

Experiences and needs of patients with type 2 diabetes during Ramadan: A qualitative study

Mona Abed El-Rahman Mohamed, Naglaa Ibrahim Mohamed Gida,
Dena Eltabey Sobh Sobeh

Diabetes management during the fasting month of Ramadan is challenging and can greatly impact glycaemic control as well as physical and psychosocial wellbeing. This study explored the experiences and needs of adults with type 2 diabetes during Ramadan fasting. A descriptive qualitative study was conducted and 30 adults who fast during Ramadan were interviewed in a diabetes clinic in Port Said, Egypt. The transcribed data were analysed using thematic analysis. Three themes were identified: participants' experience during the fasting months; behavioural strategies and coping during fasting; and healthcare support and needs. Physical and psychosocial challenges experienced by the participants affected their daily activities. Their needs for support, especially provision of additional information from healthcare professionals about safe fasting, should be addressed.

Fasting in Ramadan is one of the five pillars of Islam and involves absolute self-restraint from food, drink and sex from dawn to sunset. This is not a very difficult duty for healthy people, but it might be difficult or impossible for people with an illness or long-term condition; therefore, by the mercy of Allah, such individuals may be exempted from fasting during Ramadan (McEwen et al, 2015; Vakili et al, 2016).

When fasting, Muslims must avoid eating, drinking, smoking and even taking medications between dawn and sunset. There are two main meals: one before sunrise – Suhur – and the other at sunset – Iftar. Muslims are free to eat and drink anything they want between Iftar and Suhur. Generally, people tend to consume large amounts of many different kinds of foods and drinks at Iftar, in a feasting atmosphere (Iraki et al, 1997).

Ramadan is the ninth month of the Islamic calendar and, as this is a lunar-based calendar, occurs 11 days earlier each year (Lee et al, 2017;

Mansour et al, 2018). Diabetes management during fasting is challenging, particularly if Ramadan falls in the summer months, when the long hours of fasting may have a greater impact on glycaemic control. Globally, it is estimated that 40–50 million Muslims with diabetes fast during Ramadan. This creates a medical challenge for healthcare providers around the world (Savas, 2018).

The effects of Ramadan on glycaemic control are uncertain. Fasting-altered dietary habits, daily physical activities, treatment regimens and sleeping patterns all have a significant impact on glycaemic control (Rouhani and Azadbakht, 2014). Studies have variously reported both deterioration and improvement in glycaemic control, and others have shown no effects (Ahmad et al, 2012; Alabboud et al, 2017; Mansour et al, 2018). People with diabetes who fast during Ramadan may develop acute complications such as hypoglycaemia, hyperglycaemia, diabetic ketoacidosis and dehydration (Ahmad et al, 2012).

Citation: El-Rahman MA, Gida NIM, Sobh DE (2019) Experiences and needs of patients with type 2 diabetes during Ramadan: A qualitative study. *Journal of Diabetes Nursing* 23: JDN106

Article points

1. The current study population generally viewed fasting during Ramadan as safe and an important act of worship.
2. Most altered their antidiabetes medication and daily activities to cope with fasting and prevent hypoglycaemia; however, this was often done without consulting their healthcare professional.
3. The principal needs identified in this study were for more information about and support with fasting from healthcare professionals, as well as easier access to healthcare services in order to fast safely.

Key words

- Diet and lifestyle
- Fasting
- Ramadan
- Type 2 diabetes

Authors

Mona Abed El-Rahman is Assistant Professor, Medical–Surgical Nursing; Naglaa Gida is Assistant Professor, Family and Community Health Nursing; Dena Sobh is Assistant Professor, Medical–Surgical Nursing, all at Port Said University, Egypt.



Read more
online

How to manage diabetes during Ramadan

A quick reference guide outlining what the primary care clinician should discuss with a person with diabetes who is considering fasting during Ramadan.

