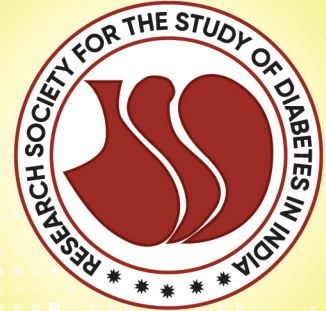


RSSDI Indian Diabetes & Metabolic

EDUCATOR JOURNAL



Theme of the Month

Cardiometabolic Continuum: Prevention to Long Term Care

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

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To keep the members of
diabetes care team abreast with
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FOREWORD

Every month, RSSDI continues to build momentum through initiatives that promote research, education, and professional development. Supported by its active state chapters, RSSDI is creating opportunities for scientific learning and improved diabetes care across the country. Recent highlights include the regional scientific online webinar “Weight Matters: Transforming Asian Diabetes Care in 2026,” which brought together experts from across Asia to advance evidence-based diabetes and obesity care. RSSDI also launched its all-new native app, providing seamless access to resources and services. These initiatives reflect RSSDI's commitment to strengthening diabetes and metabolic care in India with the support of many key stakeholders with the collective vision of establishing India as a global benchmark in this field.

The Indian Diabetes and Metabolic Educators Journal (IDMEJ), formerly known as the Indian Diabetes Educator Journal (IDEJ), has been dedicated to diabetes education since its launch in April 2015, making it India's first and longest-running monthly journal in this field. Over the years, it has evolved into an important platform for sharing evidence-based knowledge, promoting awareness, and supporting healthcare professionals in the comprehensive management of diabetes and metabolic health. Published under the aegis of RSSDI, IDMEJ continues to strengthen Diabetes Self-Management Education and Support (DSMES) while broadening its focus to include a wider spectrum of metabolic conditions. With a growing digital presence, the journal reaches a strong professional community of more than 53,000 physicians and 29,000 diabetes educators across India.

The September edition of the Indian Diabetes & Metabolic Educators Journal (IDMEJ) focuses on the theme “Cardiometabolic Continuum: Prevention to Long-Term Care.” Cardiometabolic health is a lifelong journey, requiring a proactive approach to prevention, early identification, risk reduction, and sustained management. This issue provides diabetes educators with practical, evidence-based insights into cardiometabolic risk assessment, lifestyle and nutritional interventions, weight management, and long-term care strategies. By emphasizing timely intervention and continuity of care, this edition aims to equip diabetes educators with the knowledge and tools to support sustainable behaviour change, improve clinical outcomes, and reduce the long-term burden of cardiometabolic diseases.

I sincerely appreciate all the authors and experts for their valuable contributions and insights to this issue. This edition recognises the unwavering efforts of healthcare professionals whose commitment to excellence continues to drive progress in diabetes care and shape India's leadership in the field.

(Dr. Jitendra Singh)

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CHIEF EDITOR'S NOTE



As Chief Editor, I am pleased to present the September issue of the Indian Diabetes & Metabolic Educators Journal, dedicated to the theme “Cardiometabolic Continuum: Prevention to Long-Term Care.” Cardiometabolic health is shaped by the complex interplay of cardiovascular, metabolic, and renal health, making early prevention and sustained risk management essential to improving long-term outcomes.

This edition explores important and often overlooked factors influencing cardiovascular health, including the changing face of cardiovascular disease, obstructive sleep apnea, air pollution, and the impact of chronic stress on the heart. It also highlights the cardio-renal-metabolic connection and practical perspectives on nutrition, lifestyle, and behaviour change. Through its expert interview of the month, and FAQs, including case-based discussions, this issue aims to help healthcare professionals translate evidence into meaningful everyday care.

Protecting cardiometabolic health requires more than managing individual risk factors; it calls for a comprehensive, patient-centred approach that supports prevention, early detection, and long-term care. Healthy eating, regular physical activity, adequate sleep, stress management, and appropriate medical care all have an important role to play.

My sincere appreciation goes to all the contributors who have enriched this issue with their knowledge and experience. I hope this edition serves as a valuable resource for diabetes educators, dietitians, and healthcare professionals in supporting better cardiometabolic health and improving patient outcomes across the continuum of care.

Sincere Regards,

Dr Sunil Gupta

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Article: Obstructive Sleep Apnea: A Silent Driver of Cardiovascular Disease



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Article: Air Pollution and the Heart: Why Clean Air is a Cardiovascular Intervention



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To get featured in the Indian Diabetes and Metabolic Educator Journal you can connect with us on the below mail ID for further communication: info@nurturehealthsolutions.com

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Cover Story: The New Face of Cardiovascular Disease: Why Heart Disease is no Longer just a Disease of the Elderly



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Heart disease is no longer associated with just ageing. Across the world, the number of young adults diagnosed with heart attacks, stroke, and other cardiovascular diseases (CVD) has increased. This growing trend highlights the importance of recognizing risk factors early and adopting preventive measures well before symptoms appear.

