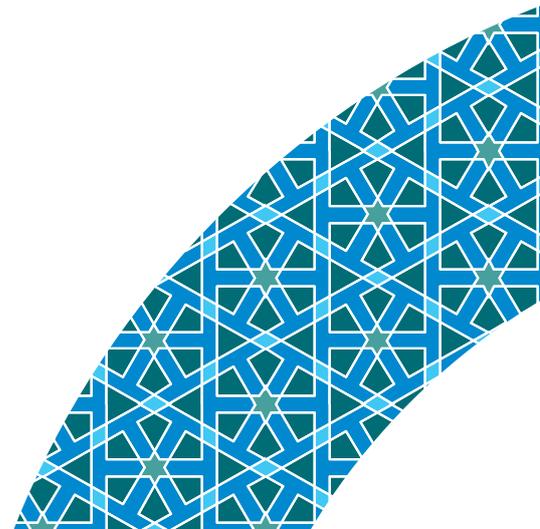


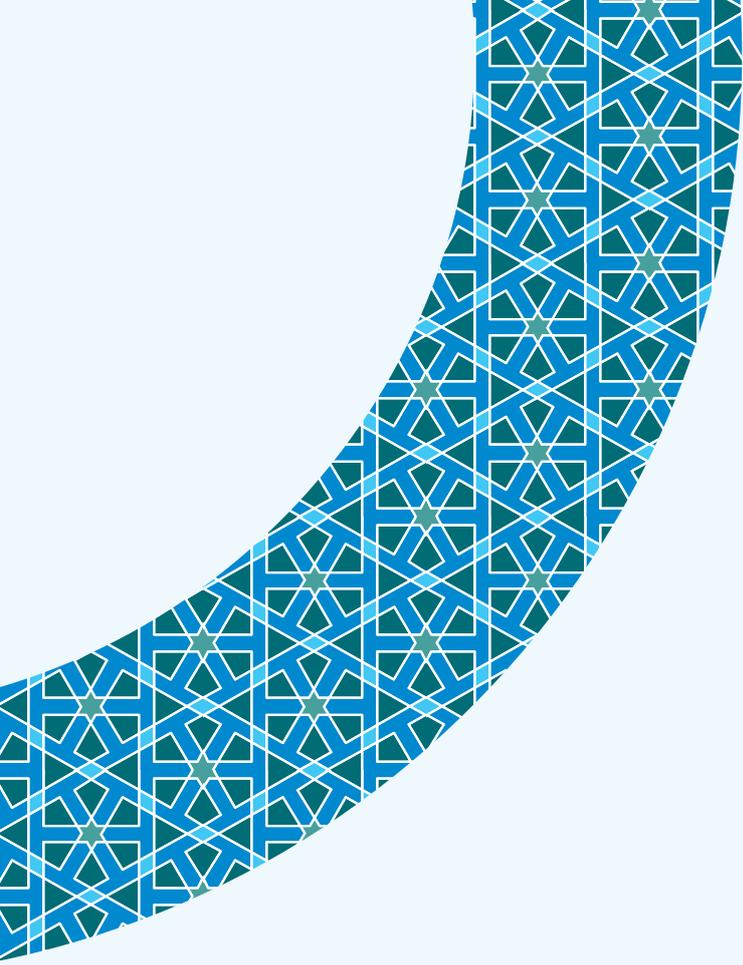
CHAPTER 12

Management of diabetes
among the elderly when
fasting during Ramadan

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CHAPTER 12

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WHAT IS KNOWN?

- Age alone is often used as a risk factor for fasting during Ramadan.
- In elderly people with diabetes a particular consideration needs to be given to any accompanying comorbidities.
- Many elderly individuals will still fast during Ramadan and guidance is needed to help these individuals fast safely.

WHAT IS NEW?

- The prevalence of fasting in elderly individuals is lower than in younger individuals.
- Comorbidities such as impaired renal functions, cardiovascular disease (CVD), dementia, frailty and a risk of falls need to be considered alongside age in risk stratification.
- The risk of diabetes related complications is higher in elderly populations.
- Modifications to medications are essential for elderly people wishing to fast.

