast can last from between 10 and 19 hours.
- Although the Koran exempts people with certain conditions from fasting, many Muslims will still feel obliged to fast.
- Some patients alter their drug dosage regimens themselves, leading to adverse consequences.
- Patients with diabetes who wish to fast should have a full review one or two months before Ramadan.

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One study indicates that women with an uncomplicated pregnancy experienced no adverse effects on fetal development when they fasted. However, pregnant or breast feeding women are considered temporarily exempt from fasting, as are those travelling more than 50 miles or who are acutely unwell. They must make up fasts at a later date but if unable to do so, they must compensate by giving alms to the poor (jidyah).

Despite the exemptions, many Muslims will still fast due to obligations towards their faith and feelings of guilt if fasting is missed. For example, one large study (EPIDIAR), which involved 12,243 individuals in 13 countries has shown that 79 per cent of people with type 2 diabetes and 43 per cent of those with type 1 diabetes fast for at least 15 days during Ramadan.

Impact of fasting
Fasting can have a psychological and biochemical impact.

Psychological impact
Fasting is a practice in self sacrifice and a way for individuals to appreciate what they have. Ramadan gives Muslims time to reflect, better their character and remove their faults. Feelings of anger during this holy month may nullify the benefit of fasting. Ramadan is not simply about giving up food. There is an increased participation in prayer. Fasting should allow individuals to attain spiritual peace. The overall psychological impact over the month should be beneficial to individuals.

Biochemical impact
Eight hours after a meal, insulin secretion is reduced, there is glycogenolysis (glycogen breakdown) and gluconeogenesis (glucose production). During fasting there is an increase in the levels of the counter-regulatory hormones glucagon and catecholamines. There is also an increase in fatty acid production and ketones.

Hypoglycaemia can reduce ability to think clearly and cause irritability, forgetfulness and confusion. In terms of effects on lipid metabolism, studies have shown no change or a decrease in cholesterol and triglyceride levels and an increase in high density lipoprotein levels, which supports a favourable cardiovascular risk profile, but the increase reduces after Ramadan.

Medication during Ramadan
The use of drugs during Ramadan can be an area of contention and uncertainty. However, a meeting of medical practitioners and Islamic jurists in Morocco (June 1997) reached a consensus as to acceptable drug use during Ramadan. They unanimously agreed that use of the following will not nullify a fast:

- Eye and ear drops
- Vaginal pessaries and washes
- Injections through the skin, muscle, joints or veins (excluding intravenous feeds)
- Oxygen and anaesthetic gases

A meeting of medical practitioners and Islamic jurists in Morocco (June, 1997) reached a consensus as to acceptable drug use during Ramadan.

- Sublingual glyceryl trinitrate tablets
- Mouthwashes, gargo or oral sprays provided none is swallowed
- Any substance absorbed through the skin (e.g., creams, ointments, medicated plasters)

A majority of the group also agreed that use of nose drops, nose sprays, inhalers and anal injections do not nullify a fast.

Dosage schedule
Individuals who have to take tablets during Ramadan may wish to adjust their dosage schedule. Aa’dil et al describe how some patients may alter their dosage schedule themselves, leading to adverse consequences.

Patients should, therefore, be advised to discuss dosage regimen adjustments with their prescriber.

Dosage adjustment will depend on the normal timing of administration, length of the fast and indication for the drug. Patients taking a single dose at night are likely to have no problems but pharmacists who advise switching a single morning dose to a night dose should remember that some drugs show circadian variation in pharmacokinetics and pharmacodynamics. For example, propranolol is more quickly absorbed after a morning dose than after an evening dose and is subject to circadian effects on sympathetic tone and vascular reactivity. Similarly, the timing of a once-daily dose of enalapril can affect blood pressure profile over the course of the day and night. However, studies on antihypertensive drugs have shown no difference in efficacy during Ramadan when administration times have changed.

Patients on twice-a-day or more frequent regimens are likely to need advice. Changing the timing of a twice-a-day regimen to fit with the start and end of fasting can affect plasma levels, with risks to efficacy and tolerance, especially for drugs with a narrow therapeutic index. Drugs that are available in modified release form may be an option during Ramadan but these formulations can be more expensive.

