RSSDI Indian Diabetes

EDUCATOR JOURNAL

Theme of the Month

Monsoon and Diabetes Care

To keep Members of Diabetes Care team abreast about
DSME/DSMS - (Diabetes Self management Education/Support) Concepts

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*DSME: Diabetes Self-Management Education, DSMS: Diabetes Self-Management Support

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RSSDI Indian Diabetes EDUCATOR JOURNAL

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To keep the members of diabetes care team abreast with DSME and DSMS concepts

FOREWORD

Research Society for the Study of Diabetes in India (RSSDI) founded by Prof. MMS Ahuja in the year 1972 is the biggest scientific association of healthcare professionals involved in promoting diabetes education and research in India. RSSDI is happy to collaborate with USV to support their endeavour to make India the 'Diabetes care capital of the world'. Through this collaboration, RSSDI would like to strengthen the cadre of diabetes educators by empowering them with recent updates in diabetes management helping bridge the gap between the physician and the patient. Today, the rule of 50% is prevailing in terms of awareness, detection, treatment and control in T2DM. Our aspiration is to achieve 90-90-90-90 i.e.90% of people with diabetes should be made aware, 90% should be detected, 90% of those detected should be treated, and 90% of those treated should reach their goals.

Indian Diabetes Educator Journal (IDEJ) is the first of its kind in India, and the longest running monthly diabetes educator journal since April 2015 and continues its endeavour to spread awareness, knowledge and enable healthcare teams to manage individuals with diabetes and empower them for self-care. RSSDI IDEJ will continue to keep the members of diabetes care team abreast with concepts of Diabetes Self-Management Education/Support (DSME/S) with a reach of 44000 doctors and diabetes educators digitally.

As the monsoon season sets in, it brings unique challenges for individuals with diabetes. This edition of IDEJ focuses on the theme "Monsoon and Diabetes Care" highlighting how seasonal changes can impact blood glucose control, physical activity, and overall diabetes management. From dealing with increased infections and foot care concerns to managing fluctuations in mood and physical activity due to weather changes, this issue explores practical strategies to support people with diabetes during the rainy season. It aims to equip diabetes educators with actionable insights to provide personalized care for individuals with diabetes throughout the monsoon.

We sincerely thank our contributors for making this issue delightful reading for our readers. We dedicate this journal to all the healthcare professionals who are working relentlessly towards making "India–The Diabetes Care Capital of the World."

Sincere Regards,

Dr. Sanjay Agarwal
RSSDI Secretary

*DSME: Diabetes Self-Management Education, DSMS: Diabetes Self-Management Support

Expert Contributors of the month

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Article: Drizzles, Downpours, and Diabetes: A Rain-proof Health Guide

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Article: Rainy Season Health Alert: Managing Infections in Diabetes

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Article: Managing Monsoon Blues in Diabetes

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Article: Rainy Season Food Safety: A Practical Guide

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Article: Research Highlights: Expert Insights: Interview with Dr. J. S. Kumar

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Article: Interpreting Blood Reports: CBC-RBC Morphology

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Article: Staying Active Indoors with Diabetes

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Article: Melioidosis in Diabetics: Risk Factors and Care

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Article: Diabetes Educator's Toolkit: Skill of the Month – Questioning

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Article: Frequently Asked Questions on Monsoon and Diabetes Care

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RSSDI Indian Diabetes
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The monsoon season offers a refreshing break from the heat, but it also presents distinct health challenges for individuals living with diabetes. From fluctuating blood glucose levels to a heightened risk of infections, particularly in the feet, the rains demand extra vigilance. Here's a comprehensive, rain-proof health guide to managing diabetes during the monsoon.

1. Watch your plate and portion: During the monsoons, many people tend to indulge in fried snacks and high-calorie comfort foods. Reduced outdoor activity due to incessant rains can exacerbate weight gain and insulin resistance, leading to elevated glucose and glycated hemoglobin (HbA1c) levels. One study reported a seasonal variation in HbA1c levels, with monsoon months showing increased values, likely due to decreased physical activity and dietary indulgences.

- Opt for healthier cooking methods like baking, steaming, or grilling instead of deep-frying.
- Limit portion sizes to enjoy fried snacks, and always pair them with protein or fiber to balance carbohydrate intake.
- Avoid street food intake to reduce the risk of gastrointestinal infections.

2. Maintain physical activity indoors: Physical activity often takes a backseat during rainy days, but movement is crucial for blood glucose control.

- Practice indoor walking, yoga, or online fitness routines. 10 minutes of continuous stair climbing and descending has also been shown to improve post-meal glucose response.
- Use simple tools like resistance bands or light weights.
- Keep a fixed routine to stay consistent, even on gloomy days.

3. Guard against infections – Especially in the feet: Wet and humid conditions increase the risk of fungal infections and foot ulcers, especially in people with diabetes, who already have reduced peripheral sensation. People with diabetes are reported to have an increased infection-related hospital admissions during the monsoon season.

- Keep feet dry and clean; inspect them daily for cuts, blisters, or signs of infection.
- Avoid walking barefoot, even indoors.
- Use antifungal powders and wear breathable, waterproof footwear.

4. Prioritize hygiene and immune support: The monsoon season is associated with a spike in infections, including flu, gastroenteritis, and skin conditions. Make sure to include immune-boosting foods such as turmeric, ginger, garlic, vegetable soups, and citrus fruits in the diet.

5. Monitor blood sugar regularly: Unusual weather patterns and diet changes can affect glucose levels.

- Check blood glucose more frequently, especially if feeling unwell.
- Record readings and note any patterns or changes.
- Stay in touch with your healthcare provider for timely adjustments to medications.

6. Emergency preparedness: Monsoons can disrupt access to pharmacies and clinics.

- Stock up on medicines, insulin, testing strips, and essentials.
- Keep emergency contact numbers handy.
- Store medications in a cool, dry place to avoid spoilage.

Managing diabetes during the monsoon is about preparation, awareness, and adaptation. By making smart food choices, staying active indoors, and being vigilant about infections and blood glucose levels, one can enjoy the season safely and comfortably. Let the rain pour, but don't let it dampen your health goals!

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3. Bellini A, Nicolò A, Rocchi JE, *et al.* Walking Attenuates Postprandial Glycemic Response: What Else Can We Do without Leaving Home or the Office?. *Int J Environ Res Public Health.* 2022;20(1):253. doi:10.3390/ijerph2001025

Rainy Season Health Alert: Managing Infections in Diabetes

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The monsoon season, characterized by high humidity, fluctuating temperatures, and increased environmental contamination, is linked with an elevated risk of infectious diseases. Elevated glucose levels in diabetes significantly increase the risk of infections due to multifactorial immune dysfunction. A large study found that diabetes accounts for approximately 6% of infection-related hospitalizations and 12% of infection-related deaths. Microvascular complications such as neuropathy increase the risk of unnoticed skin injuries, while impaired vascular flow hampers immune cell delivery and tissue healing, promoting progression and recurrence of infections and ulcers due to poor healing.