WHAT IS MISSING?

- There is a significant need for greater research in elderly individuals with diabetes that seek to fast during Ramadan, including people with associated comorbidities and diabetes related conditions.
- Greater research is needed into the use of antidiabetic medications in elderly individuals with differing comorbidities and circumstances.

1. INTRODUCTION

Previously, elderly people with diabetes have been placed in the higher risk categories for fasting during Ramadan based on their age alone. Many elderly people have enjoyed fasting during Ramadan for many years and should be allowed to continue doing so if their health is stable [1].

The risk stratification of elderly people with diabetes should not be based on age alone but rather on their health status and social circumstances.

Many elderly people, especially those who have lived with diabetes for a prolonged period, will have comorbidities that impact on the safety of fasting and present additional challenges to the healthcare professionals (HCPs) managing them. These comorbidities can often include impaired renal function and deterioration in cardiovascular health, the different risks and management of individuals in these contexts have been described in other chapters (see **chapter 5: Risk stratification of people with diabetes before Ramadan** and **chapter 13: Risks of fasting during Ramadan Cardiovascular, Cerebrovascular and Renal complications**). Assessments of functional capacity and cognition need to be performed and the care provided should be adapted accordingly [2]. The use of medications including anti-diabetic agents, which carry varying risks for hypoglycaemia, should also be reviewed. Throughout this chapter, elderly will be defined as people that are 65 years or older.

Challenges of fasting in the elderly subjects with diabetes mellitus

A major issue when it comes to providing guidance to elderly people with diabetes is that there is a significant lack of research in this population. Most of the current guidance on the management of diabetes that can be applicable to elderly people with diabetes are based on expert opinion rather than medical evidence. A prime example is the landmark, multi-country, EPIDIAR study which has been used to formulate guidance for people with diabetes that seek to fast during Ramadan, however this study did not include information specific to the elderly [3]. As such, the findings from this study will not necessarily be representative of elderly populations.

Future research on Ramadan fasting needs to include more elderly individuals with diabetes to make more specific recommendations.

It is clear that with gains made in life expectancy and advances in medical care, more people will live to the later ages in life. According to the International Diabetes Federation (IDF) 9th Atlas, 1 in 5 people with diabetes are above the age of 65 years old (163 million) [4]. Despite there being some elderly individuals that may not be able to fast, there is a high proportion of elderly individuals with diabetes that remain determined to fast during Ramadan. In recent cross-sectional study, the DAR 2020 Global survey studied the fasting practices and



characteristics of elderly individuals with T2DM during Ramadan of 2020. The intentions to fast was 71.2% among those ≥ 65 compared to 87.3% in those < 65 years [5].

Together these highlight the need for producing clear guidance and this remains an important challenge for healthcare providers to tackle.

2. COMPLICATIONS OF DIABETES IN THE ELDERLY

It is important to recognise that age in and of itself is not a good reason to categorise individuals as high risk for fasting during Ramadan, but rather it is the associated implications of old age that need consideration. Indeed, the elderly that do manage to fast can be more motivated than their younger counterparts — the DAR Global Survey found that 69% of those aged ≥ 65 years fasted for 30 days compared to 60% in those < 65 years [5].

However, people in the elderly ages can often have other comorbidities alongside diabetes. Indeed, people with diabetes have a heightened risk of complications such as diabetic kidney disease, cardiovascular disease (CVD) [6], retinopathy among others, see **Figure 1**. Indeed, old age can be a risk factor for diseases such as dementia or recurrent falls, hip fractures, amputation and visual impairment. In a study of elderly participants with diabetes and an added risk of CVD during Ramadan, it was found that there was an increased risk of impaired renal function [7]. Fasting during Ramadan was also found to have an effect on postural balance and attention in the elderly and may increase the risk of falls or fall-related injuries [8]. Volume depletion is also an important issue, especially among those aged over 75. This increase in the risk of complications occurring in elderly people with diabetes can have a direct impact on the number of days fasted during Ramadan. In a recent study there was a greater number of individuals that had to break their fast due to diabetes related complications of ages ≥ 65 compared to < 65 — 17% compared to 11.5% respectively ($p < 0.001$) [5]. Hence, it is important that all individuals that are fasting during Ramadan and recognise any acute complications or feelings of being unwell break their fast.

