

MANAGEMENT OF DIABETES DURING FASTING AND FEASTING IN INDIA

70 Journal of The Association of Physicians of India • Vol. 67 • September 2019

REVIEW ARTICLE

Management of Diabetes during Fasting and Feasting in India

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Abstract

Fasting and feasting are integral part of many religions and cultures. As the amount of food and fluid intake are markedly altered during these phases, patients with diabetes are prone to higher risk of complications. Even though several guidelines for fasting and feasting are available; Indian specific recommendations are the need of the hour, because of the distinct dietary habits and the diet content (high carbohydrate) of Indians. To fill this void, the current guidelines have been developed by experts from India who extensively reviewed the literature, shared their practical knowledge and ultimately arrived at a consensus.

Introduction

Fasting and feasting are the common practices observed by people as a regimen for traditional or cultural reasons.^{1,2} People observe fasting or feasting depending on the religion and festival in context.²⁻⁷ Literature suggests that medically supervised fasting for 7–21 days is efficacious in treatment of several diseases,⁸ however, erratic eating pattern and disrupted daily fasting and feasting cycle may have an impact on the progression of metabolic diseases in India.⁹

The International Diabetes Federation (IDF) in their current report states that approximately 73 million people with diabetes are living in India.¹⁰ Data from multi-country studies, including India, report that around 79–94% of Muslims with type 2 diabetes mellitus (T2DM) undergo fasting during Ramadan for at least 15 days. It is evident that many people with diabetes observe fasting or feasting during various festivals in India, hence management of diabetes during these phases becomes extremely important.^{11,12} Importantly to the best of our knowledge there is no consensus statement available on the management of diabetes during fasting and feasting in Indian population. This consensus will highlight the evidence-based management strategies for control of diabetes and its associated

complications during fasting and feasting in Indian population.

Methodology

An extensive systematic review of literature has been initiated in several search engines including PubMed, Google Scholar, and Cochrane library databases in order to find out the best possible evidence and quality studies for management of diabetes during fasting and feasting. In the process of literature search, various MeSH keywords including fasting, feasting, hypoglycaemia, hyperglycaemia, Ramadan, diabetes, etc. have been used. Existing guidelines, meta-analyses, systematic reviews, randomized controlled trials (RCTs), non-RCTs, and key articles related to diabetes management were reviewed.

Types of fasting

Hindu fasts and feasts

There are several types of fasting observed by the Hindu religion; for example women observe day-long

fast during annual Karva Chauth and Guru Purnima to pray for long life for their husbands, monthly fasts during Ekadashi, Purnima, and Pradosha, and longer fasts during the Navratras (9 days) twice a year etc.² Moreover, fasting may be “nirahara” – without food; “phalahara” – where fruit and milk are allowed and “alphahara” – when broken rice and the likes are allowed.³ Alike fasting, feasting is also marked by the Hindu religion where during various festivals including Diwali, Pongal, Dussehra, Holi etc.; people consume high amount of carbohydrates from sweets prepared from sugar, jaggery, rice flour and ghee.³

Islamic fasts and feasts

Islamic fast, also known as Sawm, is abstaining from eating and drinking during daylight hours. During Ramadan, all Muslims desist from both eating and drinking from dawn to sunset and refrain from smoking, taking oral medications, and sexual activities.¹⁴ Followers consume a high caloric food at iftar (evening meal after breaking the fast), and at suhur (meal consumed early in the morning). Similarly, during Eid-ul-Fitr, the festival of breaking the fast after Ramadan, Muslims celebrate with eating and drinking.¹⁵

Jain fasts and feasts

Jain people do fast at special times during festivals and on holy days.⁴ In Jainism, “Paryushan” is the most observed festival during monsoon, which lasts eight days in Svetambara Jains and ten days in Digambar Jains.

REVIEW ARTICLE:

JOURNAL OF THE ASSOCIATION OF PHYSICIANS OF INDIA.