Vector-borne infections in monsoon: Monsoon-related climatic changes increase the risk of vector-borne diseases by enhancing vector breeding and shortening the incubation period of pathogens. This facilitates the transmission of malaria, dengue, and chikungunya by mosquitoes. These infections, usually characterized by fever, myalgia, and thrombocytopenia, can have a more severe clinical course in diabetes. Fever-induced anorexia and low caloric intake can lead to hypoglycemia in patients on insulin or sulfonylureas, necessitating frequent monitoring and therapy adjustment.

Water-borne and food-borne infections in monsoon: Monsoon-related contamination of food and water significantly heightens the risk of infections. Food-borne infections like enteric fever, botulism, hepatitis, campylobacteriosis, and water-borne infections like cholera, shigellosis, leptospirosis, and schistosomiasis are quite common. In people with diabetes, such infections may precipitate dehydration, electrolyte imbalances, and acute hyperglycemic crises like diabetic ketoacidosis (DKA), hyperosmolar hyperglycemic state (HHS), and altered counterregulatory hormonal activity during illness.

Fungal and bacterial skin infections: Increased humidity promotes overgrowth of candida species and dermatophytes, leading to cutaneous fungal infections, particularly in intertriginous areas. Additionally, maceration of skin and poor foot hygiene may predispose people with diabetes to bacterial skin infections such as cellulitis, which can progress to limb-threatening diabetic foot if not addressed promptly. Preventive foot care and daily inspection are crucial in reducing morbidity.

Respiratory tract infections: Damp conditions can worsen mold and dust mite exposure, triggering respiratory infections or allergies. People with long-standing diabetes or poorly controlled blood glucose levels may face severe lower respiratory tract infections, requiring close monitoring.

Infection management in diabetes

1. **Blood glucose and ketone monitoring:** Infections can raise blood glucose levels, and hence, frequent glucose and ketone testing is essential. Monitoring of urine (urine routine and microscopy test) is essential for those on sodium-glucose co-transporter (SGLT) inhibitors, and sick day rules should include hydration, continued medications, and insulin adjustments under supervision as required.

2. **Adequate hydration and nutrition:** Adequate fluid intake and balanced meals help in avoiding dehydration and hypoglycemia. Oral rehydration solution (ORS) can be used in case of vomiting and diarrhea.
3. **Hygiene and preventive measures:** Immunizations, safe drinking water, hand hygiene, and avoiding street food can help in preventing infections.
4. **Vector control:** Using mosquito nets, repellents, and removing stagnant water helps prevent diseases like malaria and dengue. Wear full-sleeved clothing outdoors.
5. **Foot care:** Keeping feet dry, wearing protective footwear, and daily inspection of feet for injuries or infections can prevent the incidence of diabetic foot.

An integrated approach combining glycemic management, prevention strategies, patient education, and early clinical intervention is essential to minimize monsoon-related complications in diabetes. Use of anti-hyperglycemic agents like insulin and metformin can significantly reduce the risk of infection.

Key points

- The monsoon season increases infection risks for people with diabetes, including vector-borne, water-borne, food-borne, fungal, bacterial, and respiratory infections.
- Diabetes complications like poor circulation and neuropathy raise infection severity, requiring regular blood glucose checks and proper foot care.
- Preventive measures such as hygiene, immunizations, and vector control are key to managing monsoon-related infections in diabetes.

Resources:

1. Zhou K, Lansang MC. Diabetes Mellitus and Infection. [Updated 2024 Jun 30]. In: Feingold KR, Ahmed SF, Anawalt B, *et al.*, editors. *Endotext [Internet].* South Dartmouth (MA): MDText.com, Inc.; 2000. Available from: https://www.ncbi.nlm.nih.gov/books/NBK569326/
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3. Asha, Ch & Raju, Kiran & Sri, Prof & Fellow, Post & Chaduvula, Dr. (2019). Studies on Seasonal Diseases and Preventive Measures. 309–313

Managing Monsoon Blues in Diabetes

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Fluctuating weather, increased humidity, and changes in daily routines can all impact glycemic control in diabetes. Understanding these conditions and adopting proactive strategies is essential for effective diabetes management during the monsoon.

How monsoon affects diabetes management

- **Glycemic variability:** Seasonal changes, including the monsoon, can influence blood glucose trends. Studies using continuous glucose monitoring have shown that glycemic control often worsens during colder and wetter months, likely due to changes in physical activity, sun exposure, sleep, and mood.
- **Infections and illness:** The monsoon increases the risk of infections (flu, respiratory illnesses, water-borne diseases), which can affect blood glucose levels and complicate diabetes management.
- **Mental health:** Weather changes and reduced sunlight can affect mood, potentially leading to "monsoon blues" or seasonal affective symptoms, which may further impact self-care and glycemic control.

Practical tips for managing monsoon blues in diabetes

- **Exercise indoors:** Adapt routines to indoor settings like yoga, stretching, or stationary cycling. Recreational activities such as dancing or walking at home while listening to favorite music can boost mood and help manage glucose levels.
- **Stay connected:** Regularly interact with friends and family to reduce feelings of isolation and low mood.
- **Relax and unwind:** Engage in activities that promote relaxation and reduce stress, such as meditation, deep breathing, or enjoyable hobbies.
- **Bright light therapy:** Especially using a light therapy lamp in the morning can help regulate mood and circadian rhythms and may ease depression symptoms by boosting serotonin.

- **Prioritize sleep:** Maintain a regular sleep schedule. Quality sleep helps you stay motivated and energized, even on gloomy, rainy days.

Managing diabetes during the monsoon requires vigilance, adaptability, and proactive planning. By understanding the seasonal challenges and implementing targeted strategies, people with diabetes can minimize risks and maintain optimal health throughout the rainy season.

Key points

- Stay active indoors with yoga, dancing, or home workouts to manage glucose levels despite rainy-day inactivity.
- Boost mental well-being by staying socially connected, using light therapy, and maintaining good sleep to fight monsoon blues.
- Prevent infections and fluctuations by staying vigilant with hygiene, medication, and regular glucose monitoring.