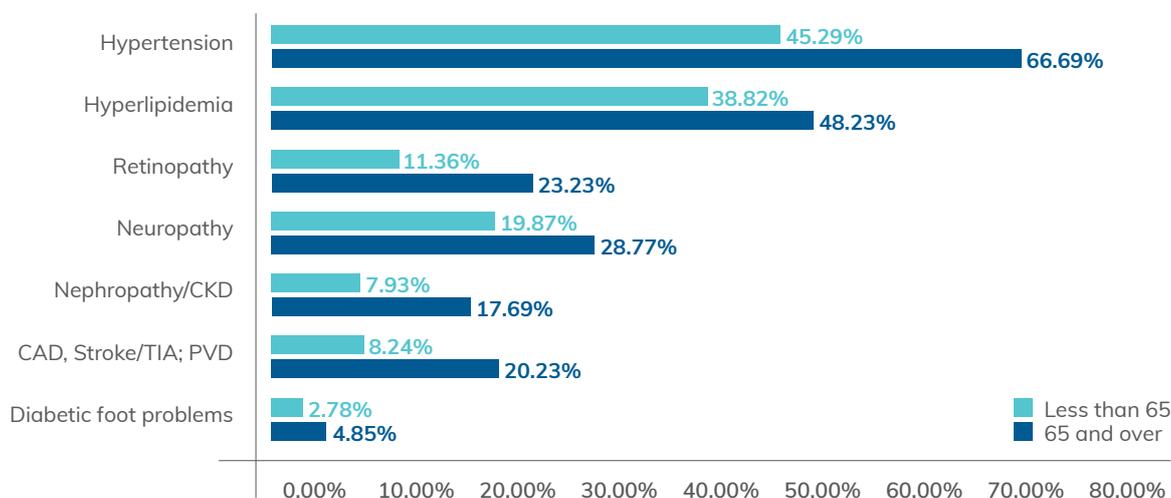


FIGURE 1

Reported complications among individuals with T2DM aged ≥ 65 and < 65 ; data adapted from the DAR 2020 Global survey [5]

It is also very important to assess an elderly individual's degree of independence and include this information in any risk assessment prior to fasting during Ramadan. An example would be (in ascending order of severity) those that are functionally independent; those that are functionally dependent — such as being frail or having dementia; those on End-of-Life Care. Likewise, any additional comorbidities to diabetes must be considered in risk stratification (see the **chapter 5: Risk stratification of people with diabetes before Ramadan**).

In elderly individuals with such comorbidities, there will inevitably be changes to their:

- Physical activity patterns
- Ability to self-manage blood glucose (SMBG)
- Ability to take medications
- Feeding patterns
- General independence

Therefore, pre-Ramadan education to elderly individuals with diabetes and their surrounding support network need to be clear and individualised covering all circumstances to prevent any unexpected outcomes from arising during the Ramadan fast.

2.1 Hypoglycaemia

The risk of hypoglycaemia is particularly increased [9] and may present with neuroglycopenic manifestations in the form of dizziness, delirium and confusion. Therefore, every measure must be taken to mitigate the risk of this occurring. This may include an increase in SMBG, or changes to treatment regimens that can cause hypoglycaemia such as beta blockers, salicylates, warfarin and tricyclic antidepressants. A particularly important concern among the elderly is hypoglycaemia unawareness and these individuals should be discouraged from fasting. **However, any changes made to these medications must be conducted in accordance with guidance from the relevant physicians as any changes could have significant consequences.**

The DAR 2020 Global Survey showed that people with T2DM aged ≥ 65 reported episodes of hypoglycaemia in statistically significantly higher proportions than those aged < 65 , 17.4% and 15.2% respectively ($p < 0.001$). Furthermore of those that experienced hypoglycaemia, 9.9% of those aged ≥ 65 had to go to the emergency department compared to 4.3% of individuals aged < 65 and similarly there was a suggestion that a greater proportion of those aged ≥ 65 required hospital admission [5].