Why are young adults at greater risk?

One of the main reasons why younger adults are getting CVD is the increasing prevalence of lifestyle-related risk factors at younger ages. Obesity, type 2 diabetes, high blood pressure (BP), unhealthy cholesterol levels, smoking, and physical inactivity are becoming more common in young adults. Since these conditions often begin years before symptoms develop, they gradually damage blood vessels and increase the lifetime risk of CVD.



Lifestyle habits that are harming heart health

Lifestyle has emerged as one of the strongest drivers of this growing burden. Modern routines often involve long hours of sitting, limited physical activity, frequent consumption of processed foods, chronic stress, smoking, and excessive alcohol intake. These habits do not act independently; they often occur together and significantly increase CV risk. Studies have consistently shown that maintaining a healthy lifestyle through regular exercise, balanced diet, stress management, maintaining a healthy weight, and avoiding smoking can substantially lower the risk of heart disease, stroke, and CV-related deaths.

Physical inactivity is particularly concerning among younger adults. Sedentary behaviour contributes to obesity, hypertension, diabetes, and poor CV fitness. Even moderate exercise performed consistently can reduce the risk of CVD and improve long-term health outcomes. Experts therefore recommend incorporating regular physical activity into daily life from a young age rather than waiting until health problems develop. In contrast, dietary patterns rich in fruits, vegetables, whole grains, legumes, nuts, fish, and healthy fats have been associated with lower CV risk. Studies have shown that following healthy eating patterns, such as the mediterranean or Dietary Approaches to Stop Hypertension (DASH) diets can significantly reduce the likelihood of developing heart disease over time.

Another risk factor is smoking. Smoking remains one of the most important preventable cause of CVD in young adults. Cigarette smoking increases the risk of coronary heart disease, stroke, peripheral artery disease, and sudden cardiac death. The risk increases with both the duration and intensity of smoking, while even passive exposure to tobacco smoke can negatively affect CV health. Quitting smoking significantly lowers CV risk and remains one of the most effective ways to protect long-term heart health.

Beyond lifestyle: Other hidden risk factors

Although lifestyle factors explain a large proportion of early heart disease, they are not the only cause. The recent rise in CV events among younger adults has also drawn attention to inherited heart conditions and structural abnormalities. Hypertrophic cardiomyopathy, inherited rhythm disorders such as long QT syndrome and Brugada syndrome, congenital coronary artery abnormalities, myocarditis, and familial hypercholesterolemia can all increase the risk of serious cardiac events even in individuals who appear healthy. In some cases, these conditions remain undiagnosed until a life-threatening event occurs.



Substance abuse is another emerging concern. The use of cocaine, anabolic steroids, high-caffeine energy drinks etc has been associated with abnormal heart rhythm, heart attacks and sudden cardiac arrest in young adults. These substances can overstimulate the CV system, increasing BP, heart rate, and the risk of life-threatening arrhythmias.

Healthy habits for a healthy heart



Regular physical activity, a balanced diet, maintaining a healthy body weight, avoiding tobacco and substance abuse, limiting alcohol intake, managing stress, getting adequate sleep, and undergoing routine screening for BP, blood glucose, and cholesterol can significantly reduce CV risk. For individuals with a family history of heart disease or sudden cardiac death, early medical evaluation and appropriate screening may help identify high-risk conditions before complications occur. As we observe World Heart Day on 29 September, it is a timely reminder that heart health should be a priority at every age. Taking small steps today can help build healthier hearts and reduce the burden of CVD disease for future generations.

Resources:

1. Parizad R, Batta A, Hatwal J, *et al*. Sudden cardiac arrest in young adults: A comprehensive systematic review of epidemiology, aetiology and preventive strategies. *Heart Int*. 2026;20(1):20-34. Published 2026 Jun 2. doi:10.17925/HI.2026.20.1.3
2. Paul P, Kamal R, Awasthi A. Young Hearts under Attack: The Alarming Increase in Heart Problems among Indian Youth. *Curr Cardiol Rev*. 2025;21(1):e1573403X333367. doi:10.2174/011573403X333367240925094017
3. Antza C, Gallo A, Boutari C, *et al*. Prevention of cardiovascular disease in young adults: Focus on gender differences. A collaborative review from the EAS Young Fellows. *Atherosclerosis*. 2023;384:117272. doi:10.1016/j.atherosclerosis.2023.117272
4. Jafari N, Alivand S, Molaee H, *et al*. How lifestyle factors can contribute to cardiovascular disease incidence: A review study. *J Prev Epidemiol*. 2023;9:e35232. doi:10.34172/jpe.2023.35232