-PUBLISHED ON SEPTEMBER 2019

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Received: 18.05.2018; Accepted: 22.05.2019

OBJECTIVES:

- Abstract
- Introduction
- Methodology
- Types of fasting
- Challenges
- Breaking of fast
- Patient monitoring
- Diabetes complications
- Management of diabetes during fasting and feasting
- Management of T1DM and T2DM
- Special populations
- Conclusion
- Executive summary

ABSTRACT:

- Fasting and feasting are the integral part of many religions and cultures. As the amount of food and fluid intake are markedly altered during these phases, patients with diabetes are prone to higher risk of complications.
- Even though several guidelines for fasting and feasting are available, Indian specific recommendations are the need of the hour, because of the distinct dietary habits and diet content (high carbohydrate) of Indians.
- To fill this void, the current guidelines have been developed by experts from India who extensively reviewed the literature, shared their practical knowledge and ultimately arrived at a consensus.

INTRODUCTION:

- The international diabetes federation(IDF) in their current report states that approximately 73 million people with diabetes are living in India.
- Data from multi- country studies, including India, report that around 79-94% of muslims with type-2 diabetes mellitus undergo fasting during Ramadan for atleast 15days.
- It is evident that people with type-2 diabetes observe fasting or feasting during various festivals in India, hence management of diabetes during these phases becomes extremely important.

Methodology:

- In the process of literature search, various MeSH keywords including fasting, feasting, hypoglycemia, hyperglycemia, Ramadan, diabetes, etc have been used.
- Existing guidelines, meta-analysis, systematic reviews, randomized controlled trials, non-RCTs, and key articles related to diabetes management were reviewed.

Types of fasting:

- Hindu fasts and feasts:

Fasts:- karva chauth, Guru poornima,ekhadasi, Pradhosha, Navratras.

Feasts:- Diwali, Pongal, Dasera, Holi.

- Islamic fasts and feasts:

Fasts:- sawn, is abstaining from eating and drinking during day light hours.

Ramadan, Ifthar, Suhur, Eid-ul-fitr.

- Jain fasts and feasts:

Paryushan, Ratri bhojan tyag.

- Buddhists fasts and feasts:

Vassa or Buddhist lent is the fast and feast observed by buddhists for 3 lunar months every year in the rainy season. Fast for 12hrs(noon to mid night) and feast for 12hrs(mid night to noon).

- Christians, Sikhs, Parsis.

Risk population:

- It is important to stratify patients into different risk categories according to their comorbid status, continued medication, health status, etc...

Challenges:

- Hyperglycemia, Hypoglycemia, Dehydration, DKA, Microvascular and macrovascular problems may create challenges.
- Taking Insulin and other OADs without any dose adjustments during fasting period increases the risk of complications.
- In spite of ill health, some people do fast .
- During fasting, alteration of physical and mental health, especially in elder and comorbid patients with diabetes, places them at great risk of complications.
- Due to irregular food habits some patients may miss their usual medication dose.
- Poor monitoring of diabetes complications, and blood sugar, specifically in rural areas pose a significant risk.

Table 2: Management of diabetes complications (hypoglycaemia, hyperglycaemia, diabetic ketoacidosis, and dehydration) during fasting and feasting period (Akbari F, 2005; Kalra S, 2015)

Lifestyle modification	<ul style="list-style-type: none">○ Attend pre-fast counselling and learn the warning symptoms of hyperglycaemia and hypoglycaemia○ Strict adherence to the diabetic diet○ Take medication regularly as per instruction○ Do not overeat after the fast is broken and minimize eating sweet or fatty foods○ Record weight daily and inform doctor of gains or loss of more than 2kg○ If a complication occurs, break the fast immediately and seek medical help○ Patients/family should be aware of potential problems and alert their doctor immediately○ Serving of meal supplements may be added to pre-fast meals or intra fast liquids, to prevent hypoglycaemia
Frequent blood glucose monitoring	<ul style="list-style-type: none">○ Test blood glucose regularly especially patients on insulin therapy during prolonged fasting like Ramadan, Navratri, and Vaasa etc.○ Test blood glucose before and 2 hours after Iftar, before Suhur and at mid-day○ Frequent SMBGs testing should be introduced
Exercise	<ul style="list-style-type: none">○ Normal levels of physical activity may be maintained. However, excessive physical activity may lead to higher risk of hypoglycaemia and should be avoided
Breaking the fast	<ul style="list-style-type: none">○ If the blood glucose level is <70 mg/dL (3.9 mmol/L) or >300 mg/dL (16.7 mmol/L) and/or development of diabetes complication, the fast should be broken○ After breaking the fast due to hypoglycaemia, patients should consume a little amount of a fast-acting carbohydrate diet
Medication	<ul style="list-style-type: none">○ Patients taking insulin and sulfonylureas should be closely monitored for hypoglycaemia○ SGLT-2 inhibitors should not be used in elderly and frail patients and those residing at hot & humid conditions○ Dose modification should be done as per individual patients risk and the preference