It was also shown that in response to hypoglycaemia, many elderly individuals with T2DM reduced the dosing or frequency of their medications (31.5%) however a large proportion continued as normal with no changes (approximately 17%) [5]. Breaking the fast due to hypoglycaemia was also higher among individuals with T2DM aged ≥ 65 (67.7%) than those < 65 (55.4%), ($p = 0.02$).



2.2 Hyperglycaemia

Hyperglycaemia was defined as blood glucose levels > 16.6 mmol/L, 300 mg/dL)

The DAR 2020 Global Survey also showed that hyperglycaemia remains a large issue among the elderly. It was reported that there was a significantly higher proportion of elderly individuals with T2DM reporting hyperglycaemia during Ramadan 2020, with 19.3% among those aged ≥ 65 compared to 15.6% among those aged < 60 , $p=0.006$. Among all, the mean number of days with hyperglycaemia was 8.1 which was similar in both age groups. The severity of hyperglycaemia meant that 8.4% of those aged ≥ 65 with T2DM had to attend the emergency department or required hospital admission. This was similar to those aged <65 years (7%) [5]. Of concern, the majority of all participants in the study did not break their fast (almost 80%) after experiencing hyperglycaemia; of those that acted on their symptoms, approximately 25% reduced their food intake or increased the dose of their medications (around 21%) and almost 20% did not change their behaviour at all.

3. MANAGEMENT OF ELDERLY INDIVIDUALS WITH DIABETES THAT FAST DURING RAMADAN

People that are in older age groups fast during Ramadan for many reasons (see **chapter 6: Diabetes and Ramadan A Medico-religious Perspective**) and it is important that their wishes to do so must be respected. As mentioned, many elderly individuals that fast do so with a heightened risk of complications. It is important that these are considered and taken into account when any individuals guidance or advice are offered. **Table 1** shows that there are similarities between the elderly and younger age groups in terms of fasting practices but there is also an increase in the risk of diabetes related complications.

TABLE 1: AN AGE COMPARISON OF THE KEY PARAMETERS OF INDIVIDUALS WITH TYPE 2 DIABETES WHO FASTED DURING RAMADAN; FIGURE ADAPTED FROM THE DAR 2020 GLOBAL SURVEY [5]

Individuals < 65 years old (N=4906)		
<ul style="list-style-type: none"> • 87.3% had an intention to fast during Ramadan • 61.9% of those that could fast did so for the whole duration of Ramadan • 84.4% reported no episodes of hyperglycaemia (BG>300 mg/dl) 	<ul style="list-style-type: none"> • Mean number of days fasting in Ramadan was 27 days • 84.3% with hypoglycaemia had events over 1-7 days • 62.5% with hyperglycaemia had episodes over 1-7 days 	<ul style="list-style-type: none"> • 94.8% fasted at least 15 days during Ramadan • 6.6% with hypoglycaemia required ER or hospital admission • 7.4% with hyperglycaemia required ER or hospital admission
Individuals ≥ 65 years old (N=935)		
<ul style="list-style-type: none"> • 71.2% had an intention to fast during Ramadan • 69% of those that could fast did so for the whole duration of Ramadan • 84.4% reported no episodes of hyperglycaemia (BG>300 mg/dl) 	<ul style="list-style-type: none"> • Mean number of days fasting in Ramadan was 27 days • 79.0% with hypoglycaemia had events over 1-7 days • 64.9% with hyperglycaemia had episodes over 1-7 days 	<ul style="list-style-type: none"> • 94.2% fasted at least 15 days during Ramadan • 12.4% with hypoglycaemia required ER or hospital admission • 8.4% with hyperglycaemia required ER or hospital admission

Statements in bold font were greater in that age group

Elderly individuals that do seek to fast during Ramadan must be given greater support than their younger counterparts. This can be through friends, relatives or carers, but it is imperative that elderly individuals that do plan on fasting have these support networks in place before conducting the fast. The heightened risk of complications arising during the Ramadan fast and the increased likelihood that individuals have accompanying comorbidities increases the need for extra care. Appropriate risk stratification must still be taken and further information on this is available in the **chapter 5: Risk stratification of people with diabetes before Ramadan**.

