ISSN 0513-3149

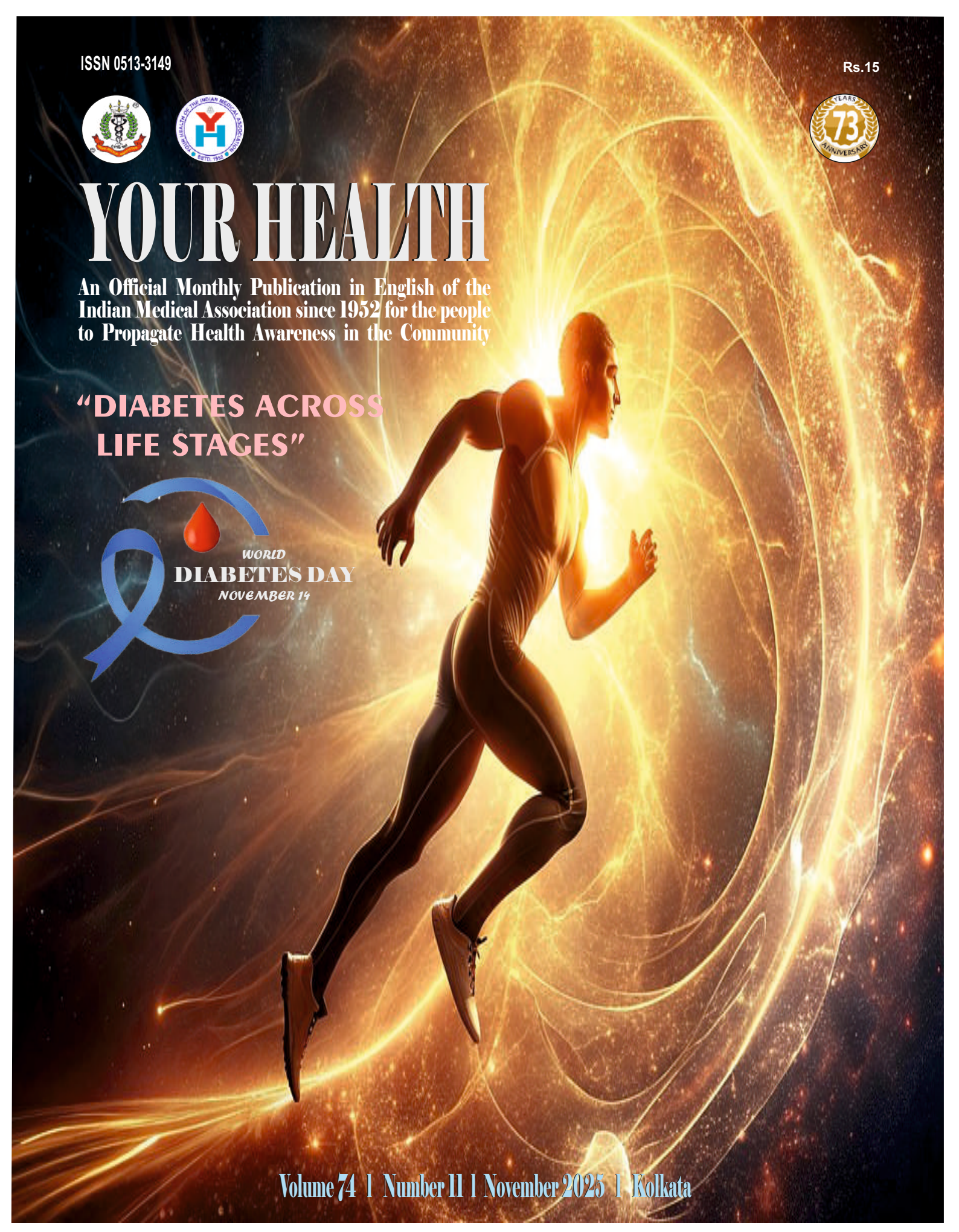
Rs.15

YOUR HEALTH

An Official Monthly Publication in English of the Indian Medical Association since 1952 for the people to Propagate Health Awareness in the Community

"DIABETES ACROSS LIFE STAGES"

WORLD DIABETES DAY
NOVEMBER 14



Volume 74 | Number 11 | November 2025 | Kolkata

YOUR HEALTH

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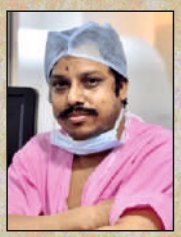

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Editorial

Dr. Khwaja Alim Ahmed
Hony. Editor, Your Health

Adhering to a consistent daily "time table" is crucial for managing diabetes effectively. Regular timing for meals, exercise, and medication helps **regulate the body's internal clock (circadian rhythm), which improves insulin sensitivity and helps maintain stable blood sugar levels**.

Key Effects of a Diabetes Timetable

- **Improved Glycaemic Control:** Consistent meal and exercise times prevent extreme fluctuations (spikes or dangerous lows) in blood glucose levels. This leads to a lower average blood sugar level over time (HbA1c).

- **Enhanced Insulin Sensitivity:** The body's insulin sensitivity naturally follows a daily rhythm, generally being highest in the morning and declining throughout the day. Eating earlier in the day and on a predictable schedule aligns food intake with this natural rhythm, leading to better glucose utilization.

- **Regulated Internal Clock:** Meal timing and light exposure are powerful signals for the body's circadian system. Maintaining a consistent daily routine strengthens these signals, which helps manage hormones involved in metabolism, sleep, and appetite. Disrupted rhythms, often caused by irregular eating or sleep patterns (like shift work or jet lag), can worsen insulin resistance.

- **Better Weight Management:** A structured routine with consistent meal times can help control hunger, regulate appetite hormones, and may reduce overall caloric intake, which is vital for managing diabetes and associated weight concerns.

- **Effective Medication Timing:** Medications and insulin dosages are often timed to match meal schedules and physical activity. A predictable timetable helps ensure that medication works effectively and prevents issues like hypoglycaemia (low blood sugar).

Practical Timetable Guidelines

- **Eat at regular times** every day, including weekends.

- **Avoid skipping meals**, especially breakfast, as this can lead to post-meal blood sugar spikes later in the day.
- **Space meals and snacks appropriately**, generally every 3-4 hours, to avoid long gaps without fuel that could cause blood sugar to dip.
- **Eat dinner earlier** in the evening (before 8 p.m. if possible) and avoid late-night snacks, as glucose tolerance is lower later in the day.
- **Prioritize a consistent sleep schedule** (7-9 hours per night) to support hormone regulation and insulin sensitivity.
- **Incorporate regular physical activity** into your daily routine, ideally around the same time each day, to help manage blood sugar levels.

Working with a healthcare provider or a registered dietician is essential to create a personalized timetable and meal plan that suits individual needs and lifestyle.

The differences between FBS, PPBS and HbA1C testing?

FBS, PPBS, and HbA1c tests differ in the time frame they measure blood sugar: FBS is a single, fasting measurement, PPBS checks blood sugar two hours after a meal, and HbA1c provides an average of blood glucose over the past two to three months. FBS offers a baseline, PPBS shows a short-term response to food, while HbA1c gives a long-term picture of overall glucose control.