Obstructive Sleep Apnea: A Silent Driver of Cardiovascular Disease



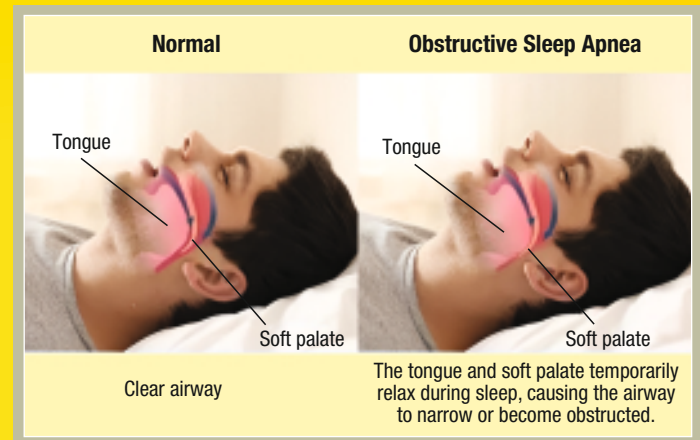
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Obstructive sleep apnea (OSA) is one of the most common yet underdiagnosed sleep disorders. It is characterized by repeated episodes of partial or complete collapse of the upper airway during sleep, leading to interrupted breathing, reduced oxygen levels, fragmented sleep, and excessive daytime sleepiness. Beyond poor sleep quality, OSA has

emerged as an important risk factor for cardiovascular disease (CVD). Research suggests that untreated OSA contributes to hypertension, coronary artery disease (CAD), heart failure, arrhythmias, stroke, and premature CV death.



How OSA affects the heart

During an episode of OSA, oxygen levels fall and carbon dioxide levels rise, leading to repeated cycles of intermittent hypoxia and reoxygenation. These repeated episodes place significant stress on the CV system by increasing blood pressure (BP), promoting inflammation, impairing blood vessel function, and increasing the workload on the heart. Over time, these physiological changes contribute to hypertension, atherosclerosis, and an increased risk of CVD. Individuals with untreated OSA are therefore at a significantly higher risk of CV morbidity and mortality.

Why early screening matters

Early detection of OSA is essential because many individuals remain undiagnosed until CV complications develop. Sonosalpingography (SSG) screening tool offers a simple and user-friendly approach for identifying individuals at high risk of OSA. The SSG tool focuses on the three most common symptoms of OSA:

- S – Snore: Do you snore loudly while sleeping?
- S – Sleepiness: Do you experience excessive daytime sleepiness?
- G – Gasp: Has anyone noticed that you gasp for air or choke during sleep?

Each response is assigned a score based on symptom frequency. A higher total score indicates a greater probability of OSA and the need for further evaluation. Following the initial symptom screening, the tool recommends assessing common risk factors (SOHNA), which include:

S – Sex, O – Obesity, H – Hypertension, N – Neck circumference, A – Anatomical abnormalities of the upper airway.

Individuals with a high SSG score should undergo confirmatory testing, with overnight polysomnography, which remains the gold standard for diagnosing OSA.

Can treatment reduce cardiovascular risk?

Continuous positive airway pressure (CPAP) remains the first-line treatment for moderate to severe OSA as it prevents airway collapse, improves oxygenation, and relieves symptoms. Along with CPAP, effective management should include weight management, healthy lifestyle changes, and optimal control of BP, diabetes, and lipid levels.



Conclusion

Obstructive sleep apnea is far more than a sleep disorder. It is a significant but often overlooked contributor to CV disease. Because a large proportion of cases remain undiagnosed, routine screening in high-risk individuals should become part of CV care. Timely diagnosis, lifestyle modification, and appropriate treatment can improve symptoms and may reduce the long-term burden of CVD.

Resources:

1. Bock JM, Vungarala S, Karim S, *et al.* Obstructive Sleep Apnea as a Cardiovascular Risk Factor-Beyond CPAP. *Can J Cardiol.* 2021;37(5):756-765. doi:10.1016/j.cjca.2021.01.027
2. Peker Y, Akdeniz B, Altay S, *et al.* Obstructive Sleep Apnea and Cardiovascular Disease: Where Do We Stand?. *Anatol J Cardiol.* 2023;27(7):375-389. doi:10.14744/AnatolJCardiol.2023.3307
3. Gunta SP, Jakulla RS, Ubaid A, *et al.* Obstructive Sleep Apnea and Cardiovascular Diseases: Sad Realities and Untold Truths regarding Care of Patients in 2022. *Cardiovasc Ther.* 2022;2022:6006127. Published 2022 Aug 11. doi:10.1155/2022/6006127
4. Raveendran AV, Kesavadev J, Saboo B, *et al.* Obstructive sleep apnea: Proposed scoring system. *World J Methodol.* 2026;16(2):114192. Published 2026 Jun 20. doi:10.5662/wjm.v16.i2.114192