Resources:

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Rainy Season Food Safety: A Practical Guide

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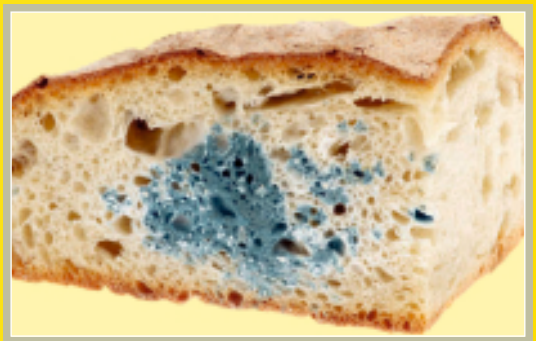
The high levels of humidity and moisture during the monsoon season create the perfect conditions for the growth of microorganisms, particularly bacteria and fungi. Due to quick microbial contamination of food items, the risk of infections and foodborne diseases increases. The Food Safety and Standards Authority of India (FSSAI) highlights that strict food safety procedures are necessary because of the increased risk of food contamination and gastrointestinal disorders during the monsoon season. These include:

- Produce should be washed properly before cooking.
- Potable water should be used to completely clean raw meats, fresh fruits, and vegetables.
- Limiting microbial growth is achieved by post-wash drying and storing well in paper bags in the refrigerator.
- To avoid exposure to pathogens, cut fruits and salads must be eaten right away.

Safe practices for consumption



- Steer clear of outside street food, since it may be contaminated with germs.
- Products from bakeries, such as bread, pav, toast, etc., are extremely perishable and prone to mold growth in moist environments.

Hygiene in the kitchen

- It's essential to clean kitchenware and surfaces both before and after preparing food.
- Contamination is reduced by using hot water and disinfectants to clean floors and utensils.
- It is recommended to clean the refrigerator often and to avoid overstocking to stop microbial growth and spoilage.

Personal cleansing

- Contamination hazards are decreased by maintaining personal hygiene, which includes washing hands properly, cutting nails, and wearing clean clothes.
- Because of the higher danger of water-borne diseases during the monsoon, it is imperative to drink boiled or filtered water.

Safe food storage and cooking

- To lower microbiological dangers, every food should be eaten fresh.
- Avoid eating raw salads and disinfect leafy vegetables with salt water.
- Perishables and cooked food should be promptly refrigerated and reheated before consumption.
- Eggs and raw meat should be kept apart to prevent cross-contamination.

Dry ingredient storage

- Raw ingredients that are susceptible to moisture should be kept under dry conditions.
- To lower the danger of spoiling during storage, bulk purchases should be avoided during the rainy season.

To avoid foodborne illnesses, the monsoon season necessitates stricter food safety regulations. Clean handling, secure storage, appropriate cooking, and personal hygiene should all be prioritized. Minimizing health hazards during this season requires careful food storage, frequent kitchen cleaning, and avoiding contaminated and street food.

Resources:

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Collaborative Approach to Managing Gestational Diabetes: A Doctor's Experience on the MyCare Patient Support Program for PwD

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A 33-year-old woman with gestational diabetes mellitus (GDM) was managed by Dr. Priyamalini.

Here's what Dr. Priyamalini has to say:

A 33-year-old woman with GDM consulted me for elevated blood glucose levels—fasting at 149 mg/dL and postprandial at 200 mg/dL. GDM requires strict glucose control to prevent complications in both mother and baby, and management includes medical nutrition therapy along with pharmacotherapy, and at times, insulin to maintain glucose levels within the desired range. With consistently elevated blood glucose levels, she needed careful management to ensure a safe delivery and the well-being of her baby. She was started on insulin therapy to achieve optimal glucose control. She and her family were unaware of GDM and healthy eating practices, which contributed to increased stress about her condition. To support her further, she was referred to MyCare Diabetes Educator (MDE), Ms. Prabavathy Vijay, for personalized dietary guidance and further counselling.

MDE Prabavathy offered support with empathy, reassuring her and motivating her to adopt key dietary changes. She took a detailed dietary recall, taking into account her likes and dislikes. She introduced small, achievable dietary goals on a weekly basis—like regular, well-spaced meal patterns, replacing simple carbohydrates with complex ones, incorporating healthy proteins, and sufficient fiber in all meals, etc. A personalized meal plan was provided, along with recipe ideas and videos in her preferred language.

MDE Prabavathy introduced stress-relief strategies, involved the family in supportive care, and encouraged short, simple physical activities. She also provided guidance on insulin use. By the fourth follow-up, her fasting blood glucose had improved to 90 mg/dL, postprandial glucose was reduced to 110 mg/dL, and she later delivered a healthy baby.

Ms. Prabavathy Vijay

NDEP and T1DE Certified Diabetes Educator

Here's what MDE Prabavathy Vijay has to say:

Personalized education, regular follow-ups, and ongoing support were key to her successful GDM management. This case shows how a collaborative, patient-centered approach—and the vital role of diabetes educators—can lead to healthier outcomes for both mother and baby.

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*PWD: People with Diabetes

Contact for more information
Nikita Thawarkar | 7304930643 | nikita.thawarkar@usv.in

In uncontrolled T2DM with A1c >8.5%, **Choose 1st**

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Dapagliflozin 10 mg + Sitagliptin 100 mg + Metformin 500 mg XR

Abridged Prescribing Information

UDAPA-TRIO Forte, UDAPA-TRIO, Dapagliflozin, Sitagliptin & Metformin Hydrochloride Extended Release Tablets

