



Bangladesh Endocrine Society (BES)  
Guideline on Management of Diabetes During Ramadan 2020  
2<sup>nd</sup> Edition





Bangladesh Endocrine Society (BES)  
Guideline on Management of Diabetes During Ramadan 2020

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# BES Ramadan Guideline Task Force 2020

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Ramadan fasting is one of the five pillars of Islam. It is compulsory for all healthy adult Muslims to fast in this month. Those with serious medical conditions may be exempted if there is significant risk associated with fasting which can exacerbate the illness. Many complicated diabetic subjects are exempted from fasting. However, they have an intense spiritual desire to fast, even against medical advice.

Diabetes is a global epidemic, and Bangladesh is also facing the burden of it. One out of eleven adult person of our population is suffering from diabetes, and the numbers are predicted to rise steeply. A good number of this diabetic population fast during Ramadan.

Ensuring the optimal care of patients with diabetes who fast during Ramadan is crucial. There are some international guidelines in use, but Bangladesh Endocrine Society feels the need of a guideline that will address the social and cultural aspects of our population. This guideline intends to provide physicians with relevant background information and practical recommendations. It will enable them to help patients with diabetes to participate in fasting during Ramadan along with minimizing the risk of complications. It covers several important topics, including pre-Ramadan planning, education, risk stratification, nutrition advice, medication adjustment, monitoring and post Ramadan follow-up. Along with this, some sample diet charts and religious leaders' opinion about blood glucose test while fasting are also included.

We hope that the content presented in the guideline will greatly enhance knowledge surrounding the issue of diabetes and Ramadan fasting. Heartfelt gratitude goes to all members of the BES Ramadan Guideline Task Force who have worked hard to bring the vision to daylight. We express thanks to the Scientific Sub-committee of BES (2018-2020) for their efforts and guidance all through its journey.

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## Abbreviations

BES	Bangladesh Endocrine Society
BG	Blood Glucose
CV	Cardiovascular
CGM	Continuous Glucose Monitoring
CSII	Continuous Subcutaneous Insulin Infusion
DAR	Diabetes and Ramadan
DPP4i	Dipeptidyl Peptidase-4 Inhibitor
DM	Diabetes Mellitus
DKA	Diabetic Ketoacidosis
eGFR	Estimated Glomerular Filtration Rate
FPG	Fasting Plasma Glucose
GDM	Gestational Diabetes Mellitus
GLP-1 RA	Glucagon Like Peptide-1 Receptor Agonist
HHS	Hyperosmolar Hyperglycemic State
IDF	International Diabetes Federation
IU	International Units
MNT	Medical Nutrition Therapy
MDI	Multiple Dose Insulin
OAD	Oral Antidiabetic Drugs
PPG	Post Prandial Plasma Glucose
SMBG	Self Monitoring of Blood Glucose
SGLT2i	Sodium Glucose Co-transporter 2 Inhibitor
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
U	Units
Kbw	Kg Body Weight
$\alpha$ Gi	Alpha Glucosidase Inhibitor

## Preface to 2<sup>nd</sup> Edition

It is a matter of utmost importance for Muslim patients having diabetes that they understand the risks and they receive proper guidance from physician for ensuring a safe fasting during Ramadan. Bangladesh Endocrine Society (BES) acknowledges that our guidance should be based on our cultural background and practice. After formulation of 1st edition in 2019, BES underwent vigorous dissemination of this guideline throughout the country and received some contributory comments from expert physicians. Guideline Task force also explored the issues that need revised thoughts. On the base on these, 2nd edition of Bangladesh Endocrine Society (BES) Guideline on Management of Diabetes During Ramadan 2020 has been published. BES hope that it will provide more clear understanding and help patients through physicians to observe safe fasting during Ramadan.

Prof Md Faruque Pathan  
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Bangladesh Endocrine Society (BES)



Guideline on Management of Diabetes During Ramadan 2020

# Introduction

## Key points:

- *Ramadan is one of the five pillars of Islam. With the increasing prevalence of diabetes, there is a rise in the number of Muslim people who fast during Ramadan.*
- *There are cultural variations in Muslim population in different parts of the world. Hence, formulation of national and regional guidelines for diabetes and Ramadan are important.*
- *In patients with diabetes, Ramadan fasting can be associated with certain risks like hypoglycaemia, hyperglycaemia, dehydration and diabetic ketoacidosis.*
- *Patients with diabetes should seek medical advice before deciding to proceed with Ramadan fasting. Co-ordination between medical and religious advice is essential to ensure safe fasting for people with diabetes.*

Fasting during the Holy month of Ramadan is one of the five pillars of Islam. Every Muslim who has reached puberty should fast during this month. The Holy Quran says: “O you who believe! Fasting is prescribed to you as it was prescribed to those before you so that you may attain self-restraint”

[1]. Among the Muslim population, there is an intense desire to participate in fasting, even among those who could seek exemption, such as the elderly, children, the infirm, and pregnant women. It is important that the decision about whether to fast is made on an individual basis in consultation with the treating physician, taking into account the severity of illness and the level of risk involved [2].

[2]. Ramadan fasting may provide important health benefits. Ramadan can provide an opportunity for a better lifestyle, facilitating weight loss and smoking cessation [3]. Fasting has favourable effects on the lipid profile of healthy individuals [4]. For patients with diabetes who choose to fast, Ramadan may help to strengthen the doctor-patient relationship, and may provide an opportunity to improve diabetes management [5]. Potential health hazards of fasting include hypoglycaemia, hyperglycaemia, dehydration and acute metabolic complications such as diabetic ketoacidosis (DKA) [2]. The duration of daylight fasting varies according to the time of year in which Ramadan falls. In Bangladesh, daylight can be as long as 15 hours in the peak of summer.

Bangladesh is a country with Muslim predominance. According to the 2011 census, the population of this country was 144 million, 90.39% of which were Muslim [6]. The number of diabetic population in Bangladesh was 7.34 million in 2017 [7]. The EPIDIAR study found that 89.8% of Bangladeshi patients with type-2 diabetes fasted for at least 15 days during Ramadan

[8]. Therefore, Ramadan has a major impact on the management of diabetes in the Muslim population of this country.

