



# 12th Al Ain Symposium on Challenges in Diabetes and Endocrinology during Ramadan (Virtual Meeting), February 16 to 17, 2024

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## Abstract

### Keywords

- ▶ Ramadan fasting
- ▶ diabetes
- ▶ risk calculation
- ▶ risk reduction
- ▶ thyroid

The 12th Al Ain Annual Meeting on Diabetes and Endocrine Challenges during Ramadan Fasting brings together health care professionals, researchers, and experts to address the complex interaction between diabetes management and religious fasting. The program aims to enhance understanding, share best practices, and explore innovative strategies for optimizing patient care during Ramadan fasting through engaging presentations, symposia, and discussions.

## Introduction

Observance of Ramadan fasting presents unique challenges and considerations. As we meet for the 12th Al Ain Annual Meeting, we are privileged to unite with esteemed colleagues and experts to explore these critical issues. Our program is

designed to foster collaboration, inspire meaningful dialog, and ultimately empower health care providers with the knowledge and tools to support patients effectively during this sacred period. By sharing the highlights of this symposium by its abstracts, we wish to spread the word beyond the virtual delegates who managed to make it.

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**Table 1** The 2-day conference schedule, including both the main program and industry-codeveloped symposia

Day 1: Friday, February 16, 2024		Day 2: Saturday, February 17, 2024	
19:30	<b>Physiology of Fasting</b> Prof. Juma Al Kaabi Consultant Endocrinologist, College of Medicine and Health Sciences, UAE University, Al Ain, UAE.	19:30	<b>Hyperglycemia in Ramadan, the Elephant in the Room</b> Dr. Mohamed Hassanein, Consultant Endocrinologist, Dubai Hospital, Dubai, UAE
19:55	<b>Management of Type 2 Diabetes during Ramadan Fasting</b> Dr. Salem Beshyah, Consultant Endocrinologist, Yas Clinic Khalifa City, Abu Dhabi, UAE	19:55	<b>Frailty and Ramadan Fasting, AHS Experience</b> Dr. Latifa Al Ketbi, Ambulatory Healthcare Services, Al Ain, UAE
20:20	Discussion	20:20	Discussion
20:50	<b>Personalized Risk Reduction Strategies and the Role of the DaR Risk Calculator</b> Dr. Mohamed Sulaiman, Consultant Endocrinologist, Wales, UK	20:50	<b>Fasting during Ramadan with Kidney Disease</b> Dr. Yousef Boobes, Consultant Nephrologist, Tawam Hospital, Al Ain, UAE
21:15	<b>Management of Hypothyroidism during Ramadan Fasting</b> Dr. Asma Al Jaber, Consultant Endocrinologist, Tawam Hospital, Al Ain, UAE	21:15	<b>Diabetes and Ramadan: "Medical Decision-Making"</b> Dr. Bachar Afandi, Consultant Endocrinologist, Tawam Hospital, Al Ain, UAE
21:40	Discussion	21:40	Discussion

## Conclusion

As the 12th Al Ain Annual Meeting on Diabetes and Endocrine Challenges during Ramadan Fasting draws close, we reflect on the wealth of insights gained, connections forged, and ideas exchanged ▶ **Table 1**. Our collective commitment to advancing diabetes care during Ramadan fasting has never been stronger, and it is through forums like this that we continue to drive progress and innovation in the field. As we depart, let us carry forward the spirit of collaboration and dedication, armed with newfound knowledge and inspiration to make a tangible difference in the lives of our patients.

### Compliance with Ethical Principles

The abstracts are accepted on the proviso that any original human research was conducted according to the appropriate ethical principles, with prior ethical approvals and

patient-informed consent. These conditions are waived for opinion-based reflective and review articles.

### Authors' Contributions

The scientific committee compiled the conference abstracts and acted as the guest editors. The organizers mandate that all named authors on submitted abstracts comply with the four ICMJE authorship criteria.