Composition: Dapagliflozin 10 mg, Sitagliptin 100 mg & Metformin Hydrochloride Extended Release 1000 mg tablets Dapagliflozin propanediol monohydrate eq. To Dapagliflozin 10 mg Sitagliptin Phosphate Monohydrate IP Eq. Sitagliptin 100 mg Metformin Hydrochloride IP (as Extended Release) 1000 mg Dapagliflozin10 mg, Sitagliptin 100 mg & Metformin Hydrochloride Extended Release 1000 mg tablets Dapagliflozin propanediol monohydrate eq. To Dapagliflozin 10 mg Sitagliptin Phosphate Monohydrate IP Eq. Sitagliptin 100 mg Metformin Hydrochloride IP (as Extended Release) 500 mg **Indication:** It is indicated as an adjunct to diet and exercise to improve Glycemic Control adults with type 2 diabetes mellitus **Recommended Dosage:** As directed by the physician. **Method of Administration:** Oral **Adverse Reactions:** Most common adverse reactions reported are: Dapagliflozin - Female genital mycotic infections, Nasopharyngitis, Urinary tract infections. Sitagliptin - Upper respiratory tract infection, nasopharyngitis and headache. Metformin - Diarrhea, nausea/vomiting, flatulence, asthenia, indigestion, abdominal discomfort, and headache. **Warnings and Precautions:** Dapagliflozin: Volume depletion; Ketoacidosis in patients with Diabetes Mellitus; Urosepsis and Pyelonephritis; Hypoglycemia; Genital mycotic infections Sitagliptin: General: Sitagliptin should not be used in patients with type 1 diabetes or for the treatment of Diabetic Ketoacidosis. Acute pancreatitis: Hypoglycemia is used in combinations when combined with other anti-hyperglycemic medicinal product; Renal impairment: Hypersensitivity reactions including anaphylaxis, angioedema, and exfoliative skin conditions - Steven johnson syndrome; Bullous pemphigoid Metformin Hydrochloride: Lactic acidosis; In case of dehydration (severe diarrhea or vomiting, fever or reduced fluid intake), metformin should be temporarily discontinued and contact with a healthcare professional is recommended. **Contraindications:** Hypersensitivity to the active substance of Dapagliflozin, Sitagliptin & Metformin or to any of the excipients listed. Any type of acute metabolic acidosis (such as lactic acidosis, diabetic ketoacidosis). Diabetic pre-coma; Severe renal failure (eGFR < 30ml/min); Acute conditions with the potential to alter renal function such as: Dehydration, Severe infection, Shock; Acute or chronic disease which may cause tissue hypoxia such as: Cardiac or respiratory failure. Recent myocardial infarction, Shock, Renal Impairment, Acute intoxication, Alcoholism. **Use in special population:** Pregnant women: Due to lack of human data, drugs should not be used during pregnancy. Lactating women: It should not be used during breastfeeding. Pediatric patients: The safety and efficacy of drugs has not yet been established. No data is available. Geriatric Patients: In patients >65 years, it should be used with caution as age increases. For Additional Information/full prescribing information, please write to us: USV Private Limited, Arvind Vithal Gandhi Chowk, B.S.D Marg, Govandi, Mumbai - 400088 Last updated on 02/04/2024.

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Ref.: L Ravikumar et al.Cardiology and Cardiovascular Medicine. 2023; 7: 141-144. |

Abridged Prescribing Information

Composition: Each Film Coated Tablet Contains: Dapagliflozin Propanediol Monohydrate eq. to Dapagliflozin (10 mg) + Sitagliptin Phosphate Monohydrate IP eq. to Sitagliptin (100 mg). **Indications:** For the treatment of type 2 diabetes mellitus inadequately controlled on Metformin monotherapy. Recommended Dosage: As directed by the physician. **Method of Administration:** Oral. **Adverse Reactions:** Female genital mycotic infections, nasopharyngitis, and urinary tract infections are most common adverse reactions associated with dapagliflozin. While, upper respiratory tract infection, nasopharyngitis, and headache are most common adverse reactions associated with sitagliptin. **Warnings and Precautions: Risk of Volume Depletion in Elderly** - Before initiating Dapagliflozin and Sitagliptin, assess volume status and renal function in the elderly, patients with renal impairment or low systolic blood pressure, and in patients on diuretics. Monitor for signs and symptoms during therapy. **Ketoacidosis in Patients with Diabetes Mellitus** - Assess patients who present with signs and symptoms of metabolic acidosis for ketoacidosis regardless of blood glucose level. If suspected, discontinue UDAPA®-S, evaluate and treat promptly. Before initiating UDAPA®-S, consider risk factors for ketoacidosis. Patients on UDAPA®-S may require monitoring and temporary discontinuation of therapy in clinical situations known to predispose to ketoacidosis. **Urosepsis and Pyelonephritis** - Evaluate for signs and symptoms of urinary tract infections and treat promptly, if indicated. Hypoglycemia - Consider a lower dose of insulin or the insulin secretagogue to reduce the risk of hypoglycemia when used in combination with Dapagliflozin and Sitagliptin. **Necrotizing Fasciitis of the Perineum** - Serious, life-threatening cases have occurred in patients with diabetes, both females and males. Assess patients presenting with pain or tenderness, erythema, or swelling in the genital or perianal area, along with fever or malaise. If suspected, institute prompt treatment. **Genital Mycotic Infections** - Monitor and treat if indicated. **Contraindications:** Patients with a history of hypersensitivity reaction to the active substance or to any of the excipients. In patients with varying degrees of renal impairment, adjusting the dosage is advised based on the severity of the condition. Prohibited medications include strong CYP2C8 inhibitors/ inducers, drugs increasing/decreasing hypoglycemic action, drugs known to cause QT prolongation, or other oral hypoglycemic agents other than study medications.

For Additional Information/full prescribing information, please write to us:
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Research Highlights:
Expert Insights: Interview with Dr. J. S. Kumar

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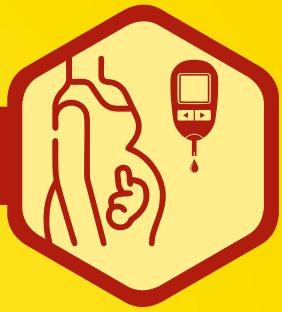
Dr. J. S. Kumar is a distinguished physician and academician serving as Diabetology In-charge, Associate Dean (PG Academics), and Head of the Department and Professor of Medicine at SRM Medical College, Tamil Nadu. With over two decades of expertise in internal medicine and diabetology, he is internationally recognized for his clinical excellence, academic leadership, and prolific research. A fellow of the Royal College of Physicians (Edinburgh), Dr. Kumar has authored more than 60 publications and guided numerous PhD and postgraduate students. His pioneering work spans diabetes management, endocrinology, and non-invasive diagnostic technologies. Actively involved with leading global diabetes associations, he is also a certified insulin pump provider and accomplished marathon runner, inspiring peers and students alike through dedication to both medicine and holistic wellness.

"Food order affects blood glucose and insulin levels in women with gestational diabetes"



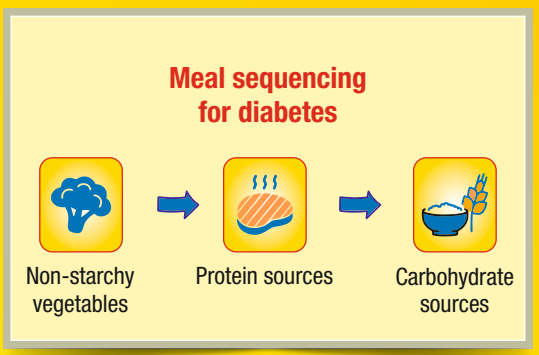
1. What inspired you to investigate the impact of food order on glycemic control in women with gestational diabetes?