Breaking of fast:

Literature and guidelines advocate that patients with diabetes should break their fast if:

- Blood glucose level is <70 mg/dl (3.9 mmol/l) or >300 mg/dl (16.7 mmol/l).
- Symptoms of hypoglycemia, hyperglycemia, dehydration or acute illness develop
- Patients taking insulin, or on any other OHA, if the blood glucose levels fall < 70 mg/dl in the first few hours after the start of fast.
- Patients suddenly feeling unwell.
- Dramatic changes in their blood glucose profile during fasting period.

Patient monitoring

Patients who are at higher risk of diabetes associated complications, should be monitored regularly.

- Those on insulin therapy
- Ill and comorbid patients
- Patients treated with OADs especially metformin, glibenclamide
- Patients with T1DM.

DIABETES COMPLICATIONS:

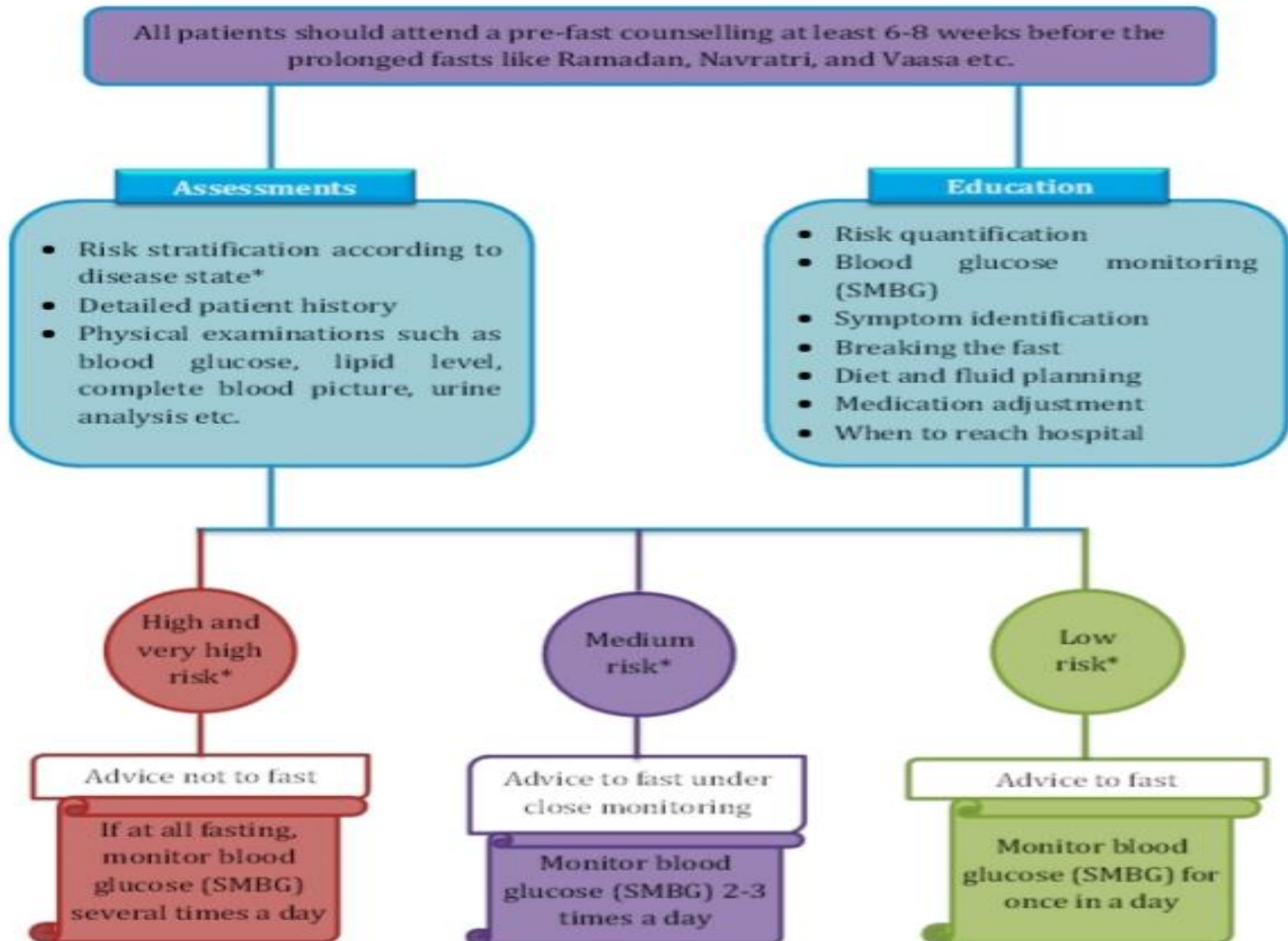
The population based epidemiology of diabetes in Ramadan (EPIDAR) study report that fasting increases the risk of severe hypoglycemia (defined as hospitalisation due to hypoglycemia) by 4.7-fold in patients with T1DM (from 3 to 14 events/100 people /month) and 7.5-fold in patients with T2DM (from 0.4 to 3 events/100 people/month).