### Funding

Unconditional educational grants from four pharmaceutical agents were received to support the event. The sponsors did not influence the presentations' scientific contents or the speakers' choice. Industry-sponsored sessions were flagged as such.

### Conflict of Interest

None declared.

## Abstracts of Presentations

### AB1.1 Physiology of Fasting

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It has been stated in the holy Quran that whoever witnesses the month of Ramadan should fast. But if anyone is ill or traveling, then he or she is exempted from fasting. The basic rule is to fast without definite harm. The impact of fasting and abstaining from fluid and food intake from dawn to sunset varies from one person to another depending on the geographical location, season, the individual, and type and severity of diabetes or its complications. The daily fast may range from a few to more than 20 hours. Clinical guidance and proper education are essential as most patients with either type 1 or type 2 diabetes fast during the month of Ramadan. The glucose profiles of people without diabetes are remarkably stable and within the normal ranges, aside from small excursions around Iftar. However, people with diabetes fasting during Ramadan can increase glucose variability and thus be at high risk of hyperglycemia and hypoglycemia.

During fasting, circulating glucose levels fall, and insulin secretion is suppressed. Glucagon and catecholamine secretion is increased, stimulating glycogenolysis and gluconeogenesis. Each fasting period is often longer than 12 hours and may be considered a state of intermittent glycogen depletion. There is a gradual shift in the proportion of fuel utilization from carbohydrates to fat as the fasting day progresses. Fasting improves blood pressure, biomarkers of oxidative stress, and fatty liver. Low-density lipoprotein (LDL) and triglyceride (TG) levels decrease rapidly during Ramadan. Sleeping hours are less and intermittent, and these changes can affect many hormonal rhythms. Hormonal changes during Ramadan fasting include lower morning cortisol levels and higher evening cortisol levels, reduction in morning adiponectin levels, large increases in morning leptin levels, and reductions in morning and evening growth hormone levels. A modest reduction in testosterone in men is also observed. In overweight and obese individuals, a marked reduction in ghrelin in the last week of Ramadan may be observed. Large increases in morning leptin levels are also observed.

### AB1.2 Management of Type 2 Diabetes during Ramadan Fasting

Salem A. Beshyah<sup>1</sup>

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**Background:** The medical management of type 2 diabetes (T2D) aims to enable those who wish and can quickly undertake this religious obligation safely.

**Key Issues:** Although most T2D patients can fast safely, proper management involves pre-Ramadan preparation, risk stratification, Ramadan-focused education, and sound counseling. Risk stratification has come a long way from simply stating fasting is “contraindicated” to the most comprehensive International Diabetes Federation - Diabetes and Ramadan International Alliance (IDF-DAR) scale. Physicians should be familiar with risk scales to inform their counseling of patients. In addition to healthy dieting to prevent hyperglycemia at night and hypoglycemia during the day, modification of medications is necessary. Knowledge about the nature and the best exercise time is a valuable safety check.

Monitoring at given times aims to prevent both hyperglycemia and hypoglycemia.

Pharmacological therapies, particularly newer ones, have been scrutinized in observational and experimental studies. Some older medications have stood the test of time, and their inherently low risk of hypoglycemia is reassuring. For instance, metformin, dipeptidyl peptidase 4 (DPP-4) inhibitors, glinides, and pioglitazone do not need any changes in the doses, yet redistribution of those given more than once daily may be needed. However, sulfonylureas carry some risk of hypoglycemia that should not be ignored. Therefore, avoiding older ones and reducing doses of modern ones (i.e., extended release) is recommended in most patients. Several studies have now dispelled early concerns about risks associated with sodium glucose cotransporter 2 (SGLT-2) inhibitors. With experience, the class has become more widely accepted as a safe and effective option. Experts believe oral glucagonlike peptide-1 (GLP-1) receptor agonist (RA) can be used effectively if patients adhere to the standard administration recommendations outside of Ramadan.

Insulin dose adjustment is usually based on the glycemic status before Ramadan, with a reduction of dose in well-controlled patients (HbA1c < 7.5%) and maintaining the same dose in those who are suboptimal controls (HbA1c > 7.5%). Redistribution of basal, rapid, and premixed insulin doses is based on a sound understanding of the pharmacological attributes of these agents and the principles of good clinical practice. The IDF-DAR guidelines provide clear and well-illustrated recommendations for using and adjusting various insulins. Adequate monitoring is vital for the safe use of insulin during Ramadan. Concerning the injectable weekly and daily GLP-1 RA, there is no need to change the doses once patients are stable. However, initiation just before or intensification during Ramadan should be avoided. Rules of basal insulin can be applied to the basal-GLP-1 RA combinations with some loss of GLP-1 RA action, which should be recovered promptly after Ramadan. There have yet to be any data available on twincretin. However, employing the same principles used on weekly GLP-1 RA sounds fair for now. Education about sick day rules and the management of hypoglycemia is crucial and does not differ from outside Ramadan. However, breaking the fast should be undertaken immediately, against the temptations to “gain” another fasting day. Post-Ramadan visit is very helpful to reflect on experiences and recover any loss of control that may have occurred during Ramadan.

**Conclusions:** Effective management of T2D starts with prediabetes assessment, risk stratification, and Ramadan-focused education. Counseling on whether to fast or not to fast should be made on evidence and empathy. Physicians should be fully familiar with the latest guidelines. Adjustment of medication doses and timing should consider the attributes of the medications, diabetes status, and overall well-being of the patient. The guiding principles have always been to avoid hypoglycemia and minimize hyperglycemia.

### AB1.3 Personalized Risk Reduction Strategies and the Role of the DaR Risk Calculator

Mohamed Sulaiman<sup>1</sup>

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**Background:** Risk stratification represents a cornerstone in managing people with diabetes who plan to fast during Ramadan. Diabetes and Ramadan guidelines aiming to stratify risk have evolved from the ADA statements in 2005 and 2010 to the joint IDF and DAR guidelines updated in 2021.<sup>1</sup>

**Main Issues:** This presentation reviews the IDF-DAR risk calculator's role in providing personalized risk stratification to patients with diabetes who plan to fast during Ramadan.<sup>2</sup> The risk calculator was based on limited evidence, but more research on diabetes and Ramadan is expected to improve the evidence base for the guidelines. One important advantage of the risk calculator is the agreement between the medical and religious views on risk stratification, which is expected to improve patient confidence in the advice given and reduce variability in recommendations made by different health professionals. Another advantage is the flexibility provided by the new risk calculator, which takes into consideration many risk elements as opposed to the rigid classification into high- and low-risk groups in the previous guidelines. Several studies have been done on the use of the risk calculator and have provided validation for its use in clinical practice.<sup>3,4</sup>

**Conclusions:** The new IDF-DAR risk calculator is an important development in risk stratification for people with diabetes who consider fasting during Ramadan. Recent studies have validated the risk calculator and showed that it can predict risks of fasting. Further research will be needed to update and fine-tune the risk calculator.

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### AB1.4 Management of Hypothyroidism during Ramadan Fasting

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**Background:** The management of hypothyroidism during Ramadan fasting has garnered attention due to concerns regarding the potential impact of fasting on thyroid function and medication timings. Fasting-induced changes in eating and sleeping patterns pose a risk of influencing thyroid hormone levels, potentially leading to increased thyroid-stimulating hormone (TSH) levels and associated adverse effects like fatigue, weight gain, and depression. Additionally, there is a recognition of the potential impact of fasting on medication absorption, thereby affecting thyroid hormone levels.

**Main Issues:** There is an intricate relationship between metabolism, specifically carbs and lipids metabolism and TSH. This relationship contributes to transient metabolic disturbances that influence the pharmacodynamics and pharmacokinetics of various drugs, adding complexity to the management of hypothyroidism during Ramadan fasting. A meta-analysis of 14 studies,<sup>1</sup> including 2 conducted in the UAE,<sup>2,3</sup> highlights a significant post-Ramadan increase in TSH

levels among euthyroid patients. Levothyroxine timing points, encompassing pre-iftar, post-iftar, and pre-suhoor, are associated with elevated TSH levels after Ramadan. The emphasis on individualized levothyroxine regimens during Ramadan is underscored, with recommendations for patients to refrain from food for at least 3 hours before and 30 minutes after levothyroxine intake to ensure optimal compliance. The association between adherence to levothyroxine during Ramadan and maintaining euthyroid status is highlighted,<sup>4,5</sup> encouraging patients to follow prescribed regimens diligently. Modified dosing frequencies, such as weekly regimens, exhibit promising results, especially in patients grappling with compliance issues. Precautionary measures advocate proactive consultations with physicians before Ramadan, thyroid function testing, and fostering open communication about fasting plans and concerns.

**Conclusion:** Managing hypothyroidism during Ramadan necessitates a nuanced understanding of medication timing, metabolic interactions, and individualized regimens. Adherence plays a critical role in maintaining euthyroid status, and weekly dosing frequencies introduce promising alternatives. Preventive measures, including proactive consultations and open communication, are essential for optimizing thyroid control during Ramadan fasting.

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### AB2.1 Hyperglycemia in Ramadan, the Elephant in the Room

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Hyperglycemia is a key factor for diabetes-related morbidity and mortality. However, achieving good glycemic control is difficult. In Dubai Health Authority, published data indicate that 60% of people with diabetes have HbA1c > 7% despite access to excellent resources.<sup>1</sup> The 2020 DAR Global Survey data show that during Ramadan approximately 15% report hyperglycemia with blood glucose level greater than 300 mg/dL.<sup>2</sup> Indeed, some of them required emergency room visits or hospital admission, while a sizable proportion reported hyperglycemia for greater than 8 days during Ramadan.<sup>2</sup>

Ramadan fasting is frequently associated with feasting, where many people increase their intake of food rich in carbohydrates, sugar, and fat, resulting in hyperglycemia. DAR guidelines support the importance of addressing all

the possible risk factors for fasting, including hyperglycemia.<sup>3</sup> Indeed, the level of hyperglycemia is an important aspect of DAR risk calculation. This is in line with general diabetes guidelines such as the American Diabetes Association-European Association for the Study of Diabetes (ADA-EASD) guidelines that categorize treatment of diabetes according to their level of efficacy.<sup>4</sup>

Multiple measures are required to minimize hyperglycemia during Ramadan, including Ramadan-focused education regarding appropriate food and fluid intake during Ramadan blood glucose monitoring. This allows the person with diabetes treated with insulin to adjust insulin dose and lifestyle to avoid hypo- and hyperglycemia.<sup>5</sup> All efforts are required for safer Ramadan, including treatment intensification, to prevent hyperglycemia.

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### AB2.2 Frailty and Ramadan Fasting, AHS Experience

Latifa Al Ketbi<sup>1</sup>

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Frailty status has proved a better discriminator than chronological age in predicting mortality and variations in outcomes in later life. The prevalence is variable worldwide, with 3.9 to 9.7% in those older than 65 years, reaching 45% in those older than 85 years. There is good evidence that assessing and managing frailty is important as each 1-unit increase in annual frailty change amplifies the risk of death by more than fivefold. In addition, health care costs increase by five-fold from 10,000 to 50,000 in annual gross domestic product (GDP) per capita for a change in frailty score of 0.4 points.

Frailty assessment tools are recommended to aid in decision-making and developing patient care plans for early management. Many frailty tools are available with good predictability of adverse outcomes. One of these tools is the FRAIL tool: F for feeling fatigued, R for resistance (climbing 10 steps stairs), A for ambulation (difficulty walking 100 yards), I for having more than four chronic illnesses, and L for losing 5% or more of body weight in the previous year. A point is given for each question, and if the score is 0, the patient is robust; if

a patient scores 1 to 2, they are considered prefrail and a patient is frail if the score is  $\geq 3$ . In Ambulatory Health Services (AHS), Abu Dhabi, the FRAIL tool was validated among diabetic patients aged  $\geq 60$  years. In all, 9.8% were frail, 43.6% were prefrail, and 46.6% were robust. Determinants of frailty were older age, increased albumin-to-creatinine ratio, chronic kidney diseases, and ischemic heart diseases. The FRAIL tool demonstrated good predictability of significant health outcomes during Ramadan regardless of fasting. The FRAIL tool also performed better than physicians' global judgments to assess frailty.

**Conclusion:** One in 10 patients who are older than 60 years with diabetes is frail, and almost half were prefrail. The FRAIL tool is recommended as a structured and validated tool for assessing frailty in clinical practice. This recommendation is consistent with established guidelines such as the British Geriatric Society. Ramadan fasting is potentially stressful and adds to other medical conditions, with frailty being a risk factor for worse outcomes.

### AB2.3 Fasting during Ramadan with Kidney Disease

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**Background:** Ramadan fasting (RF) involves primarily abstaining from food and drink during daylight hours and is obligatory for all healthy Muslims from puberty. While sick individuals are exempt from fasting, many may choose to observe it. It is crucial to support them in fasting safely.

**Main Issues:** The Ramadan and Kidney Diseases (RaK) working group, consisting of international experts in nephrology, endocrinology, and family medicine physicians from various countries, was established in May 2022. They conducted a comprehensive literature review and held multiple virtual meetings, merging existing evidence with expert insights in collaboration with DaR to formulate empirical recommendations for patients with kidney disease considering RF. The RaK working group developed an initial risk classification and assessment tool for RF, addressing various kidney diseases. Based on current evidence and expert consensus, the tool's three major elements focus on risk classification for kidney disease, categorizing them into mild, moderate, and high risks.<sup>1</sup>

**Conclusion:** Patients with kidney disease should undergo an assessment before Ramadan to determine their risk group, followed by appropriate advice on whether fasting is advisable. This process involves two additional visits during Ramadan and afterward, following the 3As recommendations: Assess, Advise, and Assist.

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### AB2.4 Diabetes and Ramadan: "Medical Decision-Making"

Bachar Afandi<sup>1</sup>

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**Background:** Fasting during Ramadan poses unique challenges for individuals with diabetes, including type 1 diabetes (T1D), type 2 diabetes (T2D), and gestational

diabetes. Proper preparation and management strategies are crucial to ensure the health and safety of patients during this period.<sup>1</sup>

**Main Issues:** This presentation reviews the comprehensive preparation required for patients with diabetes before Ramadan, encompassing pre-Ramadan medical assessments, risk categorization using diabetes and Ramadan risk calculators, and formulating personalized management plans. It emphasizes the importance of early intervention, including modifying potential risk factors and conducting pre-Ramadan medical assessments several months in advance.<sup>1</sup> Key aspects discussed include patient and family engagement, exercise teaching, medication adjustments, and the consideration of trial fasting to identify and mitigate potential complications such as hypoglycemia or hyperglycemia.<sup>2,3</sup> Furthermore, the presentation addresses essential guidelines for breaking the fast in cases of abnormal blood glucose levels or symptoms of hypo- or hyperglycemia.<sup>4</sup> Additionally, it underscores the significance of diabetes education counseling, nutritional evaluation, and monitoring to optimize patient outcomes during Ramadan.<sup>4,5</sup>

**Conclusions:** Effective diabetes management during Ramadan necessitates a multidimensional approach involving medical assessments, education, and nutritional guidance. Timely interventions, including medication adjustments and lifestyle modifications, are pivotal in minimizing risks and ensuring patient well-being. Importantly, pregnant women with diabetes are advised against fasting due to potential risks to both maternal and fetal health,

necessitating specialized care and referral to specialized clinics. Looking ahead, continued research and dissemination of best practices are essential to enhance the care of individuals with diabetes during religious fasting.

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