Air Pollution and the Heart: Why Clean Air Is a Cardiovascular Intervention



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Introduction

Air pollution, the greatest single environmental health risk, has been linked with the incidence of cardiovascular disease (CVD), which remains the leading cause of mortality worldwide. Of the various

CV illnesses, ischemic heart disease (IHD) and stroke account for approximately half of the early deaths attributed to air pollution. Amongst the air pollutants, fine particulate matter ($PM_{2.5}$) and gaseous pollutants such as ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and carbon monoxide (CO) have detrimental effects on CV health. However, studies have found the greatest and most robust associations for the PM i.e. microscopic particles suspended in the air. Emerging scientific evidence suggests that strengthening air quality regulations by enforcing stricter air quality standards for key pollutants, particularly ($PM_{2.5}$) NO_2 , and O_3 , should be considered as an important CV intervention.



What is $PM_{2.5}$?

$PM_{2.5}$ are fine inhalable particles with diameters that are generally 2.5 micrometers and smaller, emitted directly from a source such as construction sites, unpaved roads, fields, smokestacks or fires. Particle pollution levels can be especially high near busy roads, in urban areas (during rush hours), and in industrial areas. Research suggests that for every $10 \mu g/m^3$ increase in $PM_{2.5}$ concentrations, the risk of CV events increases by 10-20%.

How air pollution affects the cardiovascular system

The health effects of air pollution extend beyond the lungs. The pollutants in the air can trigger a series of biological changes that damage the heart and blood vessels. The endothelium, the lining that surrounds blood vessels, can be harmed by pollutants such as $PM_{2.5}$, which can encourage the buildup of fatty deposits, reducing the artery's flexibility and increasing its susceptibility to blockages. The following are the mechanisms that link air pollution to the development and progression of heart failure:

- $PM_{2.5}$ can trigger oxidative stress and systemic inflammation, damaging the endothelium and disrupting normal vascular function.

- High concentrations of these particles can reduce the blood's capacity to carry oxygen. The heart must exert greater effort to supply oxygen to the tissues. Owing to the heart's increasing workload, heart chambers enlarge eventually leading to heart failure.
- Air pollution may affect the heart's electrical signaling leading to arrhythmias (abnormal cardiac rhythms).
- In individuals with pre-existing CVD, such as hypertension, coronary artery disease (CAD), or a history of myocardial infarction (MI), continuous exposure can accelerate the progression of these conditions and increase the risk of developing or worsening heart failure.

Gaseous air pollutants, including NO₂, SO₂, O₃ and CO follow the same pathways in adversely affecting the CV health.

Conclusion

The CV impact of air pollution varies depending on an individual's susceptibility, the type, composition of air pollutants and the duration and intensity of their exposure. Recognizing clean air as a CV intervention broadens the approach to disease prevention. Mitigating the CV health effects of air pollution requires a combination of exposure reduction and lifestyle interventions, including an antioxidant rich diet, smoking cessation, use of air purifiers, N95 masks etc. Additionally, ongoing research will further help in developing more effective strategies to reduce the substantial burden on CV health from air pollution.

Resources:

1. Krismanuel H. Air pollution and cardiovascular diseases: mechanisms, evidence, and mitigation strategies. *J Med Life*. 2025;18(5):411-427. doi:10.25122/jml-2025-0018
2. Air Pollution and Cardiovascular Disease Basics. Available at <https://www.epa.gov/air-research/air-pollution-and-cardiovascular-disease-basics>. Last accessed on 5th August 2026

The Mind-Heart Connection: How Chronic Stress Fuels Cardiovascular Disease



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Cardiovascular disease (CVD) remains the leading cause of morbidity and mortality worldwide, and a growing body of evidence implicates chronic psychological stress as an independent, modifiable risk factor rather than a mere epiphenomenon of unhealthy behavior. Evidence has now moved towards a precise understanding of the

neuro-cardiovascular and neuro-immune pathways that translate a psychological stimulus into vascular pathology.



Note: The given image is AI generated and is used for illustrative purpose only

Neuroendocrine and autonomic mechanisms

Chronic psychosocial stress activates the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic-adreno-medullary (SAM) system, resulting in sustained elevations of cortisol and catecholamines. This neuroendocrine dysregulation promotes hypertension, insulin resistance, dyslipidemia, and pro-thrombotic state, while simultaneously altering brain regions particularly the amygdala and prefrontal cortex that govern autonomic CV control. Neuro-imaging studies reported a connection between increased amygdala metabolism in response to stress and the development of CV events providing a mechanistic bridge between the "stressed brain" and the "diseased heart."