Diabetes & Primary Care 21: 41–2

[Click here to access](#)

There is no agreement on whether Muslims with diabetes should be allowed to fast. The decision to fast or not during Ramadan remains a personal choice, and many Muslims are resistant to the idea of breaking a fast. Although the Quran exempts those who are diagnosed with an illness from fasting, the majority of Muslim practitioners living with diabetes do not perceive themselves as ill and continue to fast (Al-Musally et al, 2017).

Healthcare professionals need to educate themselves about the topics to discuss with Muslim patients to provide care on an individual basis (Ahmedani and Alvi, 2016). Religious care helps patients adhere to their belief systems and worship practices. In addition, spirituality significantly helps patients adapt to the changes that can result from chronic illness. Nevertheless, patients face the dilemma of whether or not to fast during Ramadan.

Fasting offers an opportunity to renew personal faith. It is an effective coping resource for physical and psychological symptoms (Ramezani et al, 2014). People who have a sense of spiritual wellbeing feel connected with a higher power and are able to find meaning and purpose in life, and are better able to cope with and accept their chronic condition (Sharoni and Wu, 2012).

Nurses involved in the care of people with diabetes need to be advised on the risks associated with fasting and how to manage the issues faced by adherents, and on the dietary modification, exercise and medication adjustment that may be required to maintain patients' safety. Exploring the experiences and needs of adult patients with diabetes during Ramadan fasting can be helpful in this respect.

Study aims

The purpose of this study was to explore the experiences and needs of adults with type 2 diabetes during Ramadan fasting. The research questions were as follows:

1. What are the experiences of people living with diabetes during Ramadan fasting?
2. What are the needs and desires of these individuals with respect to Ramadan fasting?

Methods

Design

This was a descriptive qualitative study.

Sample

Participants were recruited from a diabetes outpatient clinic in Port Said, Egypt. Purposive sampling was used, and data collection proceeded until data saturation. The inclusion criteria were adults who had been diagnosed with type 2 diabetes for at least 6 months and who intended to fast for at least 15 days during Ramadan. The exclusion criteria included patients who had visual, hearing, and/or cognitive impairments, or mental disorders.

Data collection

Semi-structured interviews were conducted to collect data from June to July during the Ramadan month in 2017, with long daylight hours and fasting periods lasting 17 hours per day. The participants who met the eligibility criteria were shortlisted and referred to the researcher by the charge nurse at the study clinic. When the participants came to the diabetes clinic, the researchers informed them about the study and obtained verbal consent for participation. The individual in-depth interviews were conducted in the meeting room of the diabetes clinic. The researcher selected a familiar and relaxed atmosphere that put the participants at ease and assisted participants to express and clarify their experiences during the fasting. During the interviews, the participant and researchers sat close and face-to-face with each other for effective communication. The interview schedule contained three questions comprising the following:

- What do you feel during Ramadan?
- How do you cope with difficulties during fasting?
- What are your expectations when you attend the diabetes outpatient clinic?

Questions could be posed in no specific order and could be added or dropped, depending on the direction of the interview. The conversations were recorded using a voice recorder, and the data obtained in the interviews were kept confidential for future scientific research. Clinical data were extracted from the hospital's electronic medical records system, and only the latest fasting blood glucose results were collected, if applicable. The majority of fasting patients did not self-monitor their blood glucose levels. The interviews lasted 45–60 minutes on average.

Data analysis and rigour

Thematic analysis (Braun and Clarke, 2006) was used to analyse the data. All audio-recorded data were transcribed by the same researcher who conducted the interviews. The researcher then read the transcripts repeatedly and used the colour-coding method to identify distinct concepts and categories relevant to the research questions. The concepts and categories were regrouped to form subthemes, which were then reviewed and combined to generate the themes of the study.