3.1 Pre-Ramadan education of elderly individuals with diabetes

Pre-Ramadan education for people seeking to fast during Ramadan has been described in greater detail in these guidelines (see **chapter 7: Pre-Ramadan Assessment and Education**). These measures remain an important consideration for all people seeking to fast during Ramadan and more so among the elderly. All measures must be implemented into individualised pre-Ramadan education and it is, therefore, crucial that HCPs work together in producing the most effective programmes.

It was shown that the need for pre-Ramadan education among the elderly was similar to those of younger age groups. In those that did receive education, the majority received it at their routine consultations [5]. It is important to make information widely available to ensure that dissemination is effective and methods such as online websites and mobile phone applications can be extremely useful, this need is well documented in several studies [10-13].

3.2 Self-monitoring of Blood Glucose (SMBG)

It is extremely important that elderly individuals that choose to fast pay careful attention to their blood glucose levels during Ramadan. Fluctuations in blood glucose levels can have serious detrimental effects on the health of the individuals if not appropriately treated. As mentioned, people that are of older ages carry additional risks and this makes the need to SMBG even more important.

There are many different means of monitoring blood glucose levels and these must be discussed and adopted well in advance of Ramadan. If continuous means of glucose monitoring or other specific monitoring regimens are not used, then elderly individuals must take at least 2-3 readings during fasting hours, 1-2 times during eating hours and whenever they are symptomatic with hypoglycaemia or hyperglycaemia. Indeed, it is also important that elderly individuals understand the symptoms of hypoglycaemia as awareness can often be impaired, primarily caused by a long duration of diabetes. Maintaining strict monitoring schedules will enable elderly individuals to keep track of their blood glucose levels effectively and know when it is appropriate to break their fast when it is unsafe to continue.

In the DAR 2020 Global Survey, it was shown that approximately 21% of participants with T2DM aged ≥ 65 years checked their blood glucose levels once or less than once a week. Only around 10% checked their blood glucose levels 3-4 times a day. It was also shown that the occasion of Ramadan did not lead to people changing their frequency of SMBG in both age groups of ≥ 65 and < 65 years [5]. This highlights the importance of providing proper guidance on the frequency and timing of SMBG and it must be an important aspect of pre-Ramadan education.

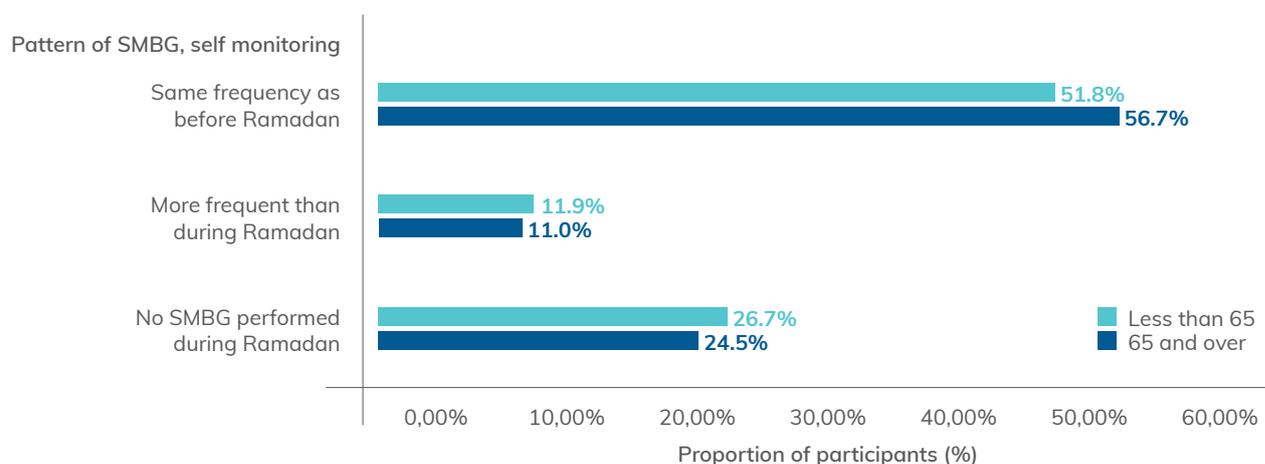


FIGURE 2
Pattern of SMBG in people with T2DM during Ramadan,
figure adapted from the DAR 2020 Global Survey [5]