Vascular inflammation and neuroimmune crosstalk

Apart from the impact on the metabolic functions, stress induces a low-grade systemic inflammatory response that substantially contributes to atherogenesis. Increased sympathetic outflow from the central nervous system triggers augmented proliferation and differentiation of hematopoietic stem and progenitor cells in the bone marrow. As a result, there is an increased production of pro-inflammatory monocytes and neutrophils in the myeloid lineage, which enhances vascular inflammation. Sympathetic nerve stimulation also promotes monocyte infiltration into the arterial intima, leading to their polarization into macrophages and subsequent foam cell formation. It has been demonstrated that acute and chronic psychosocial stress independently enhance vascular inflammatory responses, thereby promoting atherogenesis. However, the pro-inflammatory effects of chronic stress are stronger and more persistent, resulting in long-term adaptations that accelerate atherogenesis.

Clinical implications

For clinicians, these converging mechanistic pathways argue for routine psychosocial risk assessment alongside conventional CV risk factors. Behavioral interventions, stress-reduction therapies, and, where indicated, pharmacologic intervention may confer CV benefits. As diagnostic tools increasingly permit quantification of stress-related neural and inflammatory activity, integrating psychological stress into CV risk stratification is likely to become standard practice.

The mind-heart connection is no longer a matter of speculation but a mechanistically substantiated axis involving neuroendocrine dysregulation, autonomic imbalance, and neuroimmune-driven vascular inflammation. Recognizing chronic stress as a CV risk factor should prompt its systematic evaluation and management in clinical cardiology practice.

Resources:

1. Vaccarino V, Bremner JD. Stress and cardiovascular disease: an update. *Nat Rev Cardiol.* 2024;21(9):603-616. doi:10.1038/s41569-024-01024-y
2. Levine GN. Psychological Stress and Heart Disease: Fact or Folklore?. *Am J Med.* 2022;135(6):688-696. doi:10.1016/j.amjmed.2022.01.053
3. Meyer-Lindemann U, Sager HB. Neuroimmune crosstalk : How mental stress fuels vascular inflammation. *Neuro-Immun-Crosstalk : Wie mentaler Stress die vaskuläre Entzündung verstärkt. Herz.* 2024;49(4):249-253. doi:10.1007/s00059-024-05254-1
4. Hinterdobler J, Schunkert H, Kessler T, *et al.* Impact of Acute and Chronic Psychosocial Stress on Vascular Inflammation. *Antioxid Redox Signal.* 2021;35(18):1531-1550. doi:10.1089/ars.2021.0153

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Dosage and Administration: The recommended dose is one tablet daily. Each tablet contains a fixed dose of dapagliflozin, Sitagliptin and Metformin Hydrochloride.

Adverse Reactions: Most common adverse reactions reported are: Dapagliflozin- Female genital mycotic infections, nasopharyngitis, and 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; Urrosepsis and Pyelonephritis; Hypoglycaemia; 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: Hypoglycaemia when used in combination with other anti-hyperglycaemic medicinal product; Renal Impairment; Hypersensitivity reactions including anaphylaxis, angioedema, and exfoliative skin conditions- Stevens-Johnson syndrome; Bullous pemphigoid. Metformin Hydrochloride: Lactic acidosis; In case of dehydration (severe diarrhoea 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, Hepatic Impairment, Acute Alcohol intoxication, alcoholism.

Use in a special population: Pregnant Women: Due to lack of human data, drug should not be used during pregnancy. Lactating Women: It should not be used during breastfeeding. Paediatric Patients: The safety and efficacy of drug has not yet been established. No data are available. Geriatric Patients: In Patients > 65 years, it should be used with caution as age increases.

Additional information is available on request.
Last updated: March 2026

*In case of any adverse events, kindly contact: pr@usv.in

For the use of registered medical practitioner, hospital or laboratory.*



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Corvette Team

Interview of the Month with Dr. (Prof.) P. C. Manoria



Dr. (Prof.) P. C. Manoria

MD, DM (Cardiology), FICA (USA), FESC (Europe), FIAMS, FACC, FCAPSC, FICP, FISE, FCCP, FCSI, FIAE, FICN, FICMU, FIACM, FICC, FCSI, FIECR, FIMSA, FASET

Sr. Consultant Cardiologist & Director, Manoria Heart & Critical Care Hospital, Bhopal

Dr. Prof. P. C. Manoria is a distinguished cardiologist and Director of Manoria Heart & Critical Care Hospital, Bhopal. He previously served as Professor and Head of the Department of Cardiology at Gandhi Medical College, Bhopal. Dr. Manoria has served as the National President of both the Cardiological Society of India and the Association of Physicians of India. With extensive experience in clinical cardiology, diabetes, and cardiovascular medicine, he has authored numerous publications and continues to contribute to medical education, research, and evidence-based patient care. A recipient of seven Lifetime Achievement Awards, including one presented by Hon'ble Shri A. P. J. Abdul Kalam, he is also known for his compassionate, patient-focused approach, providing tailored treatment plans that integrate medical therapy with lifestyle guidance. His extensive clinical experience and commitment to patient care have earned him the trust and confidence of patients and peers alike.