Polit and Beck (2010) enumerated four criteria for ensuring the rigour of qualitative studies: credibility, transferability, dependability and confirmability. To enhance the credibility of the findings, investigator triangulation (Polit and Beck, 2010) was used during data analysis. The researchers analysed the data separately using the same method of analysis. Findings were then compared and any differences were reviewed and discussed until an agreement was reached. A reflective attitude was also maintained by the researcher through critical self-reflection and bracketing in the process of data collection and analysis to avoid imposing her personal viewpoints. To ensure dependability, an audit trail, including all field notes, audio recordings, products of data analysis and synthesis, process notes and interview guides, was kept to increase the transparency of the research process (Houghton et al, 2013). To ensure confirmability, two content and methodology experts re-examined all transcribed interviews and validated the findings. An audit trail concerning data-collection and analysis decisions was also kept to ensure that this study was auditable (Polit and Beck, 2010).

Ethical considerations

A formal application was submitted for approval to the Institutional Review Board at Port Said University and the diabetes clinic (Ethical no. 10). The purpose of this study was explained to potential participants, and those who gave informed consent were interviewed individually. Voluntary participation was emphasised and the participants were assured that refusal to participate would not influence the medical care they would receive.

Results

Thirty participants, comprising 20 women and 10 men, were enrolled. The mean age was 50.8 years,

Table 1. Participant characteristics (n=30).

| Variable | Mean ± SD |
|--------------------------------|-------------|
| Age (years) | 50.8 ± 7.49 |
| Duration of diabetes (years) | 8.3 ± 4.69 |
| Fasting blood glucose (mmol/L) | 9.5 ± 3.8 |
| Gender | Frequency |
| Male | 10 (33.3%) |
| Female | 20 (66.7%) |
| Education | Frequency |
| No education | 10 (33.3%) |
| Basic education | 11 (36.7%) |
| Secondary education | 5 (16.7%) |
| University education | 4 (13.3%) |
| Marital status | Frequency |
| Single | 10 (33.3%) |
| Married | 20 (66.7%) |
| Occupation | Frequency |
| Unemployed | 13 (43.3%) |
| Manual work | 12 (40.0%) |
| Non-manual work | 5 (16.7%) |

SD=standard deviation.

ranging from 30 to 62 years. More than half of the sample had a basic level of education, and 43.3% were unemployed. Mean diabetes duration was 8.3 years (range, 5–27 years). The participant demographics are summarised in *Table 1*.

All participants were prescribed oral hypoglycaemic agents (sulfonylureas) alone, and the mean fasting blood glucose level was 9.4 mmol/L.

Theme 1: Participants' experience during fasting months

Many of the participants, both men and women, did not perceive themselves as being ill. They tolerated fasting very well.

Optimum sense of physical wellbeing

The majority of the participants stated that they



Read more
online

The role of a healthy-eating educational module during Ramadan in a community health centre

The impact of an educational module and individual follow-up on adherence to a healthy diet, medication use and glucose levels during Ramadan in a community setting.

Journal of Diabetes Nursing
22: JDN013

[Click here to access](#)



Read more
online

**Delivering grassroots
diabetes education in the
South Asian community**

How healthcare professionals can successfully deliver culturally tailored education at the grassroots level to help tackle health inequalities.

Diabetes & Primary Care 21:
121–5

[Click here to access](#)

felt more energetic and happier during Ramadan, despite abstaining from food and medication for a long period of time.

“At the first week of fasting, I feel weak but then my body tolerates and adapts fast, then I am okay. It makes me feel mentally and physically strong and lighter.”

Some participants claimed to have better control of their diabetes during fasting, some relating it to the strength that Allah gives them during Ramadan. The willpower to abstain from food and drink seemed to result in a sense of both positive mental and physical wellbeing.

“I feel very fresh, very happy and very calm.”

They also reported doing many activities during Ramadan days more than in other months.

Theme 2: Behavioural and coping strategies during fasting

Many participants found ways of adapting their lifestyle to accommodate diabetes, and used self-management to deal with blood glucose.

Restriction in daily activities

Many participants decreased their daily activities to preserve energy and reduce worry about hypoglycaemia, whereas others reported that their activities were greatly restricted as they felt exhausted whenever they performed their usual activities such as cleaning the house, cooking and shopping. A sense of powerlessness became worse towards Iftar (evening), and the majority of participants performed necessary activities such as cooking early in the morning.