There was a 5-fold increase in incidence of severe hyperglycemia (requiring hospitalisation in T2DM (from 1 to 5 events/100 people/month) and an approximately 3-fold increase in T1DM (5-17 events/100 people/month) as reported by extensive EPIDAR study.

Management of diabetes during fasting and feasting:

- Pre-fast medical assesment/counselling
- Structured diabetes education:

The health care professionals should be sufficiently trained to deliver a structured patient education to patients and family members inclusive of blood glucose monitoring, nutritional advice, exercise advice, dosage, timing of medications, their adjustments, symptoms of complications and their management, and knowing when to break the fast in order to reduce the complications.



*For stratification of the risk of diabetes patients, please follow table 1 in this document

Adapted from: Hassenein M, 2017

Fig. 3: Patient flow chart for assessment, risk stratification, education and physician decision before prolonged fasting

Management of T1DM:

- Patients with T1DM have been considered as a very high risk group for fasting in various guidelines and literature.
- Evidence suggests that fasting for 25hrs is safe and can be observed by patients with T1DM.
- The south Asian consensus guideline on insulin use during Ramadan advocates that once or twice daily injections of intermediate or long-acting insulin along with pre-meal rapid-acting insulin can be safely used in patients during fasting.

Management of T2DM:

- Non-pharmacological management:
 life style modification, physical activity, and yoga.
- Nutrition plan:

Pre-fast meal should be composed of complex carbohydrates with low glycemic index and proteins such that it can provide enough slow release calories to take care of the fasting period; unprocessed cereals, fruits, nuts, and lentils can be used in the pre-fast meals. In contrast post-fast meal should be composed of simple carbohydrates like bread, cereals, rice, mango, pasta and artificial syrup.

Adequate water and fluids must be taken prior to the fast especially in cases where fluid intake will be restricted through out the day.