Unlike many other diseases, diabetes is a chronic condition with a multitude of complications and co-morbidities which may impose various risks on fasting. The person should be assessed for the risks associated with fasting and stratified accordingly. In the past, religious scholars have depended on the specific personal advice of an expert Muslim physician to decide illnesses in which fasting may make conditions worse or delay healing. But modern medicine relies more on scientific evidence than mere experience. The role of the physician here is to assess the risks associated with fasting and stratify them accordingly, and to provide proper guidance to the patient for safe fasting.

The first guidelines for the management of diabetes during Ramadan were published by the American Diabetes Association (ADA) in 2005 [2]. They classified patients with diabetes into one of four risk categories: very high, high, moderate and low risk depending on the type of diabetes, medical history, glycaemic control, type of medication, presence of comorbidities and the individual's personal circumstances [2]. Later in 2016, experts from the International Diabetes Federation (IDF) and the Diabetes and Ramadan (DAR) International Alliance updated the risk classifications for fasting in the IDF-DAR Practical Guidelines, taking into account a more practical approach while recognizing the need to consider the everyday practice of many people with diabetes [5]. The recommendations in IDF-DAR guidelines were approved by the Mofty of Egypt, the highest religious regulatory authority in Egypt as well as being a scholar of Al-Azhar, one of the globally renowned Islamic academic organizations [5].

Despite having these recommendations in place, many physicians as well as patients are reluctant to follow them [9]. Analysis of patients with type 2 diabetes (T2DM) enrolled on the CREED study found that around one third of the physicians involved in their care did not consult guidelines for the management of diabetes during Ramadan [10]. One has to take into account the variations in religious practice among different Muslim sectors with variation of culture and food habits. Hence, it is important to formulate unique regional or national guidelines for diabetes and Ramadan, taking into account the above mentioned factors. An ideal guideline should be based on evidence, and should address the problems related to Ramadan fasting and diabetes, such as: whether to fast or not to fast from medico-religious perspective, the ideal meal and exercise pattern, modification of antidiabetic agents and follow-up plan during Ramadan fasting.

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## Pre-Ramadan Assessment & Risk Stratification

### Key points:

- *Fasting in Ramadan is associated with increased risk of hypoglycemia, hyperglycemia, diabetic ketoacidosis, dehydration and thrombosis in diabetic patients.*
- *A pre-Ramadan individualized assessment should be performed by healthcare professionals 1 to 3 months prior to the start of fasting.*
- *Patients with diabetes who intend to fast should be categorized into 3 risk groups – very high risk, high risk and moderate/low risk.*
- *Very high risk patients must not fast and high risk patients should not fast. In spite of this, if patients insist on fasting, then this must be respected and they should take advice from physicians.*
- *Moderate/low risk patients can fast with the help of medical advice.*

Changes in lifestyle and alteration in timing of antidiabetic medication during the month of Ramadan fasting results in metabolic disturbances. Fasting and feasting in Ramadan is associated with increased risk of hypoglycemia, hyperglycemia, diabetic ketoacidosis, dehydration and thrombosis in diabetic patients [1].

2.1: A pre-Ramadan individualized assessment should be performed by healthcare professionals around 3 months(at least 1 month) prior to the start of fasting to reduce these risks [2]. The assessment should include:

- a. Appropriate risk stratification
- b. Review of positive and adverse experiences from previous fasting
- c. Formulate an individualized treatment plan
- d. Discuss antihyperglycemic medication adjustment, meals, physical activity, frequency of self-monitoring of blood glucose, and situations where it would be medically indicated to break the fast.

2.2: For risk stratification, at first, quantify the risks by considering the following factors [2]:

- a. Type of diabetes
- b. History of DKA/HHS/hypoglycemia within 3 months
- c. Current medications
- d. Individual hypoglycemic risk
- e. Presence of complications/comorbidities
- f. Individual social and work circumstances
- g. Previous Ramadan experience

The 2005 American Diabetes Association (ADA) recommendations for management of diabetes during Ramadan and its 2010 update categorized diabetic patients into four risk groups – very high risk, high risk, moderate risk and low risk [1-4]. These risk categories have been endorsed by the Islamic Organization for Medical Sciences and the International Islamic Fiqh Academy [5]. Later on the IDF and Diabetes and Ramadan International Alliance (IDF-DAR) in 2016 have categorized diabetic patients who intend to fast during Ramadan into 3 new risk groups (Table 1) and which has been approved by the Mofty of Egypt, the highest religious regulatory authority in Egypt [6].

Table 1: Risk Stratification 1

### Category 1: Very high risk

One/more of following

- Severe hypoglycaemia/ DKA/HHS within the 3 months prior to Ramadan
- History of recurrent hypoglycaemia/ hypoglycaemia unawareness
- Poorly controlled T1DM
- Acute illness
- Pregnancy in pre-existing diabetes, or GDM treated with insulin
- Chronic dialysis / CKD stage 4 & 5
- Advanced macrovascular complications
- Old age with ill health
- Cognitive impairment/uncontrolled epilepsy [2]



### Category 2: High risk

One/more of following

- T2DM with sustained poor glycaemic control
- Well-controlled T1DM
- Well-controlled T2DM on MDI or mixed insulin
- Pregnant T2DM or GDM controlled by diet only
- CKD stage 3/Nephrotic syndrome [7]
- Stable macrovascular complications
- Patients with comorbid conditions that present additional risk factors
- People with diabetes performing intense physical labour
- Treatment with drugs that may affect cognitive function



### Category 3: Moderate/low risk

Well-controlled T2DM treated with one or more of the following:

- Lifestyle therapy
- Metformin, Acarbose, Thiazolidinediones, Second-generation SUs, Incretin-based therapy (DPP-4 inhibitors or GLP-1 RAs), SGLT2 inhibitors, Basal insulin



(adopted from IDF-DAR Practical guidelines 2016)

2.3.a: Category 1 patients must not fast.