Dietary modification

Some participants talked about being overwhelmed by poor glucose control, one of the most prominent aspects of living with diabetes, while other participants attributed poor glucose control as the main factor behind their dietary patterns.

Meals in Ramadan have a special nature and are rich in simple carbohydrates and fat, like cheese or walnut katayef. All participants start their Iftar meal with dates to return their blood glucose to normal levels. This practice leads to poor glucose control.

Many participants ate slow-energy-release foods (e.g. grains, wheat, cucumber, beans and yoghurt),

which have the best results when eaten in Suhur. The majority of the participants reported that this diet helped them to tolerate fasting.

Some participants tried to minimise their intake of salty, deep-fried food to decrease the sense of thirst, and they reserved high-fat, sugar-rich sweets for breaking the fast.

Self-management and self-efficacy

Experience, symptom-driven motivation and perceived self-efficacy were expected to improve the performance of behaviours related to safe fasting, which in turn reduces the occurrence of hypoglycaemia.

Some participants took a wait-and-see approach to fasting and tried fasting for a longer period. However, when experiencing shaking and cold sweating, they would break their fast.

Medication modification

The majority of the participants altered their medications (sulfonylureas) to reduce hypoglycaemic side effects and to be safe. It is worth noting that some participants self-adjusted the dosage of their medications or omitted them completely without consulting their doctors:

“I was on the hypoglycaemic drug for three years and could not continue to fast during the Ramadan months while compliant with the therapeutic dose. I haven’t done my normal routine while compliant with the therapeutic dose based on experience and symptoms during this period to avoid hypoglycaemia. After this period, I shall start to perform my normal activities.” (51-year-old male)

Many participants expressed confidence in their ability to alter their medication regimen to avoid hypoglycaemia. This often involved missing or taking a lower dose of their diabetes medication.

“She takes one tablet in the morning and one in the evening. Early in the morning before sunrise, she takes one and the other one at Iftar. No problem, she says, because she eats after sunset.” (53-year-old female)

Theme 3: Healthcare support and needs

The majority of participants had feelings of insecurity due to the lack of a standard guideline

about fasting. Most reported receiving inadequate information about their condition, its management and treatment options. Where this was not provided, other sources of information were sought, which were not necessarily appropriate to the person's needs.

"I was given no information about safe fasting at all and I haven't really tried to access any, so I still don't know much about safe fasting. I always read about the side effects in the medication boxes; it's so long and detailed but it helps me to regulate blood sugar during fasting."

"I've discussed it with my nurse and she said, 'the choice is yours, but you've got your medication'. She pointed out that I will have long gaps. I don't know how it's going to affect me. However, I have asked them, and they say it's my choice."

All participants suggested that they would like support and advice, especially from their healthcare providers on fasting safely, provided that the clinician was trained, empathic and understood the significance of Ramadan for Muslims with diabetes.

Discussion

Fasting during Ramadan is viewed as a religious worship practice that should be fulfilled by all Muslims in spite of living with diabetes. The present study revealed that people with diabetes had a positive experience and coped effectively with difficulties faced during fasting.

One of the main themes identified by participants in this study was that fasting improved both their mental and their physical wellbeing. Fasting during Ramadan is considered an important act of worship, imposed by Almighty God on Muslims. It is considered the season to conduct periodic maintenance of the body's organs. In addition, it is a time of spiritual reflection, improvement, increased devotion and worship.

The participants, who had an average diabetes duration of 8 years, were confident about fasting in Ramadan. Since they had experience with the condition, they felt able to tolerate the fast and control their blood glucose. They also tended to have a greater sense of self-management because of the time they had spent practicing better self-care. This result is in accordance with a study by

Mahgoub and Abdelgadir (2017), in which people who had diabetes for less than 10 years were able to tolerate fasting very well. Those with a longer duration of diabetes were less likely to fast, and those with multiple comorbidities suffered more while fasting.