Ans. We were motivated by the growing need for practical, non-pharmacological strategies to improve glycemic control in women with gestational diabetes mellitus (GDM). While diet plays a central role in managing GDM, relatively few studies focus specifically on the impact of food order in this population. Most research has centered on type 2 diabetes, and much of the evidence is limited in scope. Given the rising prevalence of GDM, especially in regions like India, we wanted to fill this gap and provide evidence that could be directly applied in real-world settings.

Our aim was to investigate whether implementing a simple dietary strategy, such as eating vegetables first, could lead to meaningful glycemic benefits for pregnant women with GDM. Additionally, we wanted to explore the underlying mechanisms of this approach within the Indian population, where dietary patterns and cultural food practices differ significantly from those in other populations. By doing so, we hope to motivate dietitians and healthcare providers to incorporate food order strategies into their future consultations for GDM management.

2. Could you elaborate on the study design? How was the meal sequence structured in your study?

Ans. Our study was a controlled, comparative trial conducted among women diagnosed with GDM. The intervention group received a customized meal plan emphasizing a specific food order: Non-starchy vegetables were consumed first, followed by protein-rich foods, and carbohydrates were eaten last in each main meal. This sequence was consistently followed throughout the intervention period. In contrast, the control group continued with their routine antenatal care and received standard dietary counseling without any specific guidance on food order. They followed their usual homemade diets, reflecting typical eating habits.



To assess the impact of the intervention, we measured postprandial glucose and serum insulin levels, used continuous glucose monitoring (CGM), and evaluated changes in the metabolic profile and gut microbiota. This comprehensive design allowed us to evaluate both immediate glycemic responses and broader metabolic effects of structured meal sequencing.

3. Your results indicate that the sequence of food consumption can significantly affect postprandial glucose and insulin levels. What are the underlying physiological mechanisms that explain these effects?

Ans. Several physiological mechanisms help to explain the glucose-lowering effect of eating vegetables first:

- **Slower gastric emptying:** Fiber-rich vegetables, when consumed before other foods, slow down the rate at which the stomach empties its contents, delaying glucose absorption.
- **Blunted glycemic response:** Delayed carbohydrate digestion helps to prevent rapid glucose spikes.
- **Enhanced insulin efficiency:** Early intake of fiber and fat can modulate the insulin response, making it more effective when carbohydrates are finally absorbed.
- **Lower glycemic load in the initial phase of digestion:** This reduces the initial glucose surge and gives the body more time to respond appropriately.

4. How can this research guide dietary advice for pregnant women? How can diabetes educators apply this in real-world counseling?

Ans. Our findings offer a simple, practical intervention that can be easily integrated into dietary counseling for women with GDM. Rather than focusing solely on food restriction, educators can empower women by recommending a change in eating order. Advising women to start meals with non-starchy vegetables—like salads or cooked greens (vegetables)—followed by protein, and saving carbohydrates for last, is an easy-to-follow strategy that supports better glucose control. This approach can be adapted to different cuisines and cultural diets, making it broadly applicable in clinical practice.

5. What limitations were encountered during your research, and what directions should future studies take to enhance glucose control in gestational diabetes?

Ans. One of the main limitations of our study was its relatively short duration and the reliance on participant adherence to food order instructions at home. While we provided clear demonstrations of portion sizes, actual intake varied due to individual preferences and practical challenges. Common issues included inconsistent portion sizes, pregnancy-related symptoms such as nausea or vomiting that led to skipped meals, and variations in meal preparation.

We attempted to reduce these limitations by educating patients and their families, encouraging them to support the correct food order at home. Participants were also asked to record food intake in food diaries or share food photos via mobile apps. Despite some challenges, many participants and their families were highly cooperative, which greatly contributed to the success of the study.

Future studies should focus on more extended follow-up periods and explore how food order interventions can be integrated with other nutritional and behavioral strategies, such as the timing of meals, physical activity recording, and cultural food habits, to further improve glycemic control in women with gestational diabetes.

Resource:

Murugesan R, Kumar J, Thiruselvam S, *et al.* Food order affects blood glucose and insulin levels in women with gestational diabetes. *Front Nutr.* 2024;11:1512231. Published 2024 Dec 24. doi:10.3389/fnut.2024.1512231

Interpreting Blood Reports: CBC-RBC Morphology

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The complete blood count (CBC) is one of the most commonly ordered laboratory tests, providing vital information about the cellular components of blood. Among these components, red blood cells (RBCs) play a crucial role in oxygen transport throughout the body. Evaluating RBC morphology - the size, shape, colour, and structural characteristics of RBCs offers invaluable insights into a wide range of hematologic and systemic disorders.

Morphology feature	Description	Associated conditions
Normocytic RBCs	Normal-sized RBCs	Healthy
Microcytic RBCs	Smaller-than-normal RBCs	Iron deficiency anemia, thalassemia
Macrocytic RBCs	Larger-than-normal RBCs	Vitamin B12/folate deficiency, liver disease
Normochromic RBCs	Normal hemoglobin content	Healthy
Hypochromic RBCs	Pale RBCs with less hemoglobin	Iron deficiency anemia
Hyperchromic RBCs	RBCs appear darker	Hereditary spherocytosis
Spherocytes	Spherical RBCs without central pallor	Autoimmune hemolytic anemia, hereditary spherocytosis
Elliptocytes	Oval-shaped RBCs	Hereditary elliptocytosis
Schistocytes	Fragmented RBCs	Disseminated intravascular coagulation (DIC), thrombotic disorders

Evaluating RBC morphology in the CBC test provides critical clues to diagnose various hematologic and systemic conditions. Recognizing these morphological patterns helps guide appropriate clinical investigations and treatment strategies.

Resources:

1. Ford J. Red blood cell morphology. *Int J Lab Hematol.* 2013;35(3):351–357. doi:10.1111/ijlh.12082. PMID: 23480230.
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Staying Active Indoors with Diabetes

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For individuals with diabetes, maintaining an active lifestyle is extremely essential for optimal blood glucose control and cardiovascular health, aids in weight management, and supports overall well-being. Beyond physical health, it positively impacts mental well-being through the release of endorphins. Indoor settings facilitate consistent adherence to exercise, especially during the monsoon, when outdoor activities may be limited. Exercise recommendations for individuals with diabetes include at least 150 minutes per week of moderate to vigorous aerobic activity. Here are some indoor exercises that can be incorporated into a diabetes management plan.