2.3.b: Category 2 patients should not fast. However, many patients of these 2 categories will choose to fast and this must be respected and they need to be aware of the risks associated with fasting and of techniques to decrease this risk. They should:

- Receive structured education
- Be followed by a qualified diabetes team
- Check their blood glucose regularly (SMBG)
- Adjust medication dose, diet and exercise as per recommendations
- Be prepared to break the fast in case of hypo- or hyperglycaemia and worsening of other related medical conditions

2.3.c: Category 3 patients can fast with the help of medical advice:

- Receive structured education
- Check their blood glucose regularly (SMBG)
- Adjust medication dose, diet and exercise as per recommendations.

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## Pre-Ramadan Education

### *Key points:*

- *Education is the cornerstone of safe Ramadan Fasting.*
- *Patients, related family members, friends, HCPs who manage them, and the general public who support them should be educated.*
- *Educational program.*
- *Ramadan focused structured education program should be started around 3 months before Ramadan and that should include information on risk stratification, diet and exercise, drugs adjustment, blood glucose monitoring, recognition of hypoglycemia and other complications and situations when to break fast.*

Education is the cornerstone of diabetes management and prevention. READ and other studies have clearly demonstrated that pre-Ramadan structured education and motivation significantly reduced the risk of fasting *in terms of glycemic control, weight loss and reduced risk of hypoglycemic episodes*. [1,2]. Healthcare professionals must understand and respect the regional cultural habits and customs on the basis of individualized approach even in the same family.

Ramadan focused structured education is better than chamber education. Pre-Ramadan education should be started around 3 months before Ramadan. Target population for Ramadan focused diabetes education are healthcare professionals, patients with diabetes, family members, friends, general public, religious and community leaders and electronic media [3,4,5]. Pre-Ramadan education is beneficial for patients with diabetes to maintain good glycemic control and preventing weight gain and complications [2,6]. Components of a Ramadan focused education programme are-

- Pre-Ramadan planning
- Risk stratification
- Medical nutrition therapy
- Fluid and electrolytes
- Exercise
- Drug adjustment
- Blood glucose monitoring
- Breaking the fast

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## Modification of Diet & Physical Activity

### Key points:

- *The dietary pattern for fasting Muslims is different during Ramadan compared with other months of the year. Inappropriate eating habits and physical activity may increase risk of complications during Ramadan. Well balanced meal plan and dietary frequency should be followed as healthy balance diet as done during pre-Ramadan period.*
- *Small and six times healthy balanced diet should be accommodated in three times of meal frequency between Iftar, dinner and Suhoor keeping the total daily calorie same.*
- *Fasting people are advised to avoid exercise during fasting time. Physical exertion in Tarawih prayer can be considered as a part of daily exercise activity.*

### 4.1.a: Aims of MNT[1]

- Consume same amount of calories, with balanced proportions of macronutrients, during the non-fasting period (i.e. sunset to dawn).
- Distribute the carbohydrate intake equally among meals to minimize postprandial hyperglycaemia.
- Consider co-morbidities such as hypertension and dyslipidaemia.
- Avoid weight gain during Ramadan. Patients with T2DM who are overweight or obese may find that Ramadan provides a good opportunity to lose weight. Weight loss may result in a significant improvement in glycaemic control and may reduce cardiovascular risk.

### 4.1.b: Dietary advice for patients with diabetes during Ramadan [2,3]

Large carbohydrate meals, sugary drinks are to be avoided. Meal plan and dietary frequency should be followed as healthy balanced diet as done during pre-Ramadan period. Well balanced meals should be ensured with 45–50% carbohydrate, 20–30% protein, <35% fat (preferably mono- and polyunsaturated), low glycaemic index, complex starchy carb, high fibre foods. Protein like egg, fish, meat, milk, yoghurt must be included and carbohydrate like bread, beans, rice, plenty of vegetables and salads can be added. A moderate amount of healthy dessert is permitted, for example a piece of fruit. Foods that are high in saturated fats should be discouraged like ghee, butter, samosas, pakoras, puri, parata or heavy fried meat. Sugary desserts like jilapi, laddo, barfi, other sweets must be avoided. Sweetened drinks are advised to avoid. Small amounts of oil especially vegetable oil (corn/soya bean/ olive oil) should be encouraged while cooking.

Hydration and electrolytes balance can be maintained by taking more drinking water or other non-sweetened beverages like dub water, lemon water etc. Small and six-times healthy balanced diet of pre-Ramadan should be accommodated in two to three times of meal frequency between Iftar, Dinner and Suhoor. Diet should be planned keeping same calorie and quality and respecting patient desire and customs according to previous eating patterns. Suhoor is advised to take close to Fajar Prayer.

4.1.c: Meal plan for different caloric targets (1200, 1400, 1600 ,1800 and 2000 kcal/day) provided in the annex section [3].

4.1.d: Unhealthy nutrition habits (**Should be Avoided**) [1,2]

- Taking large meals at Iftar and taking desserts loaded with sugar after Iftar, which may result in severe postprandial hyperglycaemia and weight gain.
- Taking significant amounts of highly processed carbohydrates at Iftar, or between Iftar and Suhoor, which may also cause severe hyperglycaemia.
- Having large and frequent snacks between the two main meals, which can contribute to longer periods of hyperglycaemia.
- Temptation to take Suhoor early or avoiding Suhoor meal or less amount of meal, which may result in hypoglycaemia before Iftar, especially when fasting hours are longer than usual.
- Consumption of large portions of high glycaemic index and high glycaemic load carbohydrates at Suhoor, which can lead to post-prandial hyperglycaemia.

4.2: Exercise Recommendations during Ramadan Fasting [1]

- Fasting people are advised to avoid exercise during fasting time.
- Rigorous exercise is not recommended due to increased risk of hypoglycaemia and dehydration.
- Physical exertion in Tarawih prayer can be considered as a part of daily exercise activity.
- Rest part of exercise can be done before or after Tarawih prayer in the house premises.