The current study suggests participants were aware that food containing fibre can help them to tolerate fasting and decrease hypoglycaemia during the fast. In studies conducted by Patel et al (2015) and Ali et al (2016), Muslims with diabetes who chose to fast altered their diet and medication and generally had positive experiences of fasting. Many studies have shown a significant decrease in HbA_{1c} without an increase in the incidence of hypoglycaemia during and after Ramadan (Ahmad et al, 2012; Ahmedani et al, 2016).

Ramadan fasting offers an excellent opportunity to study prolonged meal frequency modifications as a tool to regulate blood glucose. During the Ramadan, practising Muslims abstain from food and liquids from dawn to sunset, for one month. They commonly eat one large evening meal and an optional lighter meal before dawn. In this regard, Maislos et al (2001) reported that Muslims with diabetes followed a regimen of fewer meals during the month of Ramadan. This diet was well tolerated and generally safe. The authors also reported a significant reduction in HbA_{1c}, suggesting a beneficial effect of this type of eating pattern in these individuals.

The participants in our study generally perceived medications as central to their ability to tolerate fasting. Ramadan fasting appears to improve glycaemic control, especially in those whose doses of antidiabetes agents are adjusted during Ramadan (Bravis et al, 2010). However, the majority of our participants also expressed strong concerns about the hypoglycaemic side effects of medication usage on their health, which concurs with findings by Gray et al (2015). Non-adherence to the medication regimen is a potential problem arising from such concerns (Bashir et al, 2012; Daly et al, 2014).

The present study also suggests that participants intentionally decreased their level of physical activity to avoid hypoglycaemia. Many studies recommend that people with diabetes should be advised to avoid excessive physical activity during Ramadan, because the practice of fasting may increase the



**Read more
online**

The journey towards building engaging dietary resources for BAME communities

How a pilot study led to the development of a culturally relevant book providing accessible dietary advice for four BAME communities.

Diabetes & Primary Care **21**:
13–16

[Click here to access](#)

“Fasting during Ramadan is viewed as a religious worship practice that should be fulfilled by all Muslims in spite of living with diabetes. The present study revealed that people with diabetes had a positive experience and coped effectively with difficulties faced during fasting.”

risk of hypoglycaemia, especially a few hours before the sunset meal (Khan et al, 2012; Chamsi-Pasha and Aljabri, 2014; Siaw et al, 2014). Appropriate levels of physical activity during fasting, however, do not appear to interfere with blood glucose levels (Al-Musally et al, 2017; Savas, 2018).

An individual's ability to cope actively is dependent on their perception of self-efficacy, which in turn stems from personal experience, observation of others' success and the verbal persuasion that they have the capabilities to cope successfully (Bandura and Adams, 1977). Therefore, support groups may serve as an excellent platform for people with diabetes to learn from role models who have successfully coped with their everyday life, thereby promoting self-efficacy and active coping (Sharoni and Wu, 2012).

Lack of understanding of religious beliefs and practices among healthcare professionals can be a barrier to an open and trusting patient relationship, which can impede the ability to defuse health problems associated with fasting and to offer the best possible person-centred care (Ramezani et al, 2014; Farooqi, 2016). Healthcare providers whose understanding and accommodation of the needs associated with Ramadan fasting will be more likely to be trusted if they are respectful of patients' beliefs and knowledgeable about their religious practices. Asking patients not to fast, even if based on scientific evidence, may not only lead to patients fasting without telling their doctors but may also offend their cultural and religious values. Ultimately, patients will make their own decisions, and healthcare providers must ensure that they remain healthy, safe, and well informed based on the choices they make (Sharoni and Wu, 2012; Ramezani et al, 2014; Ali et al, 2016; Mansour et al, 2018).