Prof. (Dr.) Sankar Sengupta
Hony. Secretary, Your Health

FBS (Fasting Blood Sugar)

- **What it is:** A single-point snapshot of your blood sugar after an overnight fast (typically 8-12 hours).
- **Purpose:** To establish a baseline blood glucose level.
- **Limitations:** It doesn't reflect the impact of meals or long-term trends.

PPBS (Postprandial Blood Sugar)

- **What it is:** A measurement of blood sugar taken two hours after a meal.
- **Purpose:** To see how well your body processes glucose after eating.
- **Limitations:** It only shows the immediate response to a single meal, not long-term control.

HbA1c (Glycaeted Haemoglobin)

- **What it is:** A measure of your average blood glucose levels over the past two to three months.
- **Purpose:** To provide a long-term view of your overall glycaemic control, unaffected by day-to-day fluctuations.
- **Limitations:** It can be unreliable in people with certain conditions that affect red blood cell lifespan, such as G6PD deficiency or sickle cell anaemia.

Feature	Fasting Blood Sugar (FBS)	Postprandial Blood Sugar (PPBS)	HbA1c
What it measures	Blood glucose level at single point in time	Blood glucose level at single point in time	Average blood glucos level over 2–3 month
Preparation	Fasting overnight (8– hours)	Eating a meal and having blood drawn 2 hours later	No specific preparati needed, as it's a long- term measure
Purpose	Provides an immedia baseline snapshot of blood sugar	Assesses how well th body handles glucose after eating	Provides a long-term view of overall blood sugar control
Interpretation	A single reading that can be affected by many factors	A single reading showing how well the body processes sugar after a meal	A more stable marke unaffected by daily fluctuations
Usage	Diagnosing and monitoring diabetes, pre-diabetes, or hypoglycaemia	Helps diagnose diabetes, pre-diabete or gestational diabet	Diagnosing and monitoring diabetes (type 1 and type 2), a checking long-term glucose control

Guest Editorial

Sleep and diabetes - the forgotten frontier

Dr. Soumik Goswami
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"A good laugh and a long sleep are the best cures in the doctor's book." — Irish Proverb

Sleep is a fundamental pillar of human health but is often overshadowed by discussions about diet and exercise. High-quality and adequate sleep is integral to metabolic health, with diabetes often being associated with a host of sleep disturbances that complicate glycaemic control.

Impact of Sleep on Blood Glucose

Both insufficient (< 6 hours) and excessive sleep duration (> 8 hours) are linked to elevated blood glucose levels and a higher risk of developing type 2 diabetes. Good-quality sleep helps maintain proper levels of key hormones such as insulin, leptin, and ghrelin, all of which affect appetite. Sleep deprivation increases hunger, cravings for carbohydrates, and insulin resistance, fuelling the cycle of obesity and poor glucose control. Interestingly, evening chronotypes (i.e., night owls: those who go to bed late and get up late) may be more susceptible to inactivity and poorer glycaemic levels than morning chronotypes (i.e., early birds: those who go to bed early and get up early).

Common Sleep Disorders in Diabetes

Diabetes is commonly associated with sleep disorders, including insomnia, restless legs syndrome, and obstructive sleep apnea (OSA). In type 2 diabetes, 24–86% of people are estimated to have OSA, 39% to have insomnia, and 8–45% to have restless legs syndrome (i.e., an uncontrollable urge to move the legs). Other complications, such as peripheral neuropathy, nocturia (frequent urination at night), and pain, can fragment sleep, leading to chronic fatigue and psychological distress.

Mechanisms Linking Sleep and Diabetes

Physiological changes associated with sleep deprivation—such as increased evening cortisol, sympathetic nervous system activation, and elevated inflammatory markers—cause insulin resistance and diminish the body's ability to regulate blood sugar. Disrupted circadian rhythms due to erratic sleep schedules can impair both insulin secretion and glucose uptake. Sleep fragmentation and decreased oxygen delivery to the brain in OSA activate the sympathetic nervous system, contributing to worsening blood glucose levels and increasing the risk of cardiovascular complications. Overall, poor sleep is associated with a higher risk of cardiovascular events and all-cause mortality in diabetes, underlining its clinical importance.

Managing Sleep for Better Diabetes Control

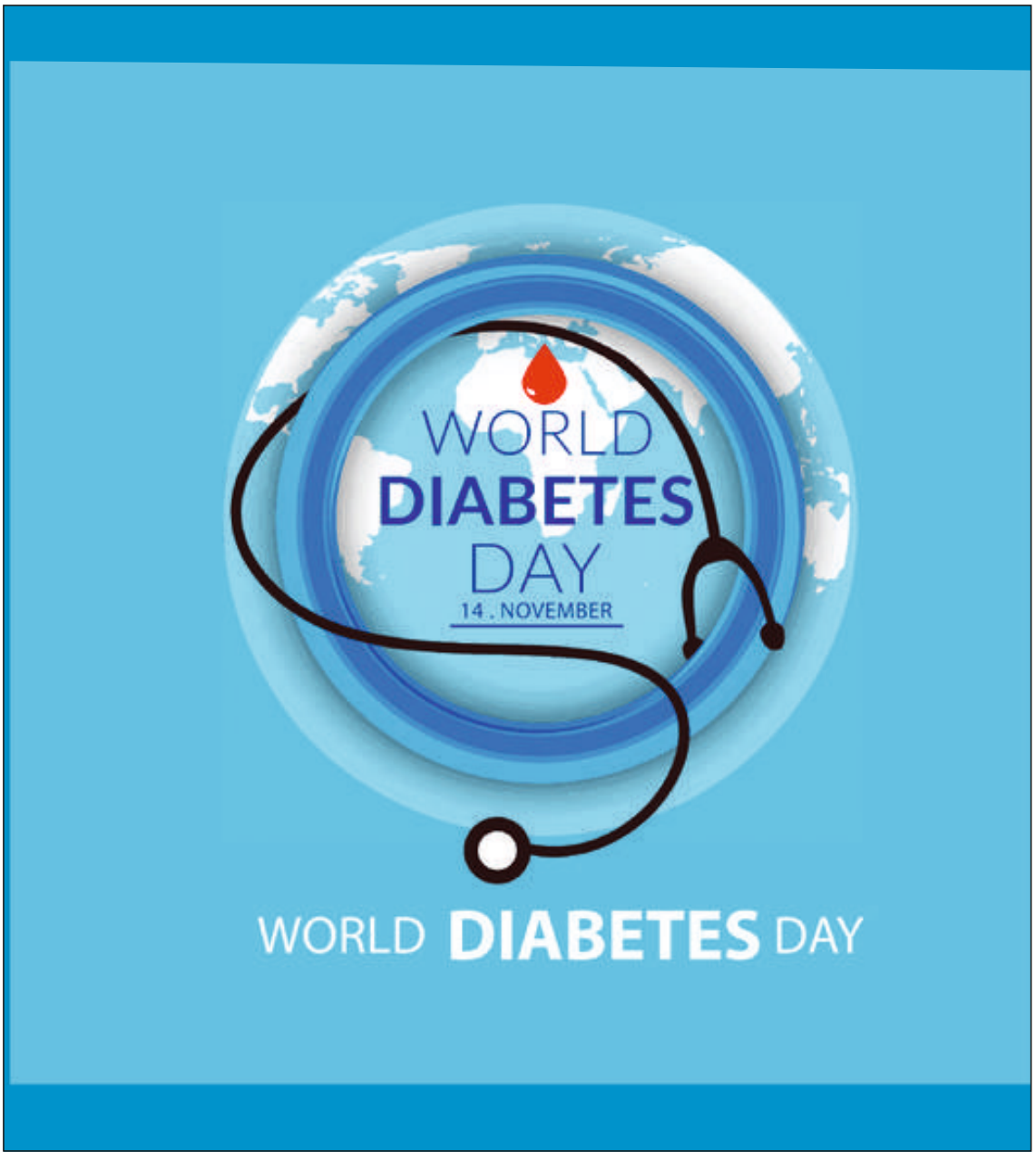
Assessment of sleep is now considered a critical component of diabetes care.