Adapted from: Sadikot S, 2017

Fig. 4: The nutrition plan (food plate) for patients with diabetes during the fasting period. The plate demonstrates the individual daily caloric intake, percentage of carbohydrate, fat and proteins that can meet the cultural setting and food preference of each individual

• Pharmacological management:

Table 3: Approach to adjustment or modification of continued antidiabetic medications in patients with diabetes during fasting period (IDF 2016, Sadikot S 2017, Kalra S 2015, Jhulka S 2017, and Latt TS & Kalra S 2012)

Anti-diabetic agents	Muslim fast	Hindu fast			Jain fast	Buddhist fast		
	Prolonged	Infrequent but brief	Infrequent but prolonged	Frequent	High-risk	Low-risk		
	Ramadan	Karva chauth	Navratri	Somvaar, Mangalvaar	Tiwihar upavas, Upavas, Bela (Chhath), Tela (Astham)	Byasana, Ekasana, Ratri Bhojan Tyag	Vaasa	
Metformin	<ul style="list-style-type: none"> Once daily: take at Iftar Twice daily: take at iftar & suhur Thrice daily: take 2/3rd of the total daily dose at the iftar and 1/3rd at the suhur 	<ul style="list-style-type: none"> Once daily: take at night Twice daily: take at morning and night Thrice daily: omit the lunch dose and follow above 	<ul style="list-style-type: none"> Once daily: take at night Twice daily: take at morning and night Thrice daily: take 2/3 of the total daily dose at night and 1/3 at the morning 	<ul style="list-style-type: none"> Once daily: take at night Twice daily: take at morning and night Thrice daily: omit the lunch dose and follow above 	<ul style="list-style-type: none"> Once daily: take at night Twice daily: take at morning and night Thrice daily: omit the lunch dose and follow above 	Omit the therapy on the day of fast	No change required	No change required
Sulfonylureas*	<ul style="list-style-type: none"> Once daily: take at iftar Twice daily: take ½ of usual evening dose with the suhur and the usual morning dose with the Iftar 	<ul style="list-style-type: none"> Once daily: take at dinner Twice daily: omit the morning dose in absence of breakfast 	<ul style="list-style-type: none"> Once daily: take at dinner Twice daily: omit the morning dose 	<ul style="list-style-type: none"> Once daily: take at dinner Twice daily: omit the morning dose 	<ul style="list-style-type: none"> Omit the therapy on the day of fast 	Avoided, or taken in half dose at night	Full dose at morning and half dose at night	<ul style="list-style-type: none"> Once daily: take at morning Twice daily: take 2/3rd at morning
DPP-4 inhibitors	<ul style="list-style-type: none"> No dose adjustments is required 	<ul style="list-style-type: none"> No change, take at dinner 	<ul style="list-style-type: none"> No change, take at dinner 	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> No change 	Omit the therapy on the day of fast	Taken at night	<ul style="list-style-type: none"> No change
SGLT-2 inhibitors†	<ul style="list-style-type: none"> No dose adjustment is required and the dose be taken with iftar 	<ul style="list-style-type: none"> No change, take at dinner 	<ul style="list-style-type: none"> No change, take at dinner 	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> No change 	Omit the therapy on the day of fast	Evening dose avoided, or taken in half dose	<ul style="list-style-type: none"> No change