Recommended indoor exercises

- Dance fitness activities such as Zumba, salsa, hip hop, and other high-energy dances.
- High-intensity interval training (HIIT): Short bursts of intense activity followed by rest periods.
- Wall push-ups: Strengthens upper body muscles (pectoralis, triceps, deltoids).
- Chair raises: Strengthens lower body muscles (quadriceps, gluteus maximus) for mobility and balance.
- Bicep curls/triceps extensions: Targets specific arm muscles for upper body strength.
- Yoga: Improves balance, strength, flexibility, coordination, and reduces stress, aiding in glucose control.

Key considerations

- Medical consent: Consult your doctor before starting any new exercise regimen for personalized guidance.
- Blood glucose monitoring: Regularly check glucose before, during, and after exercise to understand your body's response and make adjustments as needed.
- Hydration: Stay well-hydrated before, during, and after exercising to prevent dehydration.
- Listen to your body: Heed any discomfort or pain and stop if necessary.

Indoor activity is crucial for diabetes management. Incorporating varied exercises and these guidelines empowers individuals to improve health and well-being, even with limited outdoor options.

Resources:

1. Zahalka SJ, Abushamat LA, Scalzo RL, *et al.* The Role of Exercise in Diabetes. In: Feingold KR, Ahmed SF, Anawalt B, *et al.*, eds. *Endotext [Internet].* MDText.com, Inc.; Updated January 6, 2023. Available from: https://www.ncbi.nlm.nih.gov/books/NBK549946/
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5. Chapman A, Meyer C, Renehan E, Hill KD, and Browning CJ. (2017). Exercise interventions for the improvement of falls-related outcomes among older adults with diabetes mellitus: A systematic review and meta-analyses. *Journal of diabetes and its complications.* 31(3), 631–645. https://doi.org/10.1016/j.jdiacomp.2016.09.015

Melioidosis in Diabetes: Risk Factors and Care

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Introduction: A potentially lethal infection, melioidosis is caused by the gram-negative bacteria, *Burkholderia pseudomallei,* found in surface and soil water. The clinical presentation of the disease varies from life-threatening septic shock to localized abscess formation. Diabetes is said to be the most important risk factor, with compromised immune function adding to its susceptibility and severity.

Epidemiology: Melioidosis is commonly seen in several tropical regions like Southeast Asia, Northern Australia, India, Taiwan, and China. South Asia alone accounts for around 44% of the world's melioidosis. Within Southeast Asia, the disease remains highly prevalent in Myanmar, Indonesia, Malaysia, Singapore, Thailand, and Vietnam. In India, increased case detection has been made possible by advancements in diagnostic capabilities, especially in the coastal regions of Tamil Nadu, Kerala, and Karnataka. India is especially susceptible to melioidosis because of its vast rural population, high prevalence of diabetes, and favorable climatic conditions.

Melioidosis and diabetes mellitus: Risk factors

In India, diabetes mellitus was found to be the primary underlying cause of *B. pseudomallei* infection (81.6%). The incidence of melioidosis in individuals with diabetes mellitus may be linked to poor glycemic management and hyperglycemia-associated impaired immune response. These include impaired phagocytosis, decreased migration in response to interleukin-8, and the lack of ability to delay apoptosis or necrosis adds to the reduced ability to eliminate *B. pseudomallei.*

Research has indicated that individuals with diabetes who have poor glycemic control (HbA1c >8.5%) have considerably reduced phagocytosis. These individuals also exhibit higher levels of leukocytes, C-reactive protein, and erythrocyte sedimentation rate (ESR). With the rising prevalence of individuals with diabetes having poor glycemic control in melioidosis-endemic regions, the overall burden of infection is likely to increase.

Signs and symptoms: Often known as ‘the great mimicker’ of many diseases, the signs and symptoms of melioidosis are non-specific and overlap with other diseases, such as tuberculosis.

In India, the infection is commonly manifested as fever, pneumonia, visceral abscess, septic arthritis, abdominal pain, hepatomegaly, osteomyelitis, renal failure, splenomegaly, and septicemia.

Prevention and care: Treating melioidosis includes the use of antibiotics (as explained in the figure below). Melioidosis is largely preventable, but raising awareness is crucial, especially in endemic regions. Preventive measures for endemic areas include:

1. Educating those working on paddy fields on the importance of using protective measures, such as gumboots, to reduce exposure risk.
2. Healthcare providers should be trained for early diagnosis and management of melioidosis. Special attention should be given to elderly rice field workers presenting with fever and cough unresponsive to treatment for diabetes, as they may be overlooked cases of melioidosis.

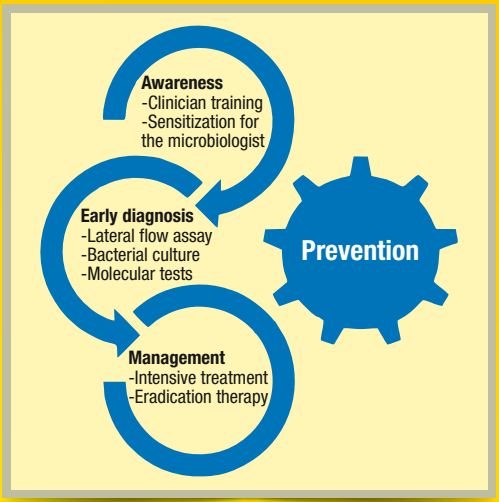

Figure: Strategies for melioidosis prevention and management

Melioidosis is a serious but often overlooked condition in India, particularly in rural and coastal areas. Results can be significantly improved by careful clinical evaluation, early diagnosis, suitable antibiotic treatment, and strict glycemic control. Proactive screening and clinician education are crucial given the high prevalence of diabetes in India and the growing awareness of melioidosis.

Key points

- Melioidosis, an infection caused by gram-negative bacteria, is closely linked with diabetes, with over 80% of cases in India.
- Individuals with diabetes who have poor glycemic control have decreased neutrophil activity and phagocytosis, which raises the risk and intensity of infection.
- Symptoms of melioidosis include fever, pneumonia, abscesses, and sepsis, which are nonspecific and often mimic tuberculosis, making diagnosis challenging.
- Treatment involves the use of antibiotics, and prevention calls for safety gear, early screening, and physician education in endemic regions.

Resources:

1. Mohapatra PR, Mishra B. Burden of melioidosis in India and South Asia: Challenges and ways forward. *Lancet Reg Health Southeast Asia.* 2022;2:100004. Published 2022 May 5. doi:10.1016/j.lansea.2022.03.004
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Diabetes Educator's Toolkit:
Skill of the Month – Questioning

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A diabetes educator (DE) with excellent counseling skills can create a positive mindset, providing support and education to individuals with diabetes.

The questioning skills of a DE are effective in counseling, as they help people with diabetes take charge of their condition, leading to better health outcomes.