Effective interventions (as and when necessary) include:

- Cognitive behavioural therapy (CBT): This can help with insomnia and also slightly improve blood glucose.
- Sleep extension and pharmacologic treatments for sleep can improve sleep outcomes and possibly insulin resistance.

- Practising good sleep hygiene, such as establishing a regular bedtime and rise time; creating a dark, quiet area for sleep with temperature and humidity control; establishing a pre-sleep routine; putting electronic devices in silent/off mode; exercising during the day; avoiding daytime naps; avoiding tea/coffee in the evening; avoiding spicy foods at night; and avoiding alcohol.
- Addressing underlying sleep disorders with medical therapies, like CPAP for OSA or appropriate management of neuropathy-related pain.

In an era of constant connectivity, prioritising sleep is not a luxury—it is a metabolic necessity. By fostering better sleep, we can mitigate the diabetes burden, enhancing quality of life and reducing healthcare costs. Future research will refine these strategies, but the message is clear: sweet dreams are vital for stable sugars.



Burden of Diabetes in India

Dr. Shaibal Chakraborty
Consultant, Cardiologist, Diabetologist, Critical Care
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India has been known as having a big burden of communicable diseases, tropical diseases. But now the focus has been shifted to non-communicable diseases, so called lifestyle diseases like Cancer, Diabetes, Hypertension, Heart-diseases, Cardiovascular and many more.

India is the capital of Diabetes with a close competition to China here as well.

To comprehend the enormity of the task, ICMR conducted an enormous nationwide study. The study named ICMR INDIA Study, which has been published in the world famous medical journal, LANCET, in 2023. It would be pertinent to discuss the findings of that study once again.

South Asia, which contributes about 25% of Global Population is facing an unprecedented surge in N.C.D. India is the largest contributor of them.

This study is the first comprehensive representative, urban and rural, data statistics amongst the thirty State and Union Territories.

A total of 113043 persons (79506 rural and 33537 urban) were studied between 18th October 2008 and 17th December 2020.

Prevalence of Diabetes overall was 11.4%, Pre-Diabetes was 15.3%, Hypertensions was 35.5%, Generalized Obesity was 28.6%, Abdominal Obesity was 39.5%, dyslipidaemia 81.8%.

Except for pre-diabetes, all NCD are significantly higher in urban population. We can jolly-well understand the huge burden and the urgent need to intervene. It would be a worthwhile talk about the study methodology.

Any adult above 20 years from representative family of the targeted population was included. Three level stratified multi stage sampling by Geography, population and socio-economic status. It did have a vast scales and methodological rigor to make it best ever public health, surgery conducted in India, setting a benchmark under NCD surveillance.

Diabetes/Pre-diabetes was diagnosed as per WHO OGTT & HbA1C criteria; Fasting >126 and Past OGTT >220. Hypertension as per JNC-8 guidelines > 140/90.

Obesity as per WHO Asia Pacific (BMI >25 kg/m^2), Waist >90cm for man >80cm for women.

Dyslipidaemia as per NCEPATP – III definition, high LDL > 130, low LDL <40, high cholesterol <200.

Uniform biochemical criteria of a single centre, same person. HbA1C by HPLC, by BIORAD as used in DCCT trial. Other biochemistry studies were done by Olympus or Beckman Coulter Auto-analyser. Capillary Blood Glucose was done by One-touch Ultra; Life-scan Johnson & Johnson by overnight fasting, atleast 08 hours. Known diabetes only CBG fasting. Person with H/O Diabetes as OGTT was done & 2 hours post load CBG was done.

Indian States were divided into six Geographical zones. Meanage was 43 years of which 46.5% was male. 26.9% had no formal education.

Urban residents were younger had higher BMI and waist circumference and higher diastolic pressure and higher education.

There was also variability in prevalence across India. Diabetes was highest in South & North India, Pre-diabetes was highest in Central & North India. The lowest rate was seen in the North Eastern States, like Sikkim, Arunachal Pradesh, etc. Women had generalized and abdominal obesity. Men are higher in Hypertension and HbA1C. State wise lowest diabetes in U.P. (4.8%) & highest diabetes in Goa (26.4%).

In conclusion, Metabolic NCDs are more widespread than previously known. Health being a State subject, urgent implementation of State wise preventive and clinical programme is needed. Faster multi-sector partnership. Together lets “Turn the Tide on Diabetes”, this World Diabetes Day.

ICMR India B-17 study stands at both a warning and a guide.

DIABETES IN WORKPLACE

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INTRODUCTION: Diabetes is one of the most common health problems today, affecting millions of working adults. The official theme for World Diabetes Day 2025 is "Diabetes and well-being" which focuses on the holistic health of people with diabetes. The key sub-theme is "Diabetes and the workplace," highlighting the importance of creating healthy environments at work to support those with the condition, including addressing stigma and promoting physical and mental well- being.As per International Labour Organization (ILO) and Periodic Labour Force Survey (PLFS) the recent official Indian data shows that average weekly working hours are around 41-42 hours. Extended working hours are common, working beyond the 8 hour daily norm, implying that workers spend approximately 1/3rd of their day at their workplace.

Diabetes affects work life, energy, and productivity. With a few simple steps, workplaces can become healthier spaces that support people living with diabetes and can help prevent the development of diabetes.

1. The Role of a Healthy Canteen

What we eat every day has a big effect on our blood glucose levels. Offices that offer only fried snacks, sugary drinks, and white bread make it harder for employees to stay healthy.

A healthy canteen can make a big difference. The following changes can be made:

- Food such as fresh fruits, vegetables, whole grains, and protein-rich foods like eggs, salads, soups, stews and grilled chicken should be offered.
- Sugary beverages should be actively discouraged, and coconut water, buttermilk, lemon water, fruit juices or low calorie drinks should be offered instead.
- If at all there should be provision for smaller portions for fried, salty, oily food and desserts.
- Clear labelling of healthy food options should be done where applicable, so people can choose wisely.When healthy food is easily available, it becomes easier for everyone especially those with diabetes to eat better without feeling left out.

- Healthy foods should be competitively priced so as to promote their consumption.

2. Exercise and Activity Corners

Sedentary lifestyle is a major cause of diabetes. Many office workers sit for 8–10 hours daily, which causes weight gain, risk of diabetes mellitus and metabolic syndrome. It has been rightly defined by the phrase "sitting is the new smoking".

Simple workplace changes can help:

- Encouraging short walking breaks every hour.
- Creating a small exercise or yoga zone in the office.
- Promoting stair use instead of elevators.
- Organizing fun activities like step-count challenges or group yoga sessions.
- Even 30 minutes of moderate activity daily can improve blood glucose control and reduce stress.

3. Reducing Screen Time

Excessive screen time on computers and phones adds to eye strain, poor posture, and inactivity.

To reduce this:

- Follow the 20-20-20 rule: every 20 minutes, look 20 feet away for 20 seconds.
- Encourage meetings that involve standing or walking.
- Limit unnecessary after-work emails so employees can relax and move around more.
- Less screen time means more movement and better mental focus.

4. The Power of Good Sleep

Poor sleep increases stress hormones and blood glucose levels. People with diabetes or those at risk should aim for 7–8 hours of restful sleep each night.

Offices can help by:

- Avoiding very late work hours.
- Reducing night shifts whenever possible.
- Promoting work-life balance so employees can rest well.

5. Managing Emotional Stress

Stress tends to raise blood glucose. Long deadlines, workload, or unhealthy competition can worsen diabetes.

Workplaces can help by:

- Creating an open and friendly environment.
- Encouraging regular breaks and mental-health sessions.
- Offering counselling or stress-management workshops.
- A supportive atmosphere helps employees stay calm and motivated.

6. Building a Conducive Office Environment

A diabetes-friendly office benefits everyone. Healthy snacks, clean drinking water, comfortable seating, access to healthy washrooms, and flexible working hours make a huge difference. Employers can organize health check-ups and awareness sessions to educate their staff about diabetes prevention and management.

CONCLUSION: A workplace that promotes healthy eating, regular movement, good sleep and emotional well- being plays a vital role in preventing and managing diabetes. Such an environment helps employees maintain stable blood glucose levels, stay energized, and perform their best. Even small, thoughtful changes like offering nutritious meals, encouraging short activity breaks, or reducing stress can make a big difference. In the long run, a workforce that feels cared for and supported is not only healthier but also more motivated and productive. Nurturing employee health is one of the strongest defences against diabetes and its complications the key to building a truly successful organization.

SIX POINT PREVENTION TOOL OF DIABETES IN WORKPLACE

World Diabetes Day and KMC Health Services

14 November every year is observed as World Diabetes Day.

It is the world's largest diabetes awareness campaign, reaching over 1 billion people in more than 160 countries. It aims to draw attention to the growing impact of diabetes on health and society.
The date, 14 November, marks the birthday of Sir Frederick Banting, who co-discovered insulin in 1921— a milestone that transformed the lives of people with diabetes.
The day promotes understanding of the causes, symptoms, prevention, and management of diabetes, encouraging early detection and lifestyle changes.

It highlights the inequalities in access to diabetes care, medicines, and education across the world and urges governments to take stronger public health action. It motivates patients to take charge of their health through regular monitoring, healthy diet, physical activity, and adherence to treatment.
The blue circle logo for Diabetes introduced by the International Diabetes Federation (IDF) in 2006.represents global unity in the fight against diabetes — blue stands for the sky and the United Nations flag.

This day aims to create global awareness about the growing challenge of diabetes mellitus, a condition that affects millions of people worldwide. It reminds us that diabetes can be prevented or delayed through healthy lifestyle choices such as balanced diet, regular exercise, maintaining a healthy weight, and avoiding tobacco and alcohol. Early detection, regular blood sugar checks, and adherence to treatment can prevent serious complications involving the eyes, kidneys, heart, and nerves.

Efforts by KMC regarding Diabetes Free diagnostic tests and expanded primary health service - Biochemical tests (for example: sugar, urea, creatinine, lipid profile,liver function test) are being made available at urban primary health centres (UPHCs) to address non-communicable diseases including diabetes. Mobile Medical Units (MMUs) are used in some hard-to-reach areas under KMC for primary care and pathological test services.

Dr. Tapan Kumar Mukherjee
Hony. Adviser (Health)
Kolkata Municipal Corporation

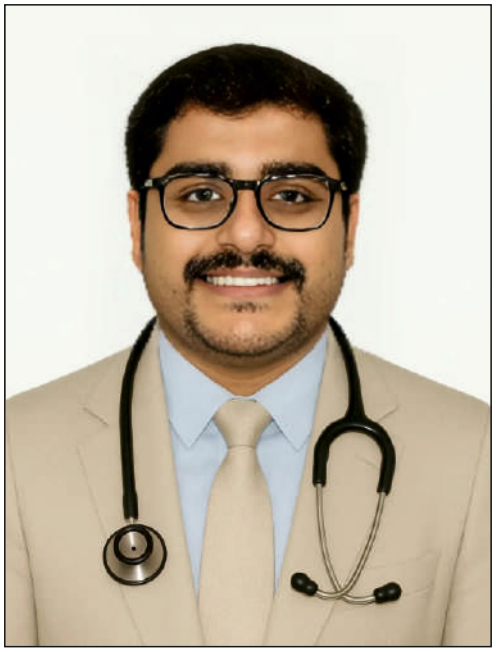
KMC adopted certificate courses of Public Health Foundation of India (PHFI) ('Certificate Course in Evidence Based Diabetes Management' (CCEBDM), 'Advanced Certificate Course in Prevention and Management of Diabetes and Cardiovascular Diseases' (ACMDC)) to train municipal medical officers in diabetes & cardiovascular risk management. The Kolkata Diabetes & Endocrinology Forum (KDEF) partnered with KMC to train doctors through its faculties comprising leading Endocrinologists and Cardiologists of the city.KMC has been into training on Metabolic Disorder in collaboration with ECHO India by Hub & Spokes method on digital platform for all Medical Officers of KMC across the city.

Example of a prevalence trend A survey once done in one KMC Borough found ~23% of residents (aged 25-70) were diabetic and about 46% of those were unaware of their status.
This highlights the growing burden of diabetes in urban Kolkata and underline the need for the services and awareness that KMC is trying to provide.
Significance & implications The fact that KMC is rolling out free tests, free clinics and capacity building shows recognition at the civic-level of diabetes as a public

health challenge (not just individual medical issue).
Early detection and free treatment access is critical, especially in a large and dense city like Kolkata, to prevent complications (kidney disease, heart disease, stroke) which are high cost and high morbidity.
Training municipal doctors is important because many patients will first approach local Health Facilities of the ward equipping front-line providers. It helps earlier referral as required as well as management.

The blue circle symbol of World Diabetes Day stands for unity in the fight against diabetes and hope for a healthier future. On this World Diabetes Day, let us pledge to spread awareness, support those living with diabetes, and work together for a world where everyone has access to the care they need.

On Type 1 Diabetes…..



Dr. Soumyajit Ghosh
Consultant Physician
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Type 1 diabetes is an autoimmune disease where the body's immune system destroys insulin-producing cells in the pancreas, leading to a lack of insulin. This results in high blood sugar levels because glucose cannot enter cells for energy. Symptoms can appear suddenly and include increased thirst and urination, extreme hunger, weight loss, fatigue, and blurry vision. Treatment involves lifelong insulin replacement, managing blood glucose through monitoring, healthy diet, and physical activity.

Causes

- **Autoimmune reaction:** The immune system mistakenly attacks and destroys the beta cells in the pancreas that produce insulin.
- **Genetics:** Certain genes increase the risk of developing type 1 diabetes.
- **Environmental factors:** Environmental triggers, such as a virus, may play a role in triggering the autoimmune response.

Symptoms

- Increased thirst and frequent urination
- Unexplained weight loss
- Increased hunger
- Fatigue and weakness
- Blurry vision
- Irritability or mood changes
- **Diabetic emergency symptoms:** If untreated, symptoms can become life-threatening and include nausea, vomiting, abdominal pain, rapid breathing, and a fruity odor on the breath.

Treatment and management

- **Insulin therapy:**

Lifelong insulin replacement is necessary to manage blood glucose levels. It can be delivered via an insulin pump or pen.

- **Blood glucose monitoring:**

Regular self-monitoring of blood glucose levels is crucial to adjust insulin doses and keep levels in a target range.

- **Healthy lifestyle:**

A healthy diet and regular physical activity are important for managing blood glucose and overall health.

- **Regular check-ups:**

Consistent medical check-ups and health checks are essential for managing the condition and monitoring for potential complications.

Important considerations

- Type 1 diabetes is a lifelong condition with no known cure.
- A correct diagnosis should always be confirmed with a doctor, even if a blood test at a health fair shows a potential issue.
- The symptoms of type 1 diabetes can develop quickly, unlike type 2 diabetes, where symptoms often develop slowly.

Revisiting the lesser ventured avenues of type 2 diabetes in the era of incretin-based therapies

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1. Introduction :

Over the last decade, all international guidelines have focussed on the periodic screening for macrovascular and microvascular complications among people living with diabetes (PwD) due to their significant impact on morbidity and mortality.The last few years have seen a massive surge in the use of incretin-based therapy. While the GLP-1Ras and the dual GLP1RA-GIP agonists are primarily used for obesity management, but their usage has led to the resurgence in interest in some of the lesser discussed complications or comorbidities of DM in which they can provide additional benefits over and above weight loss or pose some special concerns. Some of these include metabolic dysfunction-associated steatotic liver disease (MASLD), skeletal fragility , sarcopenia, obstructive sleep apnea, diabetic gastroparesis, PCOS and sexual dysfunction. With increased longevity of PwD, these complications are now coming to the forefront given their impact on patients' quality-adjusted life years (QALYs) and overall wellbeing. The following subsections give a brief overview of practical screening protocols for them and their management strategy focussing on the role of incretin-based therapies.

2. Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD)

MASLD, previously called non-alcoholic fatty liver disease (NAFLD), reflects a nomenclature transition prompted by recognition of metabolic risk factors (including diabetes) as key drivers, rather than alcohol intake alone. MASLD is highly prevalent in patients with diabetes, with increased risk of progression to cirrhosis and hepatocellular carcinoma compared to normoglycemic populations; alongwith a higher risk for atherosclerotic cardiovascular diseases. Standard imaging like ultrasound can detect liver steatosis only when the total liver fat exceeds 30%.

2a. Screening and Diagnosis in clinic: The initial screening tests for MASLD include non-invasive tests such as the Fibrosis-4 (FIB-4) index, NAFLD Fibrosis Score (NFS), and Enhanced Liver Fibrosis (ELF) score. Of these, the Fib-4 is most commonly used and can be easily calculated in the clinic using only a few commonly assessed parameters age, ALT, AST, platelet count. Scores below a low cutoff (usually 1.3–1.45) have a high negative predictive value and suggest a low risk for advanced fibrosis, so patients can generally be monitored in primary care without further immediate specialist referral. Intermediate values indicate an indeterminate zone where additional non-invasive testing, such as elastography (FibroScan), may be needed for further risk assessment. Scores above a higher cutoff (typically around 2.67–2.68 for NAFLD) suggest a higher risk of advanced fibrosis, prompting specialist referral, further imaging, or even consideration of liver biopsy for definitive diagnosis.

Thus, contrary to general practice, vibration-controlled transient elastography (“Fibroscan”) isnot recommended for MASLD screening in all but may be done only for patients deemed at intermediate or high risk by the Fib-4 or other non-invasive indices. vibration-controlled transient elastography (“Fibroscan”) is indicated. Generally, a liver stiffness measurement (LSM) below 7 kPa is considered normal or indicative of no significant fibrosis. Values above 7 kPa suggest the presence of at least significant fibrosis, while higher cutoffs such as ≥9-10 kPa indicate

significant fibrosis (METAVIR F2 or above) depending on the liver disease etiology. For cirrhosis (METAVIR F4), a FibroScan cutoff around 12-15 kPa is used. Risk prediction can be further improved by combining biomarkers like the Enhanced Liver Fibrosis (ELF) panel with FIB-4 is in the indeterminate or elevated range, or combining imaging with biomarkers like the "MEFIB" index that combines MRE ≥3.3 kPa and FIB-4 ≥1.6 to identify very high-risk patients.

2b. Treatment : Management centres on glycemic control, weight loss, consideration of emerging pharmacotherapeutics, and surveillance for advanced fibrosis [4].The PIVENS trial, a key phase 3 RCT, demonstrated that pioglitazone (30 mg/day) improved liver histology with reductions in steatosis, inflammation, and fibrosis among biopsy-confirmed MASH patients without diabetes.However, currently , pioglitazone is recommended for patients with T2DM and MASLD. Saroglitazar is recommended by the DCGI for use in both diabetics and non-diabetics with MASLD but is not available outside India and is not FDA approved due to lack of ample evidences. Glucagon-like peptide-1 (GLP-1) receptor agonists and dual/triple agonists (e.g., liraglutide, tirzepatide, retatrutide) that reduce liver fat, inflammation, and improve metabolic parameters.A meta-analysis of 13 phase 2 and 3 RCTs with 1811 participants found that GLP-1RAs (notably semaglutide 2.4 mg/week) significantly improved liver fibrosis by at least one stage without worsening MASH compared to placebo (pooled odds ratio 1.79).The ESSENCE trial (Phase 3 RCT) demonstrated that 72 weeks of weekly semaglutide achieved MASH resolution and fibrosis improvement in patients with moderate-to-advanced fibrosis.Other RCTs using liraglutide and semaglutide showed similar histological benefits in patients with MASH and fibrosis stages F2-F3.However, effectiveness was limited in patients with compensated cirrhosis (F4 fibrosis). Thyroid hormone receptor-β agonists (e.g., resmetirom), the first approved drugs shown to reduce fibrosis in MASH but is not currently available in India. Antioxidants like vitamin E may improve liver histology in selected non-diabetic patients but require careful dosing to avoid adverse effects. It is not recommended for use in diabetes with MASLD.

2c. Met-ALD – the dual blow : Since alcoholic and non-alcoholic fatty liver disease can co-exist, the Met-ALD (Metabolic dysfunction and Alcohol-Associated Liver Disease) score has been proposed which refers to liver disease that develops due to both metabolic dysfunction and the presence of significant alcohol intake. This entity recognizes that patients may have both risk factors simultaneously, and it is distinct from pure alcoholic liver disease or purely metabolic-associated liver disease. The diagnosis involves detecting fatty changes in the liver, at least one metabolic risk factor, and a history of increased alcohol consumption. Persons with Met-ALD have a higher risk of disease progression, including cirrhosis and hepatocellular carcinoma, than those with metabolic or alcohol-related disease alone.

3. Skeletal fragility in T2DM :

3a. Improved Risk prediction : Diabetes is a recognized risk factor for poor bone quality and increased fracture risk independent of bone mineral density (BMD). Paradoxically, patients with type 2 diabetes may have normal or elevated BMD on dual-energy X-ray absorptiometry (DXA), yet their true fracture risk remains high due to deficits in bone microarchitecture. Some modifications to the online fracture risk prediction tool - FRAX have been suggested to improve risk prediction for fracture risk in diabetes including

- Adjusting the femoral neck T-score by lowering it by 0.5 SD: This adjustment has been shown to improve the prediction of major osteoporotic fractures (MOF) and is considered effective for this purpose.
- Using the Trabecular Bone Score (TBS) adjustment: TBS correction improves fracture risk prediction, particularly for MOF, in patients with diabetes by accounting for bone quality impairment not captured by BMD alone.
- Increasing age input by 10 years: This simple modification tends to modestly improve fracture risk prediction, especially for hip fractures, although it is less precise than other methods.
- Ticking the rheumatoid arthritis (RA) box in the FRAX tool for patients with diabetes can improve hip fracture prediction

FRAXplus is an enhanced version of the FRAX tool that incorporates additional risk factor information, including adjustments for type 2 diabetes mellitus and its duration, to provide a more accurate fracture risk assessment in diabetic patients. It refines standard FRAX estimates by considering factors such as recent fractures, high-dose glucocorticoid use, and diabetes

duration, which are not fully accounted for in the original FRAX model.

3b. Role of Medications : Management includes optimizing glycemic control, fall prevention, vitamin D and calcium supplementation, and selected use of anti-osteoporotic agents (bisphosphonates, denosumab, or teriparatide) .Diabetes medications influence bone health: thiazolidinediones increase fracture risk, while some GLP-1 receptor agonists and SGLT2 inhibitors may have favourable or neutral bone effects. GLP-1RAs also have anti-inflammatory effects and may positively modulate bone metabolism by promoting osteoblast activity and inhibiting osteoclasts, potentially preserving bone mineral density.GLP-1RAs also have anti-inflammatory effects and may positively modulate bone metabolism by promoting osteoblast activity and inhibiting osteoclasts, potentially preserving bone mineral density.

4. Obstructive Sleep Apnea (OSA)

OSA is highly prevalent in the diabetic population, especially in those with obesity and metabolic syndrome, and exacerbates cardiovascular risk by several folds. Screening in primary care utilizes validated questionnaires—such as STOP-Bang (cut-off ≥3 for high risk)—with confirmatory diagnosis via overnight polysomnography. The Epworth Sleepiness Scale is another commonly used tool. Management includes positive airway pressure therapies (CPAP/BiPAP), weight loss, and consideration of dental or surgical interventions in selected cases. With the recent advent of anti-obesity medications, endocrinologists and physicians have a lot to offer for patients with OSA. Early identification and treatment reduce cardiovascular risk and improve glucose regulation.

GLP-1 receptor agonists (GLP-1RAs) have emerging evidence supporting their use in improving obstructive sleep apnea (OSA), especially in patients with obesity. Meta-analyses of randomized controlled trials demonstrate that GLP-1RAs significantly reduce the apnea-hypopnea index (AHI), indicating improvement in OSA severity. They also promote weight loss and lower systolic blood pressure, which contribute to better OSA outcomes. Drugs like tirzepatide show superior efficacy in reducing OSA severity and associated metabolic risks. However, gastrointestinal side effects are common, and current evidence is limited to a few RCTs, highlighting the need for further research before GLP-1RAs can be widely recommended for OSA management.

5. Sarcopenia in diabetes

Sarcopenia in diabetes is a common condition characterized by progressive loss of skeletal muscle mass, strength, and quality, leading to reduced physical function. Mechanisms include insulin resistance impairing muscle protein synthesis, and chronic hyperglycemia causing oxidative stress, inflammation, and accumulation of advanced glycation end products which damage muscle tissue.

It can easily be assessed in clinics by :

- Muscle mass: Appendicular Lean Mass Index (ALMI) cut-offs are <7.0 kg/m² for men and <5.7 kg/m² for women, measured by DXA or equivalent body composition analysis.
- Muscle strength: Handgrip strength cut-offs are <27 kg in men and <16 kg in women, measured using a dynamometer.
- Muscle performance: Gait speed <0.8 m/s or inability to complete timed up-and-go in less than 12 seconds indicates reduced function

The SARC-F questionnaire is a simple screening tool assessing strength, walking ability, rising from a chair, stair climbing, and falls. Imaging methods like DXA, CT, and MRI provide accurate muscle mass and quality assessment, while body composition analysis with bioelectrical impedance is used in clinics for muscle and fat mass estimation.

Treatment includes resistance exercise, protein supplementation, optimized glycemic control, and potentially pharmacotherapy. GLP-1 receptor agonists (GLP-1RAs) may be linked to sarcopenia due to weight loss effects; however, they also preserve muscle quality and reduce inflammation. Careful management with nutritional support and tailored exercise is recommended to mitigate GLP-1RA-associated muscle loss while benefiting metabolic health.

6. Diabetes and osteoarthritis (OA)

T2DM and osteoarthritis of the knees linked through several pathophysiological mechanisms, primarily involving chronic hyperglycemia, systemic inflammation, and metabolic dysregulation. Elevated blood glucose in diabetes leads to the formation of advanced glycation end products (AGEs) that accumulate in joint tissues, causing cartilage stiffening

and impairing repair. Insulin resistance and oxidative stress further stimulate proinflammatory cytokines that degrade cartilage and contribute to synovial inflammation. Obesity, a common comorbidity, exacerbates biomechanical stress and inflammatory mediator release, accelerating OA progression. Diagnosis of OA in diabetes mirrors standard OA criteria but includes attention to metabolic and inflammatory markers that indicate more aggressive disease.

Regarding anti-diabetic therapies, GLP-1 receptor agonists (GLP-1RAs) have shown potential benefits by promoting weight loss and reducing systemic inflammation, which may improve OA symptoms and joint health. SGLT2 inhibitors also contribute to weight reduction and improved vascular health, but their direct effects on OA are less well defined. Some studies suggest both drug classes may indirectly benefit OA by modulating metabolic risk factors and inflammation, although more focused research is needed to confirm their impact on joint structure and symptomatology.

7. Diabetic gastroparesis:

DM is often associated with delayed gastric emptying without mechanical obstruction leading to symptoms ranging from early satiety to severe vomiting, risking malnutrition and erratic glycemic control. Screening is warranted in patients with suggestive gastrointestinal symptoms, and diagnosis is confirmed with gastric emptying studies. Therapy involves dietary modifications (small, frequent, low-fat meals), prokinetic agents (metoclopramide, erythromycin), and advances in endoscopic and surgical management for refractory cases.

GLP-1 receptor agonists (GLP-1 RAs) are known to slow gastric emptying, which can have both beneficial and adverse effects in diabetic patients. The slowing of gastric emptying helps lower postprandial glucose levels, but it also increases the risk of delayed gastric emptying or gastroparesis. Studies indicate that GLP-1 RAs are associated with an increased risk of gastroparesis diagnosis in some patients, especially over longer durations of use, with effects observed at 6, 9, 12, and 24 months. This delayed gastric emptying can lead to symptoms such as nausea, vomiting, and bloating, and can complicate diagnostic assessments of gastroparesis or other gastrointestinal conditions. While GLP-1 RAs are beneficial for glycemic control and weight loss, clinicians should be mindful of these potential gastrointestinal side effects, particularly in patients with pre-existing gastrointestinal motility disorders or symptoms suggestive of gastroparesis. Data indicate an elevated risk as early as 6 months after initiation, which persists and often peaks between 12 and 24 months of treatment. Delayed gastric emptying can occur even in patients who have been on GLP-1RAs for over a year, particularly at higher doses of agents like semaglutide and dulaglutide. Symptoms may not always correlate with the degree of delayed gastric emptying, so objective tests such as gastric scintigraphy are important for diagnosis. Early dose escalation and longer duration of therapy are associated with higher risk of dysmotility. After stopping GLP-1 receptor agonists (GLP-1RAs), the timeline for reversibility of effects varies by agent due to differences in their half-lives. Liraglutide is mostly cleared within 1-2 days, so its effects including slowed gastric emptying and appetite suppression typically reverse quickly within a few days. In contrast, longer-acting agents such as semaglutide, dulaglutide, and tirzepatide take several weeks for complete clearance and gradual return of baseline gastric motility and appetite, with some effects persisting for up to several weeks after discontinuation.

8. Sexual Dysfunction in Diabetes

Sexual dysfunction—a frequent but infrequently discussed diabetes complication—occurs in both sexes: erectile dysfunction in men and arousal, orgasmic, or pain disorders in women. Screening should be part of routine diabetes care, using structured instruments such as the International Index of Erectile Function (IIEF) or the Female Sexual Function Index (FSFI). Management utilizes a combination of glycemic control, psychosocial interventions, hormonal or pharmacological therapies (e.g., PDE-5 inhibitors for men), and consideration of medical devices or sexual counselling.

GLP-1 receptor agonists (GLP-1RAs) have shown promising effects on sexual dysfunction in diabetes, particularly erectile dysfunction (ED), which affects a large proportion of men with type 2 diabetes. Mechanistically, GLP-1RAs improve insulin resistance, promote weight loss, and exert anti-inflammatory and antioxidant effects that protect vascular endothelium and peripheral nerves, all contributing to improved erectile function. Experimental studies suggest they enhance penile endothelial cell function and reduce oxidative stress. Clinical meta-analyses indicate GLP-

1RAs significantly improve erectile function compared to metformin, with the greatest benefits seen in obese patients due to weight loss and improved lipid metabolism. The REWIND trialshowed that dulaglutide reduced the incidence of moderate-to-severe erectile dysfunction and attenuated the decline in erectile function over time in men with type 2 diabetes. Smaller prospective studies have demonstrated that liraglutide improved erectile function and libido in obese men with functional hypogonadism, outperforming testosterone replacement therapy in promoting weight loss and sexual function improvement. These agents may also positively influence testosterone levels indirectly by improving metabolic health. While evidence is growing, further large-scale, well-designed trials are needed to confirm the magnitude of benefit and to assess effects on other aspects of sexual dysfunction such as libido.

9. T2DM and polycystic ovary syndrome (PCOS) :

T2DM and PCOS are closely linked through shared pathogenetic mechanisms including obesity-driven insulin resistance and hyperinsulinemia, which promote androgen excess and metabolic dysfunction in PCOS. The chronic inflammatory state and adiposity common to both conditions exacerbate hormonal imbalances and increase the risk of T2DM in women with PCOS. Screening for T2DM is essential in young women with PCOS due to their elevated lifetime risk, ideally with an oral glucose tolerance test (OGTT) to detect impaired glucose tolerance early. Diagnosis of PCOS requires assessment of clinical and/or biochemical hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology on ultrasound, following consensus guidelines.

GLP-1 receptor agonists (GLP-1RAs) are increasingly recognized in recent PCOS guidelines for managing overweight or obese women with PCOS due to their efficacy in improving insulin resistance, inducing weight loss, and reducing androgen levels. These agents improve menstrual regularity and ovulation rates by addressing key metabolic abnormalities. GLP-1RAs also reduce cardiometabolic risks associated with PCOS. Current guidelines recommend considering GLP-1RAs as adjunct therapy particularly in those who do not respond adequately to lifestyle interventions and metformin, highlighting their growing role in integrated PCOS management.

10. Conclusion:

In summary, while macrovascular and microvascular complications remain a cornerstone of diabetes management, primary care practitioners must broaden their focus to encompass these prevalent, impactful, but lesser-discussed complications in obese patients with T2DM who might have additional benefits from GLP1Ra.

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Cardiology and Diabetes a complex interface (a case based study)

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Diabetes mellitus (DM) is a well-established risk factor for both macrovascular and microvascular disease. In patients with advanced ischaemic cardiomyopathy, diabetes contributes not only to the development of diffuse coronary atherosclerosis but also to poor postoperative outcomes due to impaired tissue perfusion, endothelial dysfunction, and susceptibility to infection.

Diabetes is a major determinant of adverse cardiovascular outcomes and postoperative morbidity. Its effects extend beyond glycaemic control, influencing microvascular integrity, wound healing, infection risk, and organ perfusion. The two cases that I will be discussing are two middle aged south asian men with long-standing type 2 diabetes and severe ischaemic cardiomyopathy who developed contrasting yet related multisystem complications following coronary revascularisation.

As a clinical fellow working in a tertiary care hospital, I have observed first-hand the intricate interface between these two conditions in the daily clinical setting. The therapeutic strategies and patient management protocols are often confounded by the dual presence of cardiovascular risk factors and diabetes-related complications, making treatment decisions both nuanced and critical. Through these case examples, this article aims to provide a deeper understanding of the intricate relationship between cardiology and diabetes, emphasizing the need for integrated, multidisciplinary care that addresses both the cardiac and metabolic components of these intertwined conditions.

The first case describes bowel ischaemia and decompensated heart failure after elective coronary artery bypass grafting (CABG), while the second highlights catastrophic gastrointestinal bleeding and multifocal cerebral infarction following an acute myocardial infarction (MI). Both cases demonstrate the far-reaching impact of diabetes on vascular fragility, inflammatory response, and recovery trajectories.

Case 1: Post-CABG Bowel Ischaemia and Metabolic Decompensation in a Diabetic Patient with Advanced Heart Failure

The patient was a middle-aged south asian man with a background of type 2 diabetes mellitus with retinopathy, ischaemic cardiomyopathy (EF 15%), secundum atrial septal defect, and chronic kidney disease G2A3. He was under the care of a community heart failure clinic and was optimised on bisoprolol 1.25 mg daily, dapagliflozin 10 mg, spironolactone 12.5 mg, and losartan 25 mg, in addition to insulin-based diabetic therapy.

Surgical Intervention

He underwent an elective on-pump coronary artery bypass grafting (CABG) ×2 using LIMA–LAD and a long saphenous vein graft (SVG–D1). The procedure was uncomplicated intraoperatively, but in the immediate postoperative period, he exhibited poor end-organ perfusion, rising lactate, and worsening LV function, necessitating inotropic and vasopressor support in the ICU.

Early Postoperative Complications

Over the next 48 hours, the patient's lactate levels continued to climb, accompanied by tachycardia, abdominal distension, and hypotension. A CT abdomen revealed distal ileal ischaemia with moderate bilateral pleural effusions and patchy pulmonary changes. An urgent laparotomy confirmed ischaemia of the terminal ileum, and approximately 30

cm of bowel was resected, followed by end-to-end anastomosis to 15 cm of viable distal ileum.
A re-look laparotomy showed no further necrosis. He remained ventilated and on renal filtration , after which he was successfully weaned and extubated .

Cardiac and Metabolic Course
A contrast echocardiogram demonstrated severely impaired LV systolic function with a small apical aneurysm but no thrombus. His weight peaked at 67.5 kg consistent with fluid overload, before gradually improving to 59 kg by under high-dose IV furosemide.
Glycaemic control remained erratic throughout admission despite insulin adjustments, prompting a C-peptide test to guide further diabetic management. Wound healing was delayed, and he was followed by the tissue viability team.

Summary
This case illustrates the compounded effect of diabetes-induced microvascular fragility and low-output cardiac failure, predisposing to bowel ischaemia, renal dysfunction, and poor wound repair. Despite recovery from the acute surgical episode, his trajectory was significantly influenced by his metabolic and microvascular compromise.

Case 2: Inferior STEMI with Catastrophic Haemorrhage, Multifocal Stroke, and Recurrent Infection in a Diabetic Patient
A 63 year old south Asian man with type 2 diabetes mellitus, hypertension, hypercholesterolaemia, and Crohn's disease was transferred from a DGH to our tertiary centre following an inferior STEMI. His recent history included a transurethral resection of the prostate (TURP) two weeks prior.

Initial Cardiac Event and Management
Admission ECG confirmed inferior ST-elevation, and coronary angiography demonstrated diffuse multi-vessel atherothrombotic disease with large thrombus burden. The right coronary artery was proximally occluded, while LAD and LCx showed diffuse severe stenoses. Due to the extent of disease, he underwent plain old balloon angioplasty (POBA) and a 6-hour tirofiban infusion for thrombus resolution.

Major Haemorrhagic Complication
Within 24 hours of the procedure, he developed massive upper gastrointestinal bleeding with haemodynamic collapse. A major haemorrhage protocol was activated; he was transfused 7 units of PRBCs and 4 units of FFP and transferred to ICU. Emergency OGD revealed multiple bleeding duodenal ulcers (D1), which were treated with seven clips.
Subsequent identified recurrent ulceration requiring two further clips. His haemoglobin fell to 56 g/L, and blood pressure dropped to 70/50 mmHg, necessitating noradrenaline infusion.

Neurological and Vascular Complications
During step-down care, the patient developed delirium and agitation. CT head and MRI brain revealed acute–subacute infarcts in the left centrum semiovale and cerebellar hemisphere, suggesting a multifocal embolic process.
Echocardiography demonstrated a dilated LV (EF 23%) with akinetic inferior and posterior walls and a pseudo-aneurysmal septum. CT aorta ruled out dissection but showed an occluded left superficial femoral artery with distal recanalisation, consistent with peripheral arterial disease—another sequela of diabetic vasculopathy.

Infectious Complications
Throughout admission, repeated urine cultures grew yeasts and mixed bacterial flora. Following catheter change, he received levofloxacin and metronidazole, later escalated to fluconazole for fungal infection. Despite therapy, infection persisted, prompting additional amoxicillin and metronidazole courses .

Summary
This case underscores the interplay between diabetic vascular disease, gastrointestinal fragility, and infection susceptibility in a critically ill cardiac patient. The coexistence of major haemorrhage, embolic stroke, and infection reflects the systemic vulnerability of diabetic patients with diffuse atherosclerosis and low cardiac reserve.

Discussion
Diabetes profoundly influences outcomes in ischaemic heart disease, not only through atherosclerosis but also by compromising microcirculatory integrity, immunity, and healing capacity.
In Case 1, bowel ischaemia likely arose from mesenteric hypoperfusion compounded by microvascular diabetic injury, with delayed healing exacerbated by hyperglycaemia.
In Case 2, mucosal ulceration, endothelial fragility, and altered coagulation underpinned catastrophic gastrointestinal bleeding, while microvascular

thrombosis and embolic phenomena led to cerebral infarction.

Both cases illustrate how diabetes transforms a cardiac insult into a multisystem crisis, amplifying risk across vascular, renal, neurological, and infectious domains. The management of such patients requires a multidisciplinary approach, integrating cardiology, endocrinology, nephrology, and infection control expertise. Strict glycaemic control, individualized anticoagulation strategies, and early recognition of extra-cardiac complications are essential to improving outcomes.

These two cases emphasize diabetes as a systemic disease that modifies every stage of recovery from ischaemic cardiac events. Beyond glycaemic metrics, its impact on vascular tone, immune function, and tissue resilience determines postoperative and post-infarction trajectories. In patients with severe LV dysfunction and diffuse vascular disease, meticulous metabolic management and cross-specialty collaboration are critical to mitigating multisystem morbidity and mortality.

YOUR HEALTH
Estd.1952
only publication of
The Indian Medical Association
for the people in English
GST No. 19AAATI0290G2ZR

November 2025
Date of Publication
3rd Nov 2025

R.N. I. No.2756/1964
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Printed and Published by **Dr.Sankar Sengupta**
on behalf of Indian Medical Association
and Printed at Prabaha, 45, Raja Rammohan Sarani, Kolkata-700009.
Published from Sir Nilratan Sircar IMA House, 53 Sir Nilratan Sarkar Sarani,
(Creek Row), Kolkata-700014, INDIA. Hony. Editor **Dr. Khwaja Alim Ahmed**