Pioglitazone	<ul style="list-style-type: none"> No dose adjustments is required 	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> No change, or 2/3rd take at dinner 	<ul style="list-style-type: none"> No change 	No change	No change required	<ul style="list-style-type: none"> No change
AGIs	<ul style="list-style-type: none"> No dose adjustments is required 	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> No change 	Omit the therapy on the day of fast	No change required	<ul style="list-style-type: none"> No change
GLP-1 analogues	<ul style="list-style-type: none"> The dose should be titrated 6 weeks prior to Ramadan and no dose adjustment is required 	<ul style="list-style-type: none"> Reduce the dose to 1/2th and take at dinner 	<ul style="list-style-type: none"> The dose should be titrated prior to Navratri 	<ul style="list-style-type: none"> No change or reduce the dose to 1/2 	Once weekly dose: No change (postpone due dose still the completion of fasting)	No change required	
Long-acting insulin	<ul style="list-style-type: none"> Once-daily: ↓ dose by 15-30% and take at iftar Twice daily: Take usual morning dose at iftar & ↓ evening dose by 50% and take at suhur 	<ul style="list-style-type: none"> Need no change or may reduce the dose to 2/3rd 	<ul style="list-style-type: none"> Need no change or may reduce the dose to 2/3rd 	<ul style="list-style-type: none"> reduce the dose to 2/3rd 	25% reduction in dose	10-20% reduction in dose	Once daily, before the main meal of 24 hour period
Short-acting insulin	<ul style="list-style-type: none"> Take normal dose at iftar and lunch dose at dinner ↓ suhur dose by 50% 	<ul style="list-style-type: none"> Reduce the dose to 1/2th 	<ul style="list-style-type: none"> Reduce the dose to 1/2th 	<ul style="list-style-type: none"> Reduce the dose to 1/2th 	1 bolus	2 bolus	Reduce the dose to 1/2 th
Premixed insulin	<ul style="list-style-type: none"> Once daily: Take normal dose at iftar Twice daily: Take 1/2 of evening dose with suhur and the usual morning dose with the iftar Thrice Daily; Omit afternoon dose and adjust iftar and suhur doses 	<ul style="list-style-type: none"> 30:70 or 25:75: reduce the dose to 2/3rd 50:50: reduce the dose to 1/2th 	<ul style="list-style-type: none"> 30:70 or 25:75: reduce dose to 2/3rd 50:50: reduce the dose to 1/2th 	<ul style="list-style-type: none"> reduce the dose to 2/3rd and prefer 30:70 or 25:75 	30:70 at night or 50:50 at day	50:50 once daily	Can be given once daily, before the main meal of the 24 hour period

AGIs, alpha-glucosidase inhibitors; DPP-4, dipeptidyl peptidase-4; SGLT-2, sodium-glucose co-transporter-2; *Gliclazide and glimepiride should be preferred among all other sulphonylureas † Elderly patients, patients with renal impairment, hypotensive individuals, those at risk of dehydration or those taking diuretics should not

- Metformin:

metformin can be safely used during fasting periods due to minimal chances of hypoglycemia.

However patients who are taking metformin during lunch time should omit the dose ,during day fasting, morning dose can be taken as usual but, a large dose should be taken after breaking the fast to avoid hyperglycemia.

- Sulfonylureas:

Evidence advocate that gliclazide, among all the SUs, is associated with good glycemic control with lesser hyperglycemia.

A systematic review and network meta analysis of RCTs reports that gliclazide compared to other SUs, is associated with lower risk of all cause and cardiovascular related mortality in patients with T2DM.

Gliclazide is safest during fasting periods in Indian Patients.

Moreover, Glibenclamide should be avoided and other SUs, should be used with caution during fasting period.

- DPP-4 inhibitors: vildagliptin and sitagliptin are the mostly used DPP-4 inhibitors in the studies during the fasting period.

- SGLT-2 inhibitors:

They can be safely used in the treatment of T2DM during fasting due to low risk of hypoglycemia; however fasting for long period without taking fluids may aggravate risk of hypotension and dehydration associated with these agents.

Their usage should be restricted in patients at high risk of complications including elderly patients, patients with renal impairment, hypotension individuals, and those at risk of dehydration or taking diuretics.

- Thiazolidinediones:

Thiazolidinediones(pioglitazone) may used during fasting period due to low risk of hypoglycemia;however weight gain is a concern.

- Alpha-glucosidase inhibitors:

Acarbose, miglitol,and voglibose can be safely used without any dose adjustment.However ineffectiveness as monotherapy and concerns regarding the GI sideeffects reduces their applicability in T2DM patients during fasting period

- GLP-1 RECEPTOR AGONISTS:

Liraglutide,exanatide,albiglutide,lixisenatide and dulaglutide . Important advantage associated with these agents is low risk of hypoglycemia and weight loss.

GI upset was common with the usage of liraglutide.

- Insulins:

many T2DM patients use insulin as a treatment option. However, the higher risk of hypoglycemia and multiple injections reduces its usage in T2DM patients especially during the fasting period.

insulin analogues (basal, prandial and premix) are generally recommended over regular human insulin due to a number of advantages, including lower rates of hypoglycemia.