Changing a dosage schedule might also mean that a medicine is taken with food and care is needed with those that have to be taken on an empty stomach. The types of food eaten during Ramadan are often high in fat and this might also have an effect on the absorption and bioavailability of some medicines.

People with diabetes
Of the 1.6 million Muslims in the UK, about 325,000 have diabetes. Those who have no symptoms do not classify themselves as unwell and will partake in sawm but, in fact, studies have found that most people with diabetes will fast. In people with insulin deficiency, especially those with type 1 diabetes, fasting can result in excessive glycoegenolysis, gluconeogenesis and ketogenesis. This can lead to hyperglycaemia and ketoadiposis.

The EPIDIAR study did not assess average glycaemic levels but results showed an increase in the risk of hypoglycaemia 4.7 and 7.5 fold in people with type 1 and type 2 diabetes, respectively. The risk of hyperglycaemia was increased five- and three-fold, respectively. These results are thought to be underestimates because only individuals who had severe episodes that required hospital admissions were recorded.

It is recommended that those with type 1 diabetes — particularly those who are poorly controlled — do not fast. Women with diabetes who are pregnant should not fast during Ramadan because of the evidence of fetal and maternal risk with poor glycaemic control in pregnancy.

One or two months before Ramadan, a full review should be carried out, including measurement of lipids, blood pressure and glycaemic levels, and detection of complications. An assessment of the risks of fasting should follow. Healthcare professionals making a decision over whether it is safe for a patient to fast can use the Panel (p3), which puts individuals into different risk categories. Individuals falling into the low risk category can fast without seeking advice from healthcare professional. Those in the moderate risk category can reduce their risk by seeking appropriate advice from a healthcare professional before fasting commences. Those at high risk are recommended not to fast due to the risk of hypoglycaemia and worsening diabetic control.

If a patient wishes to fast, healthcare professionals have a duty to explore the impact of fasting for the patient in terms of risk. Deciding whether it is suitable for a patient to fast must be handled sensitively because many Muslims feel obligated to do so as an important part of their faith.

The medical assessment should also cover blood monitoring, when a fast needs to be broken and advice on diet and exercise. For example, light to moderate exercise is considered safe during Ramadan for people with type 2 diabetes. Excessive or strenuous exercise should be avoided because it can lead
to hypoglycaemia, especially in patients on insulin or taking sulphonylureas. Taraweeh (night prayer) is considered part of an individual’s exercise regimen — it entails sitting, bowing, prostrating oneself and standing.13

Medication

Muslim patients with diabetes who fast may need adjustments to antidiabetic therapy during Ramadan. Metformin There is no evidence available for the incidence of hypoglycaemia in patients taking metformin who fast, but we know that metformin can cause hypoglycaemia even in patients who do not fast. It is recommended that fasting Muslims on a three-times-a-day regimen take two-thirds of their dose of metformin at the sunset meal and one third of the dose at the predawn meal.12 The lunchtime dose should be omitted. In general, metformin is safe to take while fasting. Those on a twice-a-day dosage do not need to change their dose but if they experience any adverse effects the dose should be reduced.

Patients taking modified release metformin daily should take their dose at night rather than in the morning.13 Sulphonylureas Sulphonylureas should be used with caution by fasting patients due to their propensity to cause hypoglycaemia. It is more prudent to use short-acting agents (eg, glimepiride and glipizide). A once-a-day dose which is normally taken in the morning should be taken in the evening instead, when the meal will be heavier.

One prospective study looking at glimepiride showed no difference in the incidence of hypoglycaemia compared with before or after Ramadan.14 There was also no change in glycaemic control when the dose was switched from morning to evening.14 Similarly glinazide modified release (60mg in the evening) will be heavier.

Patients with diabetes at high risk
- Those with severe and recurrent episodes of hypoglycaemia and who lack unawareness
- Those with poor glycaemic control
- Those with ketoacidosis or who experience hyperosmolar hyperglycaemic coma in the three months before Ramadan
- Those with acute illness
- Those who perform intense physical labour
- Those with acute illness
- Those who are pregnant
- Those with co-morbidities, such as advanced macrovascular complications, renal disease (end-stage-dialysis) and cognitive dysfunction

Patients with diabetes at moderate risk
- Those whose condition is well controlled with a short-acting insulin secretagogue, sulphonylurea, insulin or combination treatment

Patients with diabetes at low risk
- Those whose condition is well controlled with diet alone, monotherapy with metformin, dipeptidylpeptidase-4 inhibitors or thiazolidinediones, and who are otherwise healthy

Deciding whether it is suitable for a patient to fast must be handled sensitively

The study) can be switched from the morning to an evening dose.

Those who are on a twice-a-day regimen should have their morning dose halved (eg, 160mg bd should be reduced to 80mg om and 160mg en.

If the risk of hypoglycaemia is high, dipeptidylpeptidase-4 inhibitors can be considered as an alternative to a sulphonylurea.13

Thiazolidinediones There is no need for any dose adjustment with pioglitazone due to the minimal risk of hypoglycaemia.

Incretin-based therapies Although dipeptidylpeptidase-4 inhibitors and glucagon-like peptide-1 analogues are relatively new and there is limited experience of use of these drugs during Ramadan, they generally pose less risk of hypoglycaemia to patients with their glucose-dependent action compared to some of the conventional treatments. Side effects, such as nausea with the injectable GLP-1 analogues, may pose a problem during fasting. No dose adjustment is needed with these drugs, but when used in combination therapy the dose of other agents, such as metformin, may need to be adjusted.

Insulin Insulin injections are considered acceptable during fasting but the change in eating habits can lead to hypoglycaemia. Advice to patients using insulin should be tailored to each individual. The following general recommendations are based on small studies and expert opinion:

- Patients with type 1 diabetes, on a basal bolus regimen and who insist on fasting should omit their midday rapid-acting dose and reduce their background dose by 20 per cent if blood glucose levels are below 7.0mmol/L. If levels are greater than 7.0mmol/L advice from specialists should be sought about dose adjustment.13
- Patients using single basal insulin (including glargine and detemir) should reduce their dose by 20 per cent. The dose should be administered in the evening.
- Patients using pre-mixed insulins should use their morning dose in the evening and halve their evening dose and use this in the morning.
- Short-acting insulin may be used instead of normal insulin because it can give fewer post prandial peaks and hypoglycaemic attacks.

Each patient should be reviewed individually to assess the effect after adjusting the insulin dose by closely monitoring blood sugars and adjusting accordingly.

Healthcare professionals can liaise with community diabetic specialist nurses for advice on insulin dosage adjustment.

Blood monitoring

Blood glucose monitoring can be carried out during fasting and all patients should be aware of the symptoms of hyperglycaemia (eg, increased thirst, blurred vision, headaches, fatigue) and hypoglycaemia (eg, shakiness, sweating, dizziness). If symptoms appear they should check their blood glucose. It is also recommended for individuals to monitor their blood glucose levels if they feel unwell and to assess the effect of any insulin dose titration or changes to antidiabetic drug dosages.13 Those using insulin should be advised to check blood glucose levels before salat, after iftar and during the day when required.

Patients wishing to fast should understand that it is imperative they break their fast if blood glucose levels are below 3.9mmol/L in the morning, particularly if they are on insulin or sulphonylureas. If they have hyperglycaemia (ie, if blood glucose levels are above 16.7mmol/L) they should not be fasting.13

Some individuals may be reluctant to break their fast even if they feel unwell and this topic should be handled sensitively when counselling patients before Ramadan.

Structured education interventions have been found to be beneficial in terms of...
conclusion about the safety of fasting for patients. Factors that should be taken into account before recommending whether or not patients can fast safely are: the length of the fast, frailty, age and any medicines taken. In diabetes, each patient’s treatment plan should be individualised and reviewed on an annual basis whereby their health status may have differed from the previous year. Healthcare professionals should use Islamic leaders in the community as a source of support to convey key health messages pertaining to fasting safely.

Resources
- Information on local mosques can be found on the Muslim council of Great Britain website (www.mcb.org.uk). The site also has guides to Ramadan for employers and employees.
- The United Kingdom Ramadan Diabetes Network website (www.ukramandiabetes.net) contains further information on fasting and diabetes and links to educational tools for healthcare professionals and patients.

References

Extracts from this article have been taken from a resource pack for healthcare professionals, entitled “Ramadan and your diabetic patient” (NHS Glasgow) written by the author.

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