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## Modification of Oral Antidiabetic Drugs

### *Key points:*

- *The choice of oral anti-diabetic drug (OAD) should be individualized during fasting.*
- *Generally, the insulin secretagogues have higher risk of hypoglycaemia than the insulin sensitizers.*
- *Second generation Sulfonylurea (Gliclazide, Glicazide MR, Glimepiride) are preferred Sulfonylureas.*
- *There is also need to change the dose and timing of OAD during Ramadan.*

The cornerstone of a Ramadan individualized management plan is therapeutic modification [1-3]. The type of medication the patient is taking for diabetes management influences the potential risks [4-7].

Adjustments of oral anti-diabetic drugs in patients with Type 2 diabetes who are fasting during Ramadan can be done in following ways [1, 8, 9]. [Table 2]

Table 2: Modification of OADs during Ramadan

Name of drug	Modification during Ramadan
Metformin	Daily total dose remains unchanged. Once daily dose should be taken at Iftar. For twice daily dose, should be taken at Iftar and Suhoor. For thrice daily dose, morning dose should be taken at Suhoor and combined afternoon and evening dose at Iftar. Prolonged release preparation should be taken at Iftar.
Sulfonylurea	Switch to newer Sulfonylurea (Gliclazide, Glimepiride) where possible. Glibenclamide should be avoided. For once daily dose, the total dose should be taken at Iftar. Dose may be reduced in patients with good glycemic control. For twice daily dose, full pre-Ramadan breakfast dose should be taken at Iftar and 50% of the dinner dose should be taken in Suhoor.
Meglitinides	Thrice daily dosing may be reduced/ redistributed to two doses taken with Iftar and Suhoor.
Acarbose	No dose modification. Pre-Ramadan morning dose is given at Iftar, lunch dose at dinner (if taken), and evening dose at Suhoor.
Thiazolidinediones	No dose modification. Can be taken at Iftar or Suhoor.
DPP-4 Inhibitors	No dose modification. Can be taken at Iftar or Suhoor.
SGLT2 inhibitors	No dose modification. Dose should be taken with iftar. Extra water should be ingested during non-fasting periods. Should not be used in the elderly, patients with renal impairment, hypotensive individuals or those taking diuretics.

N.B.: At the start of Ramadan, up to dinner, OAD should be taken as per pre-Ramadan schedule. At Suhoor of first Ramadan, OAD should be omitted. At the end of Ramadan, up to Iftar, Ramadan schedule should be followed. On the Eid day breakfast, Pre-Ramadan schedule should be started.



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## Modification of Injectable antidiabetic Medication

### Key points:

- *The main aim for insulin therapy during Ramadan fasting is to provide adequate insulin to prevent the hyperglycemia or hypoglycemia during the period of fast.*
- *Individual risk factors should be identified and patients at high risk are recommended to avoid fasting while treating with insulin.*
- *It is recommended to switch the pre-Ramadan morning dose of insulin to Iftar and to reduce the pre-Ramadan evening dose and switch it to Suhoor.*
- *Analog insulin, especially analog basal-bolus regimen is the safest regimen to be used during Ramadan fasting.*
- *GLP 1 RA can be continued in patients with T2DM, during Ramadan fasting.*
- *Insulin alone or in combination with OADs and GLP 1RA can be used during Ramadan.*

### 6.1: Management of Patients with type 1 diabetes:

Patients with T1DM fall in very high risk group in Ramadan and they must not fast. However, if anyone wishes to fast against medical advice, they should receive structured education, and medications should be adjusted.

Current recommendations aim at intensive glycaemic management in patients with diabetes type 1 diabetes, which requires use of multiple daily insulin injections (three or more) or use of continuous subcutaneous insulin infusion through pump therapy [1-3]. Few of the type 1 diabetes patients prefer to fast at Ramadan, and most of them change their insulin regimens immediately before, during, and a few days after this month.

6.1.a: Basal-bolus regimen is the preferred protocol of management as it is thought to be safer, with fewer episodes of hyper- and hypoglycemia. Analogue insulins are preferred over conventional insulin due to low risk of hypoglycemia.

6.1.b: Compared with those who do not fast during Ramadan, patients with type 1 diabetes on insulin pump therapy who fast shows a slight improvement in HbA1c without increasing the risk of hypoglycemia [4,5,6].

## 6 Section

### 6.2.a: Management of Patients with type 2 diabetes:

Hypoglycemia, though less frequent, is still a risk, especially in elderly patients or who have required insulin therapy for a number of years. This can be reduced by using basal insulin analogs such as insulin detemir, glargine, degludec and rapid acting insulin analogs such as aspart, lispro, or glulisine as bolus.

### 6.2.b: Recommended changes to insulin regimen who fast during Ramadan.

Adjustment of insulin regimen whether basal bolus, pre-mixed or slit-mixed should be customized and individualized according to food habit, food composition adopted specially during the fasting state (7).

### Tables: 3-8 [adopted from BES Insulin Guideline 2018]

**Table 3: Pre-mixed (Conventional and analogue) insulin dose adjustment during Ramadan both T2DM & T1DM.**

Once-daily dosing	Usual dose at iftar	
Twice-daily dosing	Usual morning/ higher dose at iftar.	Reduce evening/lower dose 50% if BG controlled or 0-25% if BG is uncontrolled and prescribe at suhoor.
Thrice-Daily dosing (analogue)	Usual morning/ higher dose at iftar.	Reduce evening/lower dose 50% if BG controlled or 0-25% if BG is uncontrolled and prescribe at suhoor. Omit lunch-time dose.
SMBG guided Dose titration: Should be carried out every 3 <sup>rd</sup> days.		

**Table 4: Co-formulation (analogue) insulin dose adjustment during Ramadan.**

Once-daily dosing	Usual dose at iftar	
Twice-daily dosing	Usual breakfast/ lunch dose at iftar.	Reduce evening dose 30-50% and prescribe at suhoor.
SMBG guided Dose titration: Should be carried out every 3 <sup>rd</sup> days.		

**Table 5: Intermediate (NPH)/Long acting (basal analogue) and Short/ rapid (analogue) acting insulin dose adjustment during Ramadan both T2DM & T1DM.**

NPH/Basal analogue: Once-daily dosing	Reduce dose by 15-30% and prescribe at iftar	
NPH/ Basal analogue: Twice-daily dosing	Usual morning dose at iftar.	Reduce evening dose 50% and prescribe at suhoor.
Short acting insulin/ rapid acting analogue	Usual morning dose at iftar.	Reduce evening dose 50% and prescribe at suhoor, omit lunch-time dose if dinner is not taken.
SMBG guided Dose titration: Should be carried out every 3 <sup>rd</sup> days.		

**Table 6: Switching human Pre-mixed to analogue premixed insulin & dose adjustment during Ramadan**

Once-daily dosing	Reduce 20-30% of morning dose and prescribe at iftar	
Twice-daily dosing	Reduce 20-30% of morning dose and prescribe at iftar	Reduce evening/lower dose 60% and prescribe at suhoor.
SMBG guided Dose titration: Should be carried out every 3 <sup>rd</sup> days.		

**Table 7: Insulin pump dose adjustment during Ramadan both T2DM & T1DM.**

Basal rate	Increase dose by 0-30% during early hours after iftar	Reduce dose by 20-40% during last 3-4 hours of fasting. Basal rate can be set into different 3-5 settings during iftar, dinner, suhoor, mid-day, afternoon etc.
Bolus rate	As per carbohydrate counting and insulin sensitivity principles	

**Table 8: Intermediate (NPH)/Long acting (basal analogue) and Short / rapid (analogue) acting insulin dose adjustment during Ramadan in Adolescent T1DM.**

NPH/Basal analogue: Once-daily dosing	Reduce dose by 30-40% and given at iftar	
NPH/ Basal analogue: Twice-daily dosing	Usual morning dose at iftar.	Reduce evening dose 50% and prescribe at suhoor.
Short acting insulin/ rapid acting analogue	Usual morning dose at iftar.	Reduce evening dose 25-50% and prescribe at suhoor, omit lunch-time dose if dinner is not taken.
SMBG guided Dose titration: Should be carried out every 3 <sup>rd</sup> days.		



### 6.3: Insulin dose titration algorithm during fasting

IDF recommends a normal dose before evening meal, omit lunchtime dose and reduce morning dose by 25-50%. If fasting/pre-meal blood glucose is  $<3.9$  mmol/L (70mg/dL) or 3.9–5.0 mmol/L (70–90mg/dL), morning/evening dose before meal is to be reduced by 4U and 2U respectively. Further, the guidelines recommend no dose change if fasting/pre-meal blood glucose is 90–130 mg/dL (5.0–7.2 mmol/L). However, if fasting/pre-meal blood glucose is 7.2–11.1 mmol/L (130–200 mg/dL) or  $>11.1$  mmol/L (200mg/dL) increase dose by 2U and 4U respectively [6]. [Table 4]

Fasting/before breaking fast	Insulin units
$<70$ mg/dL (3.9 mmol/L) or symptoms of hypoglycaemia	Break the fast and down-titrate
$<90$ mg/dL (5.0 mmol/L)	-2 IU
90–126 mg/dL (5.0–7.0 mmol/L)	No change
126-200 mg/dL (7.0-11.1 mmol/L)	+2 IU
$>200$ mg/dl (11.1 mmol/L)	+4 IU

### 6.4: Advantages of rapid acting analogs compared to regular human insulins during Ramadan: [7-11]

- Rapid onset of action and higher peak with same dose
- Better control of post prandial blood sugar
- Lesser risk of hypoglycemia especially late post-meal period during the fast
- Offers meal time flexibility as it can be given just before the meals or even after completing the meals
- Safe to use in patients with renal and hepatic impairment (Insulin Aspart)
- Safe in pregnancy, if they still insist to fast (recommended are aspart, lispro, detemir.)

6.5.: GLP-1 analogue: (Liraglutide-0.6/1.2/1.8 mg) [8].

Table-10: Adjustment of GLP-RA during Ramadan	
Pre-Ramadan schedule	Ramadan schedule
• Single dose before breakfast	• Same dose at Iftar

6.6.: Combination of different antidiabetic agents [13,14]:

6.6.a: Combination of Oral (OAD) and Insulin:

- For modification of OAD: see Section-5, Table-2.

6.6.b: Combination of GLP1 analogue with OAD or Insulin:

- For modification of OAD: see Section-5, Table-2.
- For modification of GLP-1 RA: see Table-10

N.B.:

1. N.B.: At the start of Ramadan, up to dinner, insulin/GLP-1RA should be taken as per pre-Ramadan schedule. At Suhoor of first Ramadan, insulin/GLP-1RA should be omitted. At the end of Ramadan, up to Iftar, Ramadan schedule should be followed. On the Eid day breakfast, Pre-Ramadan schedule should be started.

2. For further reading BES Insulin Guideline.



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## Monitoring of Blood Glucose during Ramadan

### Key points:

- *Hypoglycemia as well as hyperglycemia are major concerns in diabetic patients during Ramadan fasting.*
- *Monitoring of blood glucose during Ramadan fasting is very important for the prevention of any acute complications and also for medication adjustment.*
- *Every diabetic patient willing for fasting must have their own glucometer.*
- *Blood glucose monitoring in Ramadan fasting is approved by Islamic Scholars and does not invalidate religious fast.*

Diabetic patients are in different risk profiles in Ramadan fasting as they are on single to multiple OAD or insulin preparations that can cause hypoglycemia or even hyperglycemia if not properly educated [1]. Self-monitoring of blood glucose (SMBG) is essential for every diabetic patient who chooses to fast and it should be emphasized that testing does not invalidate religious fast [2]. The Quran clearly states that if one is ill “the missed fast should be completed at another time”, because “Allah intends ease for you and does not intend to put you in difficulty” [3]. Patients with diabetes can present with a range of complications and co morbidities and need specific personal advice to an “expert Muslim physician to decide illness in which fasting may make conditions worse or delay healing” [4]. Even diabetic patients may need to break fasting in any physical illness. Importantly, these recommendations are approved by the Mofty of Egypt, the highest religious regulatory authority in Egypt as well as being a scholar of Al – Azhar, one of the globally renowned Islamic academic organizations [4].