Questioning as a DE skill

- Open-ended questions encourage reflective thinking and prompt individuals to reflect on their behaviors, actions, and motivation for change.
- Asking open-ended questions rather than questions like- "Have you cut back on sweets?" and instead ask "What have you been doing to lower your blood glucose level?"
- Asking neutral questions like "What kind of exercises are you doing nowadays? Rather than "Do you walk daily?"
- Questioning allows DE to understand individual needs, lifestyles, and challenges, and helps with providing individual support and personalized education.
- Questioning gives clear information about the individual, and it also clarifies things.
- Setting priorities is crucial, and concise questions are important due to time constraints, leaving no room for in-depth probing.
- Avoid asking too many questions, 'why' questions, or irrelevant questions.
- Through targeted questions, a DE can help individuals set achievable and realistic health goals.

Questioning is a very important DE skill which enables the DE to build trust and rapport with individuals having diabetes, helping them to manage their condition better, empowering the individuals with diabetes to take care of their lives, and helping them set and achieve realistic health goals.

Resources:

1. American Diabetes Association. *Mental Health and Diabetes: A Workbook for Healthcare Professionals, Chapter 1*. American Diabetes Association; 2020. Accessed April 18, 2025. https://professional.diabetes.org/sites/default/files/media/ada_mental_health_workbook_chapter_1.pdf
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Frequently Asked Questions on Monsoon and Diabetes Care

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1. I am 26 years old and have had type 1 diabetes for the last 20 years. I have recently started working. With all the walking, sweating, and now the damp monsoon weather, my shoes are often wet for hours. I've heard this can raise the risk of skin infections. Do you have any practical foot care tips to keep my foot safe and infection-free?

Ans. Yes, people with diabetes, especially if uncontrolled, are more susceptible to foot infections due to potential neuropathy (nerve damage reducing sensation), impaired circulation, and potentially weaker immunity, hindering healing. Here are some practical tips that you could follow to prevent foot infections:

- **Daily inspection:** Make sure to check feet daily (while bathing or when going to bed at night) for cuts, blisters, redness, or swelling. Neuropathy can mask injuries, allowing infections to develop unnoticed.
- **Choose the right footwear:** Go for well-fitting (neither too tight nor too loose), closed-toe shoes that are quick-drying and waterproof shoes, with a good grip to avoid slipping. Avoid closed shoes made of cloth or leather in heavy rain, as they soak up water and take time to dry. Avoid wearing damp shoes for prolonged periods; allow them to dry completely to inhibit microbial growth.
- **Carry an extra pair:** Carry or keep a spare pair of dry shoes and socks at your workplace or in your bag, so you can change out of wet ones quickly. Change socks during the day if they get wet or sweaty.
- **Dry feet promptly:** Wash feet daily with water and mild soap, drying carefully, especially between toes. Dampness promotes fungal growth, which can lead to bacterial infections. Don't rub harshly—gentle drying prevents micro-tears in the skin.
- **Inspect shoes:** Before wearing, check inside shoes for foreign objects that could cause injury, especially crucial with potential neuropathy.

Emphasize consistent daily care and prompt attention to any foot issues to minimize infection risk. Regular professional foot exams are also vital.

2. I have had type 2 diabetes for the past four years, and with the monsoon season here in Mumbai, I often feel like snacking. Could you suggest some healthy and blood sugar-friendly snack options that I can have?

Ans. It's quite common to feel like eating something when the weather is damp, cool, and cozy. Think of your snacks as mini-meals that should ideally have a good mix of fiber, protein, and healthy fats. Here are a few Indian snack ideas that can be healthy for you:

- **Sprouts chaat:** You can easily sprout moong beans or other lentils at home. Mix them with chopped onions, tomatoes, cucumber, a squeeze of lemon, and some spices like chaat masala (in moderation). Sprouts are high in fiber and protein, which are great for blood glucose control.
- **Roasted chana:** These roasted chickpeas are a crunchy and satisfying snack. They are packed with protein and fiber and have a low glycemic index, meaning they won't cause a rapid rise in blood glucose levels.
- **Roasted makhana:** These are light and airy and become wonderfully crunchy when roasted. You can roast them in a little bit of ghee or oil and sprinkle with salt and pepper or other mild spices.
- **Moong tikki/chickpea tikki:** Swap aloo tikkis with these protein and fiber-rich tikkis made from moong or chickpeas.
- **Boiled eggs/egg vegetable omelet:** A simple and easy-to-make snack. Eggs are pure protein and will keep you feeling full without significantly impacting your blood glucose levels.

Remember portion control, avoid fried and sugary snacks, stay hydrated, and monitor your blood glucose levels regularly.

3. My daughter is 14 years of age and has had type 1 diabetes for the past 10 years. For the last two years, we have observed that her blood sugar levels tend to rise during monsoon, and she needs more insulin during this time. Could you explain how the monsoon conditions might be contributing to these increased glucose levels?

Ans. I understand your concern. The reduced physical activity during the monsoon months significantly impacts glucose control. Exercise enhances insulin sensitivity by making muscles more receptive to glucose uptake from the bloodstream for energy. Less outdoor activity is one of the main reasons, potentially leading to higher readings.

Furthermore, the monsoon often brings cravings for high-fat, fried comfort foods like pakoras and samosas. These have a high glycemic index, causing rapid glucose release. Their high fat content can also impair insulin sensitivity over time, exacerbating blood glucose spikes. Additionally, the monsoon coincides with a number of festivals, which may have a lot of calorie-dense and high sugar foods.

Therefore, the observed spikes are likely a combination of decreased physical activity reducing insulin sensitivity and glucose utilization, coupled with dietary shifts towards high-glycemic index and high-fat foods, further compounded by festive indulgences. We need to explore indoor exercise alternatives and healthier dietary choices for monsoon cravings and celebrations, alongside continuous blood sugar monitoring.