3.3 Recommendations for treatment medications in the elderly

There is a lack of research available on elderly individuals that fast during Ramadan and as such it is difficult to provide specific recommendations on medications. The DAR 2020 Global Survey also looked into the use of medications that can increase the risk of hypoglycaemia and noted that the use of sulfonylureas was equal among both age groups (both at 39%). Moreover, the use of insulin was higher in those ≥ 65 years (32.7%) compared to < 65 (26.3%), perhaps in part due to a longer duration of diabetes.

In general, elderly individuals are at a higher risk of hypoglycaemia and any medications or treatment regimens that can increase this risk should be adjusted. It is recommended that a thorough assessment with a diabetes specialist takes place where medications and their risk towards hypoglycaemia can be discussed.

In individuals that are being treated with oral antidiabetic medications the following recommendations should be considered:

- Where sulfonylureas are used, gliclazide and glimepiride should be used instead of glibenclamide.
- SGLT2 inhibitors doses should be reviewed in accordance with advice from a specialist and considerations must be given to benefit vs risks of adverse events **especially in elderly people with impaired renal function or those that are treated with diuretics.**

Among individuals using insulin therapy it is recommended that analogue insulins are considered over human insulins.

3.4 Top tips for elderly individuals seeking to fast during Ramadan

MEDICATIONS AND REGIMENS

- Have an assessment and discussion with your diabetes specialist prior to Ramadan
 - Choose medications that have a lower risk towards hypoglycaemia
 - Make dose adjustments to lower the risk of hypoglycaemia.

SMBG

- Increase the frequency of SMBG when fasting during Ramadan than before Ramadan.
- Consider the using a continuous means of monitoring blood glucose levels if available.

DIET

- There needs to be an emphasis on staying properly hydrated, particularly in individuals prone to diabetes related comorbidities.
- It is important to have an adequate intake of nutrients when breaking the fast.
- An individualised nutrition plan should be made prior to Ramadan and adhered to during the Ramadan fast.

PHYSICAL ACTIVITY

- Physical activity levels should be curtailed but not halted during fasting hours.
- Activities should be planned ahead of time and thought of holistically — i.e., in conjunction with nutrition plans and medication regimens.

SOCIAL CONSIDERATIONS AND COMMUNITY SUPPORT

- Adequate support mechanisms should be in place to ensure that elderly individuals with diabetes wishing to fast receive adequate support from family members, friends, carers or community members. This should provide greater levels of safety and confidence.

RISKS OF COMPLICATIONS AND AWARENESS

- There needs to be an active effort to increase personal awareness of symptoms of hypoglycaemia and hyperglycaemia
 - Symptoms and events should be documented to help with recognition.
- The effects of fasting in people with comorbidities such as dementia, impaired renal function, CVD and others should be considered and discussed with a medical specialist prior to conducting Ramadan fasting.



SUMMARY

- Lower proportions of elderly individuals fast than their younger counterparts.
- Diabetes related complications such as hypoglycaemia and hyperglycaemia can be more frequent in elderly individuals than in younger individuals during the Ramadan fast.
- Greater and more careful planning pre-Ramadan is needed in elderly individuals to ensure a safe fast during Ramadan can be achieved.
- There must be a greater emphasis on SMBG in elderly individuals during the Ramadan fast to ensure safety.
- Antidiabetic drugs with lower risks of hypoglycaemia are preferred in elderly individuals.
- There is a significant need for more research into elderly individuals with T1DM, T2DM and differing comorbidities that fast during Ramadan.

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