Monitoring depends on treatment regimens and patients risk profile. SMBG should be performed multiple times during the day and, most importantly, whenever symptoms of hypoglycemia or acute illness occur. Patients should break the fast if blood glucose <3.9 mmol/L or > 16.7 mmol/L and should not fast if they feel unwell [5].

High risk diabetic patients if they fast against medical advice then SMBG should be monitored on multiple times of day. The regularity of the blood glucose checks is dependent on the frequency of insulin treatment and/or the risk of hypo or hyperglycemia [6].

Moderate and low risk patients and patients on metformin, DPP4 inhibitor, GLP1 analogue monotherapy or in combination of these drugs should also monitor their blood sugar, at the following times: pre-Suhoor, midday, pre-Iftar and whenever symptoms of hypoglycemia or acute illness occur [3]. During Ramadan, there is a dramatic change in eating patterns compared with other months of the year [1]. The post meal test reduce the risk of postprandial hyperglycemia [2].

To get a true understanding of how blood glucose changes while fasting, patients should be encouraged to keep a Ramadan logbook detailing the measurement [2].



2-4 hours after Suhoor
<b>Mid-day: 11am to 2pm</b>
<b>Pre-Iftar</b>
<b>2 hours after Iftar</b>
Pre-Suhoor
Any time if feeling unwell

Figure-1: Time of SMBG during Ramadan (Must to do times are in bold)

#### 7.1: Time of SMBG: Good to do

1. Pre Suhoor – before taking meal (for adjustment of OAD , premixed insulin)
2. Early Morning – 2 to 4 hrs after Suhoor (patients are in bolus, split, premixed regimen, OAD)
3. Mid-day – 11 am to 2 pm (Premixed Insulin, intermediate acting insulin, OAD , basal Insulin )
4. Pre Iftar - for every patients and dose adjustment for long acting insulin analogue, long acting OAD
5. 2 hrs after Iftar –Bolus insulin, OAD
6. At any time when there are symptoms of hypoglycemia / hyperglycemia or feeling unwell.

#### 7.2 : Time of SMBG: Must to do

1. Before Iftar
2. 2 hour after Iftar
3. Mid-day

7.3: Frequency of SMBG should be daily for first 3 days, every 3rd day from next week onwards and every alternate day in the last week.

#### 7.4: When to break fast (5, 7)

Patients should break the fast if

- Blood glucose is  $<3.9$  mmol/L. (Re-check within 1 hour if BG is 3.9-5.0 mmol/L)
- Blood glucose is  $>16.7$  mmol/L
- If they feel unwell
- Symptoms of hypoglycemia
- During acute illness.

Date	Pre Suhoor	2 - 4hrs after Suhoor	11 am to 2 pm	Pre Iftar	2 hrs after Iftar	Any time of the day if feeling unwell



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## Emergencies Related to Diabetes during Ramadan

### Key points:

- *Major complications associated with fasting in patients with diabetes are hypoglycemia, hyperglycemia, diabetic ketoacidosis/HHS, dehydration and thrombosis.*
- *Inappropriate adjustment of medication, lifestyle and physical activity are main contributor to development of hypoglycemia.*
- *Hyperglycemia may result from inappropriate reduction of dosage of medications, an increase in food and/ or sugar intake.*
- *Patients with type 1 diabetes are at an increased risk for development of DKA, particularly if they are grossly hyperglycemic before Ramadan.*
- *Patients with moderate to severe hyperglycemia (average blood glucose 8.3 to 16.7 mmol/L) before fast, renal insufficiency, advanced micro-/macrovascular complications and other comorbid conditions are at increased risk to develop DKA or HHS.*
- *Dehydration may occur due to hot-humid climates, limited fluid intake during prolonged fast, excess hard physical activity, hyperglycemia. Increased blood viscosity secondary to dehydration may enhance the risk of thrombosis.*
  - *The key components to minimize acute complications are risk quantification, empowering people with diabetes with Ramadan focused education, blood glucose monitoring, nutritional and exercise advice, appropriate drug-dose modification, addressing comorbidities and personal circumstances.*

Major complications associated with fasting in patients with diabetes are [1]:

- Hypoglycemia
- Hyperglycemia
- Diabetic ketoacidosis/ HHS
- Dehydration and thrombosis

### 8.1: Hypoglycemia:

- Among diabetic people who fast during Ramadan, the rate of hypoglycemia is found to be 1.6 times higher compared with non-fasting periods [2].
- The EPIDIAR study [3] showed that fasting during Ramadan increased the risk of severe hypoglycemia (defined as hospitalization due to hypoglycemia) some 4.7-fold in patients with type 1 diabetes (from 3 to 14 events/100 people/month) and 7.5-fold in patients with type 2 diabetes (from 0.4 to 3 events/100 people/month). Inappropriate adjustment of medication and lifestyle are main contributor to development of hypoglycemia.
- Excessive physical activity may lead to higher risk of hypoglycemia [1].

### 8.2: Hyperglycemia:

- The extensive EPIDIAR study showed a 5-fold increase in the incidence of severe hyperglycemia (requiring hospitalization) during Ramadan in patients with type 2 diabetes (from 1 to 5 events/100 people/month) and an approximately 3-fold increase in the incidence of severe hyperglycemia with or without ketoacidosis in patients with type 1 diabetes (from 5 to 17 events/100 people/month) [3].
- Hyperglycemia may result from inappropriate reduction of dosage of medications in fear of hypoglycemia [3].
- An increase in food and/ or sugar intake also significantly increases rates of severe hyperglycemia [3].