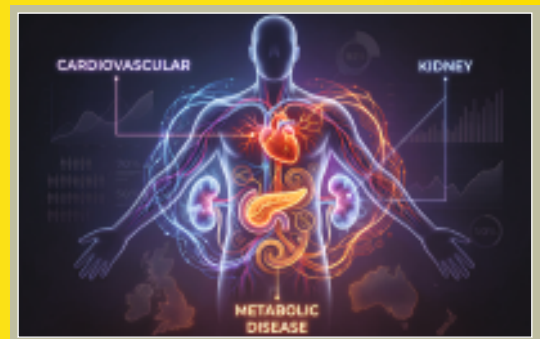
Cardiometabolic Continuum: Prevention to Long Term Care



1. Why is cardiovascular (CV) health important in people with diabetes and metabolic disorders?

Cardiovascular health is critically important in people with diabetes and metabolic disorders because these conditions substantially increase the risk of atherosclerotic cardiovascular disease (ASCVD), heart failure, stroke, and CV death. The various reasons are outlined below:

- Cardiovascular disease is a major cause of morbidity and mortality. Many people with type 2 diabetes ultimately develop CV complications, making prevention a central goal of diabetes care.
- Diabetes accelerates atherosclerosis. Chronic hyperglycemia promotes endothelial dysfunction, inflammation, oxidative stress, and vascular damage, accelerating plaque formation in the coronary, cerebral, and peripheral arteries.
- Metabolic disorders cluster multiple risk factors—obesity, hypertension, dyslipidemia, insulin resistance, and diabetes often co-exist. Their combined effect markedly increases CV risk.
- Heart failure risk is increased. Diabetes and obesity can lead to myocardial dysfunction and substantially increase the risk of both heart failure with preserved ejection fraction (HFpEF) and heart failure with reduced ejection fraction (HFrEF).



- Cardio-kidney-metabolic (CKM) interactions create a vicious cycle. Diabetes can damage the heart and kidneys, while kidney dysfunction further increases CV risk. Therefore, these conditions should be managed as an interconnected CKM continuum.
- Cardiovascular disease may be silent. Diabetic autonomic neuropathy may mask typical symptoms of myocardial ischemia, meaning significant coronary disease can sometimes remain undetected until an advanced stage.

In diabetes and metabolic disorders, treating blood glucose alone is no longer enough. Comprehensive management of CV risk including body weight, blood pressure, lipids, kidney health, and heart failure risk is essential to improve both longevity and quality of life.

2. Which cardiometabolic risk factors should be monitored and how frequently?

People with diabetes and metabolic disorders should undergo regular, comprehensive cardiometabolic risk assessment. The frequency should be individualized according to age, baseline risk, treatment, and the presence of CV or kidney disease.



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Risk factor / Parameter	What to monitor	Suggested frequency
Body weight and Body mass Index (BMI)	Weight, BMI and weight change	Every visit or at least every 3–6 months
Waist circumference	Central/abdominal obesity	At least annually
Blood pressure	Office BP; home/ambulatory BP when appropriate	Every clinical visit
Glycemic control	Glycated hemoglobin (HbA1c)	Usually every 3 months; every 6 months if stable and at target
Blood glucose	Fasting glucose/ Self-monitoring of blood glucose (SMBG)/ continuous glucose monitor (CGM), as appropriate	Usually every 3 months; every 6 months if stable and at target
Lipid profile	Low-density lipoprotein cholesterol (LDL-C), High-density lipoprotein cholesterol (HDL-C), triglycerides, non-HDL-C	At least annually; 4–12 weeks after starting/changing lipid therapy, then periodically
Lipoprotein(a) [Lp (a)]	Lp (a)	Once before the age of 18 years or earlier if there is family history of ASCVD or familial hypercholesterolemia (FH)
Kidney function	Serum creatinine and estimated glomerular filtration rate (eGFR)	At least annually; every 3–6 months or more often if chronic kidney disease (CKD) is present
Albuminuria	Urine albumin-to-creatinine ratio (UACR)	At least annually; more frequently in established CKD
Lifestyle factors	Diet, physical activity, sedentary time	Every visit or regular follow-up

Risk factor / Parameter	What to monitor	Suggested frequency
Smoking/tobacco use	Current use and cessation status	Every visit
Alcohol intake	Quantity and pattern of use	Periodically, preferably at routine reviews
ASCVD risk	Overall CV risk and risk enhancers	At least annually, and when clinical status changes
Heart failure risk	Symptoms, signs, weight change, dyspnea, edema	Every visit in high-risk individuals
Electrocardiogram (ECG) / cardiac evaluation	When symptoms, high risk, or clinical indication exists	Not routinely at fixed intervals for everyone; individualized

Cardiometabolic monitoring should not focus on glucose alone. A “whole-risk” approach, monitoring adiposity, blood pressure, glycemia, lipids, kidney function, and CV status at regular intervals is essential for early detection and prevention of CV and renal complications.

3. What lifestyle changes have the greatest impact on heart and metabolic health?

The greatest benefits come from a combination of sustainable lifestyle changes, rather than focusing on a single intervention.

- Achieve and maintain a healthy body weight even a 5–10% reduction in body weight can improve blood glucose, blood pressure, triglycerides, fatty liver, and overall cardiometabolic risk. If weight is reduced more than 15% diabetes may undergo remission, decrease in CV mortality, and improvement of HFpEF.
- Adopt a heart-healthy eating pattern. Emphasize vegetables, fruits, whole grains, legumes, nuts, and healthy protein sources. Reduce highly processed foods, refined carbohydrates, excess sugar, trans fats, and excess saturated fat.
- Be physically active regularly. Aim for at least 150 minutes/week of moderate-intensity aerobic activity, along with muscle-strengthening exercise at least 2 days/week. Reducing prolonged sitting is also important.
- Stop smoking and avoid tobacco in all forms. Smoking cessation is one of the most powerful interventions for reducing CV risk.
- Prioritize good sleep. Aim for regular, adequate, good-quality sleep, and identify conditions such as obstructive sleep apnea when clinically suspected.
- Manage stress effectively. Chronic stress can adversely affect blood pressure, glucose control, eating behaviour and sleep. Relaxation, yoga, meditation and regular social engagement may help.
- Limit or avoid alcohol. Avoiding excess alcohol can help improve blood pressure, triglycerides, body weight and liver health.
- Reduce sedentary behavior. Move regularly throughout the day. Break up prolonged sitting with short periods of walking or activity.



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4. How do Sodium-glucose co-transporter 2 (SGLT2) inhibitors and glucagon-like peptide-1 receptor agonists (GLP-1 Ras) support CV health?

SGLT2 inhibitors and GLP-1 receptor agonists support CV health through complementary mechanisms:

1. **SGLT2 inhibitors** like empagliflozin and dapagliflozin are a panacea for heart failure and can be used across the spectrum of heart failure. They are a boon for CKD and slow down the trajectory of CKD and postpone dialysis by 15 years.

They primarily provide heart failure and kidney protection by:

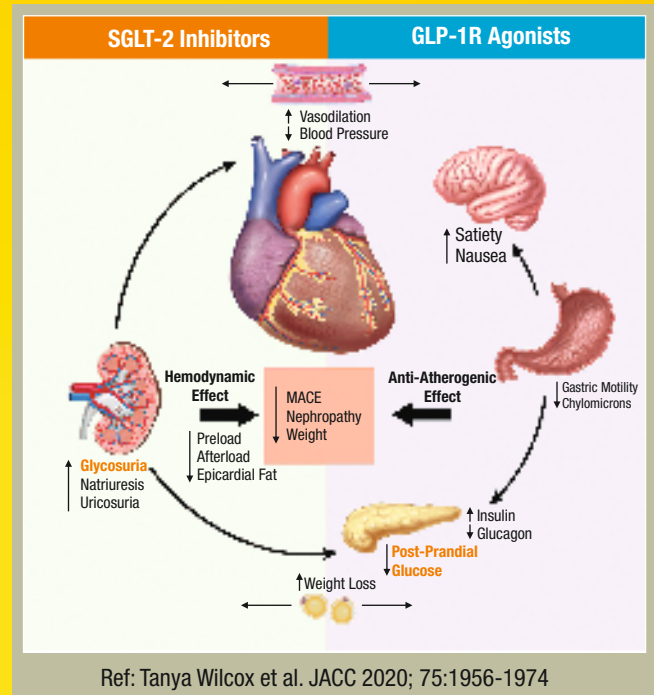
- Reducing heart failure hospitalization
- Lowering the risk of CV death in appropriate heart failure populations
- Promoting mild natriuresis and osmotic diuresis, reducing plasma volume and cardiac congestion
- Lowering blood pressure without significant tachycardia
- Producing modest weight loss
- Improving renal protection, which indirectly supports CV health
- Reducing adverse cardiac loading conditions and improving cardiorenal hemodynamics

2. GLP-1 receptor agonists

Examples: Semaglutide, liraglutide, dulaglutide.

They significantly reduce weight and provide atherosclerotic CV risk reduction by several mechanisms.

- Producing substantial weight loss, particularly with newer agents
- Improving glycemic control
- Reducing major adverse cardiovascular events (MACE) in appropriate high-risk populations
- Lowering the risk of myocardial infarction and stroke
- Modestly reducing blood pressure
- Improving metabolic risk factors and reducing adiposity
- Potentially exerting favorable effects on vascular inflammation and endothelial function



5. What is one key heart-health message for people with diabetes this World Heart Day?

“Protect your heart today—control your diabetes, know your CV risks, and act early to prevent heart and kidney disease.”



Note: The given image is AI generated and is used for illustrative purpose only

Drug Spotlight: Alpha-glucosidase Inhibitors



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Alpha-glucosidase inhibitors (AGIs) are oral glucose-lowering agents that delay carbohydrate digestion and absorption in the small intestine, thereby reducing postprandial blood glucose levels. They are recommended as an option for individualized treatment in people with type 2 diabetes, particularly when high carbohydrate

intake is a major contributor to postprandial hyperglycemia. Since AGIs do not stimulate insulin secretion, they have a low risk of hypoglycemia when used as monotherapy.

Mechanism of action

- AGI's competitively inhibit α -glucosidase enzymes located on the brush border of the small intestine.
- These enzymes include maltase, sucrase, glucoamylase, and isomaltase, which are responsible for breaking down complex carbohydrates into absorbable monosaccharides.
- Inhibition of these enzymes delays carbohydrate digestion and glucose absorption.
- As a result, postprandial plasma glucose excursions are reduced.

Forms

- Oral tablets administered with meals
- Commonly available agents include acarbose, voglibose, and miglitol

Advantages

- Reduces postprandial blood glucose levels and over a period of time lowers HbA1c
- Low risk of hypoglycemia when used as monotherapy
- Can be used alone or in combination with other glucose-lowering medications

Clinical considerations

- Gastrointestinal adverse effects, including flatulence, abdominal discomfort, and diarrhea, are the most frequently reported side effects.
- Gastrointestinal symptoms are usually mild to moderate and tend to improve with continued treatment.
- AGIs are contraindicated in patients with inflammatory bowel disease (IBD), intestinal obstruction, or chronic intestinal diseases associated with impaired digestion or absorption.

Drug snapshot

Drug group	Specific drug	Effects	Adverse effects	Contraindications
AGIs	Acarbose Voglibose Miglitol	HbA1c ↓ Postprandial glucose ↓	Flatulence ↑ Diarrhea ↑ Abdominal discomfort ↑	• IBD • Intestinal obstruction • Chronic intestinal diseases associated with impaired digestion or absorption

Nutrition - Drug related key takeaways

- AGIs delay the digestion and absorption of dietary carbohydrates and attenuate postprandial glucose excursions. Accordingly, appropriate carbohydrate intake should be maintained within a balanced dietary pattern, with carbohydrate restriction individualized according to overall glycemic targets and nutritional requirements. Extremely low carbohydrate diets are discouraged during AGI treatment, as it may precipitate hypoglycemia.
- Mild-to-moderate hypoglycemia in individuals receiving AGIs should be treated with glucose or glucose-containing preparations, as AGIs may delay the digestion and absorption of disaccharides or polysaccharides (sucrose, candy, aerated drinks, etc.).

Resources:

1. RSSDI 2025 Nutrition Guidelines for Individuals With Type 2 Diabetes (Supported by ICMR-National Institute of Nutrition). *Int J Diabetes Dev Ctries*. 2025. doi:10.1007/s13410-025-01588-6.
2. Weinberg Sibony R, Segev O, Dor S, *et al*. Drug Therapies for Diabetes. *Int J Mol Sci*. 2023;24(24):17147. Published 2023 Dec 5. doi:10.3390/ijms242417147
3. Regalla DKR, Patel P. Oral antidiabetic medications. In: StatPearls. StatPearls Publishing; 2026. Updated June 28, 2026. Accessed August 4, 2026. <https://www.ncbi.nlm.nih.gov/books/NBK482386/>

Trending Diets- Portfolio Diet



Prof. Dr. Anshuman Naik

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The portfolio diet is a plant-based dietary pattern combining recognised cholesterol-lowering food groups such as plant protein (legumes, soy), viscous soluble fibre (oats, barley, psyllium), nuts, plant sterols/stanols, and plant monounsaturated fats into a single, additive strategy for cardiovascular disease (CVD) risk reduction.

Mechanism of action

Each component acts on a distinct step of cholesterol metabolism, fibre increases bile acid excretion, sterols inhibit cholesterol absorption, plant protein and nuts improve the lipoprotein profile, and monounsaturated fatty acid (MUFAs) displace saturated fat producing an additive low-density lipoprotein cholesterol (LDL-C) lowering effect.

What does the portfolio diet look like?

Expected LDL-cholesterol lowering

1. Nuts and seeds, 45 g daily

All nