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Integrating IDF-DAR Risk Stratification and Telemedicine in Ramadan Diabetes Care: The Suhar Hospital Experience

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Abstract
Fasting during Ramadan poses complex challenges for individuals with diabetes, particularly those classified as high risk. Over the past decade, Suhar Hospital in Oman has implemented a structured Ramadan diabetes care model that Incorporating IDF-DAR risk stratification, individualized Patient education, digital health support, and close follow-up. This Comprehensive approach has enabled many patients, including those with type 1 diabetes mellitus (T1DM), to fast safely and with minimal metabolic disruption. Key elements of the program's success include early risk assessment, personalized care plans, and continuous monitoring via telemedicine platforms such as WhatsApp. A notable 2024 case involving a young woman with T1DM illustrates the model's transformative potential: she completed the fasting period without major complications despite her high-risk status. Multicenter clinical data further support high rates of fasting success among low- and moderate-risk individuals, and select high-risk patients. Suhar Hospital's experience offers a culturally attuned and scalable framework for safe Ramadan fasting, highlighting the critical role of structured education and digital communication in optimizing diabetes care.

Keywords: Ramadan, Diabetes, Structured Education, Telemedicine, Risk Stratification, Suhar Hospital, Oman, Type 1 Diabetes, Type 2 Diabetes

Case Spotlight: High-Risk Fasting Achieved Safely through Structured Multidisciplinary Support
In early 2024, a 26-year-old woman with a longstanding history of type 1 diabetes mellitus (T1DM)—diagnosed at the age of eight—presented to the diabetes clinic at Suhar Hospital with a strong personal and spiritual desire to fast during Ramadan. Despite previous medical advice discouraging fasting due to her historically unstable glycemic profile (HbA1c 9.2%), she remained highly motivated. A comprehensive evaluation using the International Diabetes Federation–Diabetes and Ramadan (IDF-DAR) risk stratification tool classified her as high risk, with a total score of 7.5.

Instead of recommending against fasting outright, the multidisciplinary diabetes care team devised an individualized Ramadan care plan. The strategy included intensive pre-Ramadan education on carbohydrate counting, insulin titration (both basal and bolus), and real-time feedback using continuous glucose monitoring (CGM) technology. Daily glucose readings were remotely monitored via a dedicated WhatsApp communication channel, enabling timely therapeutic adjustments and continuous patient support. The patient received weekly check-ins from the care team and had 24/7 access for urgent concerns or real-time guidance through a WhatsApp number.

Through this structured and closely supervised approach, the patient successfully completed the entire month of Ramadan without experiencing severe hypoglycemic or hyperglycemic episodes, emergency department visits, or hospital admissions. Interestingly, her glycemic control improved considerably, with a post-Ramadan HbA1c of 7.4%. This case underscores the transformative potential of risk-based, culturally sensitive diabetes care, demonstrating that, with appropriate support, even high-risk individuals can fast safely and meaningfully during Ramadan.

The Physiological Challenge of Ramadan Fasting in Diabetes
Ramadan fasting induces significant metabolic alterations, characterized by prolonged daytime caloric deprivation followed by substantial post-sunset nutrient intake. These cyclical shifts impact glucose homeostasis, insulin dynamics, and counter-regulatory hormone responses, presenting unique physiological challenges for individuals with diabetes [1]. Among patients treated with insulin or insulin secretagogues such as sulfonylureas, the fasting period is associated with increased risks of acute

metabolic complications, including hypoglycemia, hyperglycemia, diabetic ketoacidosis (DKA), and dehydration [1-3]. These risks are amplified by alterations in meal timing, physical activity, and medication schedules during the fasting month [1-3].

Despite religious exemptions for individuals with serious health conditions, a considerable proportion of patients with type 2 diabetes (T2D) choose to fast during Ramadan. The EPIDIAR study reported that 78.7% of patients with T2D fasted during Ramadan, while the CREED study found that 63.6% did so. These findings demonstrate that many patients prioritize fasting despite potential health risks [2, 4]. The 2001 EPIDIAR study also revealed that 42.8% of patients with type 1 diabetes (T1D) and 78.7% of those with T2D experienced pronounced fluctuations in blood glucose levels during Ramadan [2]. Similarly, a study in Pakistan reported hypoglycemic episodes in 35.3% of T1D patients and 23.2% of T2D patients, and symptomatic hyperglycemic episodes in 33.3% of T1D and 15.4% of T2D patients [4].

These findings underscore the critical need for structured, evidence-based Ramadan diabetes management programs. Such programs should not only mitigate clinical risks but also respect patients' religious commitments—enabling safe fasting through individualized care, education, and culturally sensitive interventions [5].

Framework for Safe Fasting: The IDF-DAR Guidelines

The International Diabetes Federation (IDF), together with the Diabetes and Ramadan (DAR) International Alliance, has developed clear guidelines to help people with diabetes fast safely during Ramadan [1]. These guidelines consider both medical safety and religious practices, offering a patient-centered and culturally sensitive approach [1].

A key part of the guidelines is a risk assessment tool. This tool places people with diabetes into low, moderate, or high-risk groups. The classification depends on factors like blood sugar control, type of treatment (for example, insulin or sulfonylureas), history of severe hypoglycemia or diabetic ketoacidosis (DKA), comorbidities, renal function, and the presence of diabetes-related complications [1].

Instead of discouraging fasting altogether, the model helps doctors give tailored advice and support. This includes pre-Ramadan education, adjusting medications, regular glucose monitoring, and in some cases using modern tools such as continuous glucose monitoring (CGM) devices [5, 6]. By combining medical evidence with respect for religious values, the IDF-DAR approach improves patient involvement, reduces health risks, and supports safer fasting during Ramadan [2, 5, 7].

Suhar Hospital's Ramadan Diabetes Program: A Decade in Practice

Since 2015, Suhar Hospital has implemented a structured Ramadan diabetes care model aligned with the recommendations of the American Diabetes Association (ADA) and the International Diabetes Federation–Diabetes and Ramadan (IDF-DAR) Alliance. This model functions as an annual, multidisciplinary initiative lunched approximately 6 to 8 weeks prior to Ramadan. During this preparatory phase, patients with diabetes undergo systematic evaluation using the IDF-DAR risk stratification tool to determine their fasting eligibility and associated risk category [1, 5].

Patients deemed suitable for fasting are enrolled in individualized education sessions that address medication adjustment, dietary modifications, self-monitoring of blood glucose (SMBG), hydration strategies, and recognition of red flag symptoms that warrant breaking the fast. Each care plan is formally documented and includes personalized fasting recommendations, dose-adjustment charts, SMBG schedules, and safety instructions [1, 5].

Educational materials—including printed leaflets and individualized written plans—are filed in the patients' medical records to ensure follow-up and continuity of care. The program is supervised by an endocrinologist-led team that conducts an annual audit to assess outcomes, refine protocols, and enhance patient safety during the fasting period [5, 8].

Impact of Telehealth and Conferences

To enhance patient accessibility and ensure continuity of care, Suhar Hospital has integrated telemedicine solutions, including daily glucose monitoring and real-time consultations via WhatsApp and phone calls. The teleconsultation system is structured to provide daily individual check-ins for high-risk patients and weekly follow-ups for those classified as low or moderate risk. Patients may also send messages at any time to ask questions or request medication adjustments.

In addition, the care team utilizes structured broadcast messages to disseminate tips on safe fasting and shares daily WhatsApp status updates featuring reminders, motivational messages, and practical health advice related to diabetes management during Ramadan [5, 8]. The WhatsApp platform is available each year during Ramadan for all community members, including those not routinely followed at Suhar Hospital, offering consultation services related to diabetes and fasting.

Each year, the multidisciplinary team—comprising trained diabetes educators and endocrinologists—responds to approximately 100 to 150 WhatsApp messages and inquiries. These digital tools foster a simple, consistent, and supportive communication channel between patients and their healthcare providers. These digital tools proved especially valuable during the COVID-19 pandemic, enabling uninterrupted diabetes care when in-person services were restricted.

In parallel, Suhar Hospital hosts an annual regional conference and training workshops, with the latest held in 2025 under the theme *"Navigating Diabetes in Ramadan."* This initiative aims to train healthcare professionals, enhance clinical services, and deliver standardized patient education across the North Batinah region [5, 8].

Clinical Outcomes and Research from Suhar

A prospective multicenter study conducted in 2024 across three diabetes centers in Oman—including Suhar Hospital—evaluated the safety and outcomes of Ramadan fasting among 326 patients with type 1 and type 2 diabetes mellitus using the IDF-DAR risk stratification model and a structured pre-Ramadan educational intervention. Participants were categorized into three risk groups: low (30.1%), moderate (31.6%), and high risk (38.3%). Fasting completion rates for the entire month of Ramadan were significantly associated with risk category: 97% in the low-risk group, 82% in the moderate-risk group, and 58% in the high-risk group ($p<0.001$) [5]. Logistic regression analysis revealed that high-risk patients were over 22 times more likely to break their fast than those in the low-risk group (OR 22.56; 95% CI: 6.77–75.12), while moderate-risk patients had nearly a seven-fold increased likelihood (OR 6.87; 95% CI: 1.95–24.14). Within the cohort, 51% of patients with T1DM successfully fasted the entire month, compared to 89% of patients with T2DM ($p < 0.001$). The most common reasons for breaking the fast were hypoglycemia (37%) and hyperglycemia (20.5%), with hospitalization required in only 1.9% of cases—primarily for diabetic ketoacidosis [5].

The study further demonstrated that structured pre-Ramadan education—including individualized treatment plans, medication adjustments, dietary guidance, SMBG protocols, and continuous medical access via WhatsApp—was significantly associated with improved fasting outcomes, reduced fatigue, and better glycemic control ($p<0.001$). These findings affirm the effectiveness of a personalized, risk-based Ramadan care models in supporting safe fasting practices, even among high-risk patients, and highlight the critical role of multidisciplinary education in reducing diabetes-related complications during Ramadan [5].

Role of Structured Education and Digital Support in Enhancing Fasting Safety

Pre-Ramadan education is one of the main pillars for ensuring safe fasting among people with diabetes. Both international and local studies show that this type of education plays a key role in lowering risks and improving health outcomes. For example, the Ramadan Education and Awareness in Diabetes (READ) program in the UK reported fewer cases of hypoglycemia and better fasting success in type 2 diabetes patients who received structured pre-Ramadan teaching [9].

At Suhar Hospital, this model was expanded by adding digital health tools such as WhatsApp consultations and remote glucose monitoring. These innovations helped patients in rural areas and those with limited mobility stay connected and supported throughout Ramadan. Similarly, the DEARS study in Malaysia confirmed that using technology in education reduces emergency visits and improves blood sugar control during fasting [10].

Alongside individual consultations, Suhar Hospital also launched community-focused initiatives across different digital platforms, such as:

- Video tips on when to break the fast, covering both religious guidelines and warning signs like low or high blood sugar and dehydration
- Public lectures and seminars on diabetes management during Ramadan, held in person and online to reach more people
- Infographics and short posts on insulin adjustment, glucose monitoring, hydration, and warning symptoms, shared through Instagram, Twitter, and Facebook.

These combined educational and digital efforts provided accessible, culturally sensitive, and safe guidance for patients. This hybrid approach—mixing medical advice, community involvement, and respect for religious practices—proved effective in supporting safe fasting during Ramadan [5, 9, 10].

Challenges and Cultural Considerations

Despite clear medical guidance and established exemptions, many patients classified as high risk still continue to fast during Ramadan, driven by deep spiritual motivations [2, 4]. This highlights the importance of a compassionate, culturally sensitive dialogue between healthcare professionals and patients. Effective communication strategies should integrate not only clinical evidence but also religious context, aligning health recommendations with patients' spiritual values [1]. Engaging religious leaders in structured educational initiatives has shown promise in bridging trust gaps and enhancing acceptance of medically necessary decisions—such as breaking the fast when complications arise [1, 5, 11, 12]. Accordingly, physicians must be equipped with both clinical and basic religious knowledge to address patients concerns and offers balanced, respectful guidance grounded in both science and faith [11, 12]. Ongoing education for healthcare professionals in these areas is essential to ensure consistent, evidence-based, and empathetic care delivery during Ramadan [5, 9, 10, 11].

Conclusion

The Suhar Ramadan Diabetes Program provides a model that incorporates IDF-DAR risk stratification, individualized care, and digital health interventions. This structured framework has enabled fasting for patients, including those at high risk and individuals with type 1 diabetes, by aligning clinical decision-making with religious and cultural considerations [5].

To expand outreach and community involvement, the program has utilized digital platforms through educational videos and awareness posters designed for social media. These resources have contributed to informing healthcare professionals, patients, and the public about safe fasting practices during Ramadan. The use of digital tools is consistent with ongoing efforts in physician-led public education and digital professionalism [13].

The initiative combines clinical strategies with culturally aware communication and digital outreach, serving as an adaptable reference for other health systems in Muslim-majority countries seeking to support diabetes management during Ramadan [5, 8, 13].

Recommendations for Practice and Future Guidelines

Drawing on a decade of experience at Suhar Hospital, Al Reesi *et al.* (2025) proposed a structured, evidence-based framework to enhance the safety and efficacy of Ramadan fasting among individuals with diabetes [5]. Central to this model is the universal application of the IDF-DAR risk stratification tool, which enables clinicians to systematically assess fasting eligibility and guide personalized treatment decisions [1]. The authors advocate for the initiation of pre-Ramadan education at least one to two months in advance to support medication adjustments, dietary planning, and patient empowerment through self-monitoring strategies. Telemedicine platforms—particularly WhatsApp—have proven instrumental in maintaining daily communication, enabling real-time therapeutic adjustments, and extending support to rural populations [5]. Findings suggest that patients classified as low- and moderate-risk can fast safely, while selected high-risk individuals may also fast successfully under close supervision. Promoting essential self-care behaviors—such as frequent glucose monitoring, recognizing indications to break the fast, and maintaining regular contact with healthcare teams—is critical [5]. This structured and adaptable model provides a culturally sensitive roadmap for safe fasting practices that can be implemented by healthcare systems in Muslim-majority regions and beyond (Summarized in Table 1).

Table 1: Recommendations for Safe fasting derived from Our Experience

Policy Implication / Recommendation [5]	Details
Use IDF-DAR risk tool before Ramadan	Check if it's safe for each person with diabetes to fast
Start Ramadan education early	Begin 6 to 8 weeks before Ramadan; teach patients to adjust medications, plan meals, stay hydrated, recognize warning signs
Use digital tools	WhatsApp, continuous glucose monitoring (CGM) for regular contact, especially in rural or hard-to-reach areas
Train healthcare providers	Understand basic religious principles to give advice respecting medical needs and spiritual beliefs
Involve religious and community leaders	Participate in educational activities to improve patient trust and encourage safer fasting
Share success stories and patient videos	Use social media to motivate and educate patients with diabetes and community
Provide clear guidance on breaking the fast	Base on religious rules and medical safety warnings
Offer public lectures and community sessions	Raise awareness about diabetes and fasting during Ramadan

Authorship contribution

All the named authors contributed to the drafting, further development, and finalization of the manuscript. They all accept responsibility of its contents.

Conflicts of Interest

The author declares no conflicts of interest.

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Ethical Approval

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