Special populations:

- Pregnant women, children, elderly, patients with comorbidities and poorly controlled T1DM are group of patients requiring special attention during fasting and feasting period.
- Pregnant women with diabetes are generally are managed with insulin preparations during the fasting period.
- Elderly patients who wish to fast for a prolonged period are at increased risk of hypoglycemia, hyperglycemia and metabolic decompensation including hyperosmolar coma, DKA, Dehydration and thrombosis.
- SGLT2 inhibitors should not be used in this group due to risk of dehydration and volume contraction.

Table 4: Studies investigating efficacy and safety of antidiabetic agents during fasting

Author et al.	N	Intervention	Outcomes/conclusion
Randomized clinical trials			
Azar S T et al. 2016 ⁴¹	343	Liraglutide vs sulphonylureas (gliclazide, glimepiride, glipizide, glibenclamide): outcomes	<ul style="list-style-type: none"> • Similar \downarrow in fructosamine levels were observed for both groups during Ramadan: (liraglutide, $-12.8 \mu\text{mol/L}$; sulphonylurea, $-16.4 \mu\text{mol/L}$; $p = 0.43$) • No severe hypoglycemic episodes were reported by either group • More subjects in the glibenclamide stratum (14.8%) experienced hypoglycemic episodes than in the glimepiride/gliclazide/glipizide stratum (9.8%)
Hassanein M 2014 ⁴²	557	Vildagliptin (A) vs gliclazide (B) + metformin: Hypoglycemic events	<ul style="list-style-type: none"> • Confirmed hypoglycemia (A vs B): 3.0% vs 7.0% ($p = 0.039$) • Adjusted mean change pre- to post-Ramadan in HbA1c (A vs B): $0.05\% \pm 0.04\%$ vs $-0.03\% \pm 0.04\%$ ($p = 0.165$). • Adjusted mean \downarrow weight: $-1.1 \pm 0.2 \text{ kg}$ ($p = 0.987$) for both group • No significant change in any parameter found in either group
Malha LP 2014 ⁴³	69	Vildagliptin vs sulphonylureas (Glimepiride/ gliclazide): hypoglycemia event	<ul style="list-style-type: none"> • HbA1c from baseline to the last visit was similar for both groups • Hypoglycemic events was not statistically significant ($p = 0.334$) between the groups • Vildagliptin may be a better agent than sulphonylureas
Brady EM et al. 2014 ⁴⁴	99	Liraglutide (A) vs sulphonylureas (B) (gliclazide, glipizide or glibenclamide):	<ul style="list-style-type: none"> • There were no episodes of severe hypoglycemia in either group, however, self-recorded episodes of blood glucose $\leq 3.9 \text{ mmol/L}$: $A < B$ ($p < 0.0001$) • Change in HbA1c 3 weeks post-Ramadan: $A > B$; $\downarrow 0.54\%$ vs $\downarrow 0.27\%$ ($p = 0.03$) • Body weight 3 weeks post-Ramadan: $A > B$; $\downarrow 2.23 \text{ kg}$ vs $\downarrow 0.42 \text{ kg}$ ($p = 0.02$)
Aravind SR 2012 ⁴⁵	870	Sitagliptin (A) vs sulphonylureas (B) (Glimepiride/ gliclazide/ glibenclamide) \pm metformin: overall incidence of symptomatic hypoglycemia	<ul style="list-style-type: none"> • Hypoglycemic events in Indian patients (A vs B): 4.1% vs 7.7% (Gliclazide $<$ glimepiride $<$ glibenclamide; $1.8\% < 5.2\% < 9.1\%$) • No patient discontinued treatment and no events required medical assistance