In this study, the most commonly reported need among participants who decided to fast was informational support from healthcare professionals, as well as easier access to healthcare services in order to fast safely (Lou and Hammoud, 2016; Mansour et al, 2018). Moreover, Ramadan-specific patient education was identified as the cornerstone of safe fasting. It was emphasised that clear and careful advice should be provided to all patients with diabetes. Nurses can also organise and conduct support groups for people with diabetes who fast

during Ramadan so they can share their experiences and coping strategies and gain confidence and self-efficacy from meeting others in the same situation. The religious demands of Ramadan also need to be discussed so that people do not feel guilty for being unable to fast.

The current study provides preliminary evidence and direction for the development of intervention programmes to optimise the management of diabetes during Ramadan. It seems that most participants were highly motivated to fast and believed that doing so is not dangerous. They also desired more support and education regarding safe fasting.

Study limitations

This study offers some valuable insights into the experiences and ways that people with diabetes manage their fasting. However, despite the mechanisms we applied to enhance the rigour of this study, some limitations may be inherent. The sample size was small and purposive sampling of patients with type 2 diabetes was used. Therefore, it is difficult to generalise the findings. Further studies should be conducted with larger samples.

In addition, the study was limited by its single-centre design and its location. The participants lived in Port Said city, located in the Arab country of Egypt, where the majority of the population is Muslim. To mitigate this, the study's population was drawn from four diverse geographical areas with different demographic characteristics; however, the experiences and needs of this cohort may differ from those in other countries where Islam is not the majority religion. Further studies with larger samples and mixed methodologies should be conducted.

Conclusion

This study contributes to our knowledge about the experiences and needs of people with diabetes during Ramadan fasting. The participants experienced a positive sense of health wellbeing. It seems that most were highly motivated to fast and believed that doing so is not dangerous, while some wished to know how to fast safely. Furthermore, they used various behavioural and cognitive coping strategies to fast safely. Most participants tolerated fasting well and coped effectively to prevent poor glucose control by adjusting their medications. ■