Superfood: Healthy Vada

Serves: 2 (makes 6 vadas)

Ingredients	Amount
Boiled potato, mashed	2 nos. (medium sized)
Bottle gourd, finely grated	200 g
Cumin seeds	¼ teaspoon
Green chili, finely chopped	1 no.
Ginger-garlic paste	¼ teaspoon
Turmeric powder	¼ teaspoon
Lime juice	2 teaspoons
Coriander leaves, finely chopped	1 tablespoon
Mint-coriander chutney	1 tablespoon
Salt	To taste
Oil	2 teaspoons
For batter	
Besan/gram flour	4 tablespoons
Salt	To taste
Asafoetida	A pinch
1 cup: 250 mL; 1 tablespoon: 15 mL; 1 teaspoon: 5 mL	

Method

1. In a large pan, heat the oil and add cumin seeds. Once they splutter, add finely chopped green chili, ginger-garlic paste, turmeric powder, mashed potatoes, finely grated bottle gourd, lime juice, finely chopped coriander leaves, salt, mix well, and sauté on a low flame for about 5 minutes.
2. Remove the pan from the flame, and let it cool.
3. Divide the mixture into six equal portions.
4. Roll each portion into round balls and keep aside.
5. For making the batter, slowly add a little water to the besan flour, salt, and asafoetida, mix well, and the batter consistency should be thick and flowing.
6. Take an appam maker, grease it with a little oil, and heat it on a low flame.
7. Dip the potato rounds in the batter and place them in the appam maker.
8. Cook till they are golden brown on both sides.
9. Serve hot with mint-coriander chutney.

Role Play

Scenario – Mr. ABC, a 48-year-old male with type 2 diabetes mellitus for the past 9 years, visits the diabetes educator at his clinic. He has recently been diagnosed with dengue fever and is experiencing weakness and poor appetite. His blood glucose levels have been fluctuating, and he is unsure about how to manage his diabetes while dealing with dengue.

Mr. ABC: Hello, doctor! I have been diagnosed with dengue. I feel weak, and I don't feel like eating anything. My blood glucose levels have been all over the place. I'm quite worried.

Diabetes educator: That's understandable. Dengue combined with diabetes needs careful management. But don't worry, we'll take it step by step. First, tell me, are you monitoring your blood glucose levels regularly?

Mr. ABC: I was checking twice a day, but now with this fever, I've not been consistent.

Diabetes educator: Try to check every 4–6 hours, especially during illness. Infections like dengue can raise glucose levels unpredictably.

Mr. ABC: Okay, I am not able to eat anything.

Diabetes educator: You still need to eat, even if it's in small amounts. Light, easy-to-digest meals like dal khichdi, vegetable soups, curd rice, and in between a small portion of fruits with nuts for essential nutrients. Include protein options like moong dal, paneer, curd or yogurt, and well-cooked eggs to prevent muscle loss and hasten recovery.

Mr. ABC: That sounds manageable. What about hydration? I don't feel like drinking water.

Diabetes educator: That's very important. Dengue fever can cause dehydration. You can sip on lemon water, clear soups, or oral rehydration solution (ORS) without sugar to keep up your fluid intake. Avoid sugar-sweetened or carbonated beverages, fruit juices, etc., as these can spike glucose levels.

Mr. ABC: I usually take my tablets after meals, but now I'm barely eating. So, should I still take them? Also, I am not exercising currently due to fever, could this be increasing my sugar levels?

Diabetes educator: If your appetite is very low and you are going into hypoglycemia, discuss this with your doctor, as you may need to adjust the medication dose. Never adjust or stop medication on your own. Also, no need to exert yourself with exercise. Your body needs rest to fight off the infection. For the time being, if your post-meal glucose levels are high, you can take a short 10–15 minute walk post meals, which helps in getting glucose levels under control. Start with 5 minutes and gradually increase.

Mr. ABC: Understood. Thanks.

Diabetes educator: Take care. Get well soon!

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Metformin Hydrochloride 1000 mg SR + Glimepiride 4 mg

Abridged Prescribing Information

Active Ingredients: Metformin hydrochloride (as sustained release) and glimepiride tablets **Indication:** For the management of patients with type 2 diabetes mellitus when diet, exercise and single agent (glimepiride or metformin alone) do not result in adequate glycaemic control. **Dosage and Administration:** The recommended dose is one tablet daily during breakfast or the first main meal. Each tablet contains a fixed dose of glimepiride and Metformin Hydrochloride. The highest recommended dose per day should be 8 mg of glimepiride and 2000mg of metformin. Due to prolonged release formulation, the tablet must be swallowed whole and not crushed or chewed. **Adverse Reactions:** For Glimepiride: hypoglycaemia may occur, which may sometimes be prolonged. Occasionally, gastrointestinal (GI) symptoms such as nausea, vomiting, sensations of pressure or fullness in the epigastrium, abdominal pain and diarrhea may occur. Hepatitis, elevation of liver enzymes, cholestasis and jaundice may occur; allergic reactions or pseudo allergic reactions may occur occasionally. For Metformin: GI symptoms such as nausea, vomiting, diarrhea, abdominal pain, and loss of appetite are common during initiation of therapy and may resolve spontaneously in most cases. Metallic taste, mild erythema, decrease in Vit B12 absorption, very rarely lactic acidosis, Hemolytic anemia, Reduction of thyrotropin level in patients with hypothyroidism, Hypomagnesemia in the context of diarrhea, Encephalopathy, Photosensitivity, hepatobiliary disorders. **Warnings and Precautions::** For Glimepiride: Patient should be advised to report promptly exceptional stress situations (e.g., trauma, surgery, febrile infections), blood glucose regulation may deteriorate, and a temporary change to insulin may be necessary to maintain good metabolic control. Metformin Hydrochloride may lead to Lactic acidosis; in such cases metformin should be temporarily discontinued and contact with a healthcare professional is recommended. Sulfonylureas have an increased risk of hypoglycaemia. Long-term treatment with metformin may lead to peripheral neuropathy because of decrease in vitamin B12 serum levels. Monitoring of the vitamin B12 level is recommended. Overweight patients should continue their energy-restricted diet, usual laboratory tests for diabetes monitoring should be performed regularly. **Contraindications:** Hypersensitivity to the active substance of glimepiride & Metformin or to any of the excipients listed. Any type of acute metabolic acidosis (such as lactic acidosis, diabetic ketoacidosis, diabetic pre-coma). Severe renal failure (GFR<30ml/min). In pregnant women. In lactating women.Acute conditions with the potential to alter renal function (dehydration, severe infection, shock, intravascular administration of iodinated contrast agents); acute or chronic disease which may cause tissue hypoxia (cardiac or respiratory failure, recent myocardial infarction, shock); hepatic insufficiency; acute alcohol intoxication; alcoholism. **Use in a special population:** Pregnant Women: Due to a lack of human data, drugs should not be used during pregnancy. Lactating Women: It should not be used during breastfeeding. Pediatric Patients: The safety and efficacy of drugs has not yet been established. Renal impairment: A GFR should be assessed before initiation of treatment with metformin containing products and at least annually thereafter. In patients at increased risk of further progression of renal impairment and in the elderly, renal function should be assessed more frequently, e.g. every 3-6 months.

Additional information is available on request.
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In case of any adverse events, kindly contact: pv@usv.in For the use of registered medical practitioner, hospital or laboratory.

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