### 8.3: Diabetic ketoacidosis: The risk of diabetic ketoacidosis (DKA)

- higher during Ramadan as fasting will result in hypoinsulinemia, hyperglucagonemia, ketone body formation and eventually development of DKA [9].
- Due to inappropriate reduction of insulin dosages [1].
- Patients who have moderate to severe hyperglycemia (average blood glucose 8.3 to 16.7 mmol/L) before fast, renal insufficiency, advanced micro-/macrovascular complications and other comorbid conditions are at increased risk to develop DKA or HHS [1,3].

8.4: Dehydration and thrombosis[1]: may develop due to:

- Limitation of fluid intake during the fast
  - hot and humid climates
- hard physical labor.
- Hyperglycemia
- hypercoagulable state due to increase in clotting factors and impaired fibrinolysis

Prevention and management of emergencies related to Diabetes during Ramadan:

8.5: The key components to minimize acute complications are[1,3,4,5]

- Risk quantification
- Empowering people with diabetes with Ramadan focused education, including blood glucose monitoring, nutritional advice and advice on exercise
- Appropriate drug and dose modification as required
- Addressing comorbidities and personal circumstances
- Addressing of underlying conditions





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## Post- Ramadan Follow-up

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*Key points:*

- *A post-Ramadan follow-up consultation is recommended to review medication and regimen readjustments and to monitor and record BMI, S. creatinine, lipid profile and HbA1C.*

Eidul-Fitr, a day of festival, marks the end of Ramadan and patients with diabetes should be made aware of the risks of overindulgence during this time.

9.1: A post-Ramadan follow-up meeting with physician is advisable in order to discuss medication and regimen readjustments and assess how the patient handled the fasting, level of glycemic control, incidence of hypoglycemia, hyperglycemia or any acute complication like DKA, HHS that would help the physician to make a patient specific Ramadan plan for the next year [1-4].

9.2: Physician should note patients BMI, S. creatinine, lipid profile and HbA1C to observe any change in these parameters because the metabolic instability and change in lifestyle during the Ramadan fasting and feasting [5,6].

9.3: It should be stressed to the patient that a safe fast one year does not automatically make them a low risk for the next year due to the progressive nature of the disease.

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## Annexure:1

### Diet Planning during Ramadan

Diet Chart -1200 Calorie	
Iftar	<ul style="list-style-type: none"> <li>• Drinks-Dub Water/ lemon Water (without sugar), sour fruit juice-1 glass</li> <li>• Fruit- any one sweet fruit (one portion)</li> <li>• Muri (puffed rice)/ Chira/ Oats/ Noodles -1 cup</li> <li>• Piau- 1 piece, beguni -1 piece</li> <li>• Chola boiled/ cooked-1/4th cup / Chop-1/ Kabab-1/ Haleem-2 Tablespoon</li> <li>• As per wish-cucumber, sour fruit, Dub water</li> </ul>
Dinner	<ul style="list-style-type: none"> <li>• Ruti (chapatti)-2/ Rice -1 cup(120 gm)</li> <li>• Fish/ Meat/ Egg-1 piece</li> <li>• Vegetable, Salad- as per wish</li> <li>• Dal-1 cup</li> </ul>
Suhoor	<ul style="list-style-type: none"> <li>• Rice- 1.5 cup(180 gm)</li> <li>• Fish/ Meat- 1 piece</li> <li>• Vegetable, Salad - as per wish</li> <li>• Dal-1 cup</li> <li>• Milk -1 cup</li> </ul>

Diet Chart -1400 Calorie	
Iftar	<ul style="list-style-type: none"> <li>• Drinks-Dub water/ lemon water (without sugar), sour fruit juice-1 glass</li> <li>• Fruit- any one sweet fruit (one portion)</li> <li>• Muri (puffed rice)/ Chira/ Oats/ Noodles -1 cup</li> <li>• Piau- 1 piece, beguni -1 piece</li> <li>• Chola boiled/ cooked-1/4th cup /Chop-1/ Kabab-1/ Haleem -2 tablespoon</li> <li>• As per wish-cucumber, sour fruit, Dub water</li> </ul>
Dinner	<ul style="list-style-type: none"> <li>• Ruti (chapatti)-2/Rice -1 cup(120 gm)</li> <li>• Fish/Meat/egg-1 piece</li> <li>• Vegetable, Salad- as per wish</li> <li>• Dal-1 cup</li> </ul>
Suhoor	<ul style="list-style-type: none"> <li>• Rice- 2 cup (240 gm)</li> <li>• Fish/ Meat- 2 pieces</li> <li>• Vegetable, Salad - as per wish</li> <li>• Dal-1 cup</li> <li>• Milk -1 cup</li> </ul>

## Annexure:1

# Diet Planning during Ramadan

Diet Chart -1600 Calorie	
Iftar	<ul style="list-style-type: none"> <li>• Drinks-Dub water/ lemon water (without sugar), sour fruit juice-1 glass</li> <li>• Fruit- any one sweet fruit (one portion)</li> <li>• Muri (puffed rice)/ Chira/ Oats/ Noodles -1 cup</li> <li>• Piaju- 1 piece, beguni -1 piece</li> <li>• Chola boiled/ cooked-1/2 cup /Chop-1/ Kabab-1/ Haleem -1/2 cup</li> <li>• As per wish-cucumber, sour fruit, Dub water</li> </ul>
Dinner	<ul style="list-style-type: none"> <li>• Ruti (chapatti)-2/ Rice -1.5 cup (180 gm)</li> <li>• Fish/ Meat/ Egg-1 piece</li> <li>• Vegetable, Salad- as per wish</li> <li>• Dal-1 cup</li> </ul>
Suhoor	<ul style="list-style-type: none"> <li>• Rice- 2 cup (240 gm)</li> <li>• Fish/ Meat- 2 pieces</li> <li>• Vegetable, Salad - as per wish</li> <li>• Dal-1 cup</li> <li>• Milk -1 cup</li> </ul>

Diet Chart -1800 Calorie	
Iftar	<ul style="list-style-type: none"> <li>• Drinks-Dub water/ lemon water (without sugar), sour fruit juice-1 glass</li> <li>• Fruit- any one sweet fruit (two portions)</li> <li>• Muri (puffed rice)/ Chira/ Oats/ Noodles -1 cup</li> <li>• Piaju- 1 piece, beguni -2 pieces</li> <li>• Chola boiled/ cooked-1/2 cup/ Chop-1/ Kabab-1/ Haleem -1/2 cup</li> <li>• Chicken/Vegetable soup- 1 bowl (200ml)</li> <li>• As per wish-cucumber, sour fruit, Dub water</li> </ul>
Dinner	<ul style="list-style-type: none"> <li>• Ruti (chapatti)-3/ Rice -2 cup (240 gm)</li> <li>• Fish/ Meat/ Egg-1 piece</li> <li>• Vegetable, Salad- as per wish</li> <li>• Dal-1 cup</li> </ul>
Suhoor	<ul style="list-style-type: none"> <li>• Rice- 2.5 cup (300 gm)</li> <li>• Fish/ Meat- 2 pieces</li> <li>• Vegetable, Salad - as per wish</li> <li>• Dal-1 cup</li> <li>• Milk -1 cup</li> </ul>

## Annexure:1

# Diet Planning during Ramadan


Diet Chart -2000 Calorie	
Iftar	<ul style="list-style-type: none"> <li>• Drinks-Dub water/ lemon water (without sugar), sour fruit juice-1 glass</li> <li>• Fruit- any one sweet fruit (two portions)</li> <li>• Muri (puffed rice)/ Chira/Oats/ Noodles -1.5 cup</li> <li>• Pajju- 2 pieces, beguni -2 pieces</li> <li>• Chola boiled/ cooked-1/2 cup /chop-1/ Kabab-1/ Haleem -1/2 cup</li> <li>• Chicken/Vegetable soup- 1 bowl(200ml)</li> <li>• As per wish-cucumber, sour fruit, Dub water</li> </ul>
Dinner	<ul style="list-style-type: none"> <li>• Ruti (chapatti)-3/ Rice -2 cup(240 gm)</li> <li>• Fish/ Meat/ Egg-2 pieces</li> <li>• Vegetable, Salad- as per wish</li> <li>• Dal-1 cup</li> </ul>
Suhoor	<ul style="list-style-type: none"> <li>• Rice- 3 cup (360 gm)</li> <li>• Fish/ Meat- 2 pieces</li> <li>• Vegetable, Salad - as per wish</li> <li>• Dal-1 cup</li> <li>• Milk -1 cup</li> </ul>



Annexure: 2

## রোজা রেখে সুগার টেস্ট ও ইনসুলিন দেয়া সম্পর্কে বিজ্ঞ আলোচনার অভিমত

### মিশরীয় আলোচনার অভিমত



**প্রশ্ন :** ডায়াবেটিক রোগী রোজা রাখা অবস্থায় চামড়ার নিচে ইনজেকশনের মাধ্যমে ইনসুলিন নিলে তাতে রোজার কি কোন ক্ষতি হবে?

**উত্তর :** না, কোন ক্ষতি হবে না। রোজাদার চামড়ার নিচে ইনসুলিন ইনজেকশন নিলে রোজা নষ্ট হয় না। তবে রোজাদার যদি ইচ্ছাকৃতভাবে খোলা উদরে, খোলা লোমকুপে, রক্তবাহী শিরার ভিতর, এমন কিছু পৌছায় যার দ্বারা চেতনা লোপ পায় তাহলে রোজা নষ্ট হবে বা রোজার ক্ষতি হবে। আত্মাহুই সবচেয়ে ভাল জানেন।

ফতোয়া বিভাগ, নিবন্ধন নং ১৫৮৯, ২০০৬ সাল।  
একসেমিন আহমেদ-ইকর আলম বাহের আহমেদ মুহাম্মদ

### বাংলাদেশী আলোচনার অভিমত

الإسلام يدعو إلى الصيام

সহজ ও স্বাভাবিক সময়ের একটি সমন্বিত নিয়ন্ত্রণ।

রমজান মাসের হেজর হেজর হওয়ার সময় এতে রমজান মাসে ইনসুলিন ইনজেকশন দেয়া সম্পর্কে হতে।

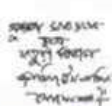
আমরা মনে করি

১। রমজান মাসের সময় রমজান মাসে - ১৮ - ৩ পৃ - ২২

২। রমজান মাসের সময় - ১৮ - ৩ পৃ - ১২২, ১২৩



৩। রমজান মাসের সময় - ১৮ - ২ পৃ - ৩৮

৪। রমজান মাসের সময় - ১৮ - ৩ পৃ - ১১০, ১১১

  
**OBABDUL HOQUE**  
 Khairul Haidul Mukarram  
 National Mosque, Dhaka


গ্লুকোজ পরীক্ষার উদ্দেশ্যে রক্ত পরীক্ষায় এক প্রয়োজনে ইনজেকশনের মাধ্যমে ইনসুলিন নেয়াতে রোজার কোন ক্ষতি হয়না।

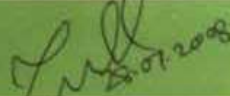
Ref: Diab Endocr J 2001; 29 (Suppl) : 48

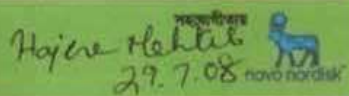
পৃষ্ঠপোষকতায়  **জনস্বার্থে** 

**বাংলাদেশ ডায়াবেটিক সমিতি**

ডায়াবেটিক রোগীরা রোজা রাখার জন্য ৩ মাস আগে থেকে ডাক্তারের সঙ্গে পরামর্শ করে প্রস্তুতি নিন।

  
28/7/08

  
29.7.08

  
29.7.08









## Bangladesh Endocrine Society (BES)

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