- Ahmad J, Pathan MF, Jaleel MA et al (2012) Diabetic emergencies including hypoglycemia during Ramadan. *Indian J Endocrinol Metab* **16**: 512–5
- Ahmedani MY, Alvi SF (2016) Characteristics and Ramadan-specific diabetes education trends of patients with diabetes (CARE): a multinational survey (2014). *Int J Clin Pract* **70**: 668–75
- Ahmedani MY, Haque MS, Basit A et al (2012) Ramadan Prospective Diabetes Study: the role of drug dosage and timing alteration, active glucose monitoring and patient education. *Diabet Med* **29**: 709–15
- Alabboud MH, Ho KW, Simons MR (2017) The effect of Ramadan fasting on glycaemic control in insulin dependent diabetic patients: a literature review. *Diabetes Metab Syndr* **11**: 83–7
- Ali S, Davies MJ, Brady EM et al (2016) Guidelines for managing diabetes in Ramadan. *Diabet Med* **33**: 1315–29
- Al-Musally RM, Al-Sardi MA, Al-Elq ZA et al (2017) Health education to diabetic patients before the start of Ramadan: experience from a teaching hospital in Dammam. *J Family Community Med* **24**: 111–7
- Bandura A, Adams NE (1977) Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research* **1**: 287–310
- Bashir MI, Pathan MF, Raza SA et al (2012) Role of oral hypoglycemic agents in the management of type 2 diabetes mellitus during Ramadan. *Indian J Endocrinol Metab* **16**: 503–7
- Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology* **3**: 77–101
- Bravis V, Hui E, Salih S et al (2010) Ramadan Education and Awareness in Diabetes (READ) programme for Muslims with type 2 diabetes who fast during Ramadan. *Diabet Med* **27**: 327–31
- Chamsi-Pasha H, Aljabri KS (2014) The diabetic patient in Ramadan. *Avicenna J Med* **4**: 29–33
- Daly H, Byrne J, Martin-Stacey L et al (2014) “A Safer Ramadan”: developing an integrated approach to support safer fasting and feasting for people with type 2 diabetes. *Practical Diabetes* **31**: 292–7
- Farooqi MH (2016) Can type 1 diabetes patients safely fast during Ramadan? *Journal of Nutrition Fasting and Health* **4**: 92
- Houghton C, Casey D, Shaw D, Murphy K (2013) Rigour in qualitative case-study research. *Nurse Res* **20**: 12–7
- Gray LJ, Dales J, Brady EM et al (2015) Safety and effectiveness of non-insulin glucose-lowering agents in the treatment of people with type 2 diabetes who observe Ramadan: a systematic review and meta-analysis. *Diabetes Obes Metab* **17**: 639–48
- Iraki L, Bogdan A, Hakkou F et al (1997) Ramadan diet restrictions modify the circadian time structure in humans. A study on plasma gastrin, insulin, glucose, and calcium and on gastric pH. *J Clin Endocrinol Metab* **82**: 1261–73
- Lee JY, Wong CP, Tan CSS et al (2017) Type 2 diabetes patient's perspective on Ramadan fasting: a qualitative study. *BMJ Open Diabetes Res Care* **5**: e000365
- Lou A, Hammoud M (2016) Muslim patients' expectations and attitudes about Ramadan fasting during pregnancy. *Int J Gynaecol Obstet* **132**: 321–4
- Khan NB, Khan MH, Shaikh MZ et al (2012) Effects of Ramadan fasting and physical activity on glucose levels and serum lipid profile among type 2 diabetic patients. *Pak J Med Sci* **28**: 91–6
- Mahgoub AO, Abdelgadir E (2017) The association between health-related quality of life and Ramadan fasting in diabetic patients: a survey using a structured D-39 assessment tool. A Sudanese cohort. *Journal of Nutrition Fasting and Health* **5**: 24–30
- Maislos M, Abou-Rabiah Y, Zuili I, Shany S (2001) Improved diabetes control after prolonged fasting – the Ramadan model. *Practical Diabetes Int* **18**: 149–51
- Mansour A, Shiaa NR, Narjis A (2018) Attitude of patients with diabetes mellitus toward fasting Ramadan in Basrah, Iraq. *Endocrinol Metab Int J* **6**: 00146
- McEwen LN, Ibrahim M, Ali NM et al (2015) Impact of an individualized type 2 diabetes education program on clinical outcomes during Ramadan. *BMJ Open Diabetes Res Care* **3**: e000111
- Patel NR, Kennedy A, Blickem C et al (2015) Having diabetes and having to fast: a qualitative study of British Muslims with diabetes. *Health Expect* **18**: 1698–708
- Polit DF, Beck CT (2010) *Essentials of Nursing Research: Appraising Evidence for Nursing Practice* (7th edition). Lippincott Williams & Wilkins, Philadelphia, PA, USA
- Ramezani M, Ahmadi F, Mohammadi E, Kazemnejad A (2014) Spiritual care in nursing: a concept analysis. *Int Nurs Rev* **61**: 211–9
- Rouhani MH, Azadbakht L (2014) Is Ramadan fasting related to health outcomes? A review on the related evidence. *J Res Med Sci* **19**: 987–92
- Savas E (2018) Attitudinal determinants of Turkish diabetic patients and physicians about Ramadan fasting. *J Relig Health* **57**: 47–56
- Sharoni SK, Wu SF (2012) Self-efficacy and self-care behavior of Malaysian patients with type 2 diabetes: a cross sectional survey. *Nurs Health Sci* **14**: 38–45
- Siaw MY, Chew DE, Dalan R et al (2014) Evaluating the effect of Ramadan fasting on Muslim patients with diabetes in relation to use of medication and lifestyle patterns: a prospective study. *Int J Endocrinol* **2014**: 308546
- Vakili R, Niazi Z, Rezaie P (2016) Type 1 diabetes and Ramadan fasting: a narrative review. *J Fasting Health* **4**: 22–4

“The participants used various behavioural and cognitive coping strategies to fast safely. Most participants tolerated fasting well and coped effectively to prevent poor glucose control by adjusting their medications.”