Al Sifri S 2011 ⁴⁶	1066 Sitagliptin vs sulphonylureas(Glimepiride/ gliclazide/ glibenclamide): overall incidence of symptomatic hypoglycemia	<ul style="list-style-type: none"> • Risk of symptomatic hypoglycemia: Sitagliptin, 6.7%; gliclazide, 6.6%; glimepiride, 12.4%; glibenclamide, 19.7% • No reported events that required medical assistance or were considered severe during Ramadan • The incidence of hypoglycemia was lower with gliclazide relative to the other sulphonylureas and similar to that observed with sitagliptin
Observational studies		
Shete A et al. 2013 ⁴⁷	97 Vildagliptin vs sulphonylureas (Glimepiride/ gliclazide/ glibenclamide/ glipizide)	<ul style="list-style-type: none"> • Hypoglycemic episodes were reported in low frequencies in both the vildagliptin and the sulfonylurea groups [0 vs 2 patients, respectively] • HbA1c lby -0.43% in the vildagliptin group (P = 0.009) while 10.01% in the sulfonylurea group (P = 0.958) • Both treatment groups were well tolerated during Ramadan
Aravind S R 2011 ⁴⁸	1378 Glimepiride/ gliclazide/ glibenclamide ± metformin: overall incidence of symptomatic hypoglycemia	<ul style="list-style-type: none"> • Symptomatic hypoglycemia drug wise: glibenclamide, 25.6%; glimepiride, 16.8%; gliclazide, 14.0% • Symptomatic hypoglycemia country wise: Israel, 40%; Malaysia, 24%; UAE, 18%; India, 13%;Saudi Arabia, 10%
Zargar AH 2010 ⁴⁹	136 Gliclazide MR 60 mg monotherapy, switched to evening administration of the same dose during Ramadan	<ul style="list-style-type: none"> • lMean FPG by 0.01 mmol/l (p = 0.3) with evening medication by the end of the fast. • Hypoglycemic episodes: before Ramadan, 3.7%, ; during, 2.2%; after Ramadan, 1.5% • Gliclazide evening administration safely maintains glycemic control during the fast
Sari et al, 2004 ⁵⁰	40 Repaglinide vs sulphonylureas (glimepiride & gliclazide): outcomes	<ul style="list-style-type: none"> • Only 1 hypoglycemic event reported in glimepiride patient • ltriglyceride levels from BL: Repaglinide (p=0.024), SU (p=0.002) • lHDL-cholesterol from BL: Repaglinide (p=0.022)

l, decrease/reduction; l, increase/elevated; BL, baseline; FPG, fasting plasma glucose; HbA1c, glycated haemoglobin; HDL, high density lipoprotein; UAE, United Arab Emirates

Conclusion:

The panel concludes that appropriate lifestyle modifications including physical activity, nutrition plan, prefast counseling and structured diabetes education plan along with proper treatment dose adjustment or modification are important to ensure a safe fasting or feasting period.

Executive summary:

- A structured diabetes education should be planned for patients with diabetes along with their family members in order to observe a safe fasting.
- Patient with diabetes should break their fast if the blood glucose level is <70 mg/dL (3.9 mmol/L) or >300 mg/dL (16.7 mmol/L) or when complications develop.
- Patients with stable T2DM can undergo fasting safely; however, their frequency and dose of medications need to be adjusted or modified.
- Metformin can be safely used during fasting, however, some dose modification might be required.
- Hypoglycaemia is the major concern associated with SUs. However, gliclazide in this class has lowest risk of hypoglycaemia and CV complications with higher glycaemic efficacy. Moreover, owing to its low cost, gliclazide can be widely used in Indian population during the fasting period.

- DPP-4 inhibitors like vildagliptin and sitagliptin can be used during fasting; however higher cost might restrict their use in Indian population.
- The SGLT-2 inhibitors should be cautiously used in elderly and frail patients due to their volume contraction, infection and dehydration effects.
- Thiazolidinedione and alpha-glucosidase inhibitors can be safely used; however weight gain and GI upset are the respective complications that indicate treatment individualization.
- GLP-1 receptor analogues can be used safely during fasting because of their weight loss effect and low risk of hypoglycaemia, however, high cost, GI side effects, and injectable nature reduces their applicability, especially during fasting.
- Insulin requires dose modification during the fasting period. Patients who are using insulin should be strictly monitored for hypoglycaemic complications.

MY VIEWS:

- Patients with diabetes and undergoing fasting should share their experience related to physical and mental health, symptoms, complications, steps taken to prevent complication and about their quality of life during the fasting period.
- Patients who are using the insulin should practice the SMBG monitoring system and communicate their readings to physicians regularly in order to reduce the risk of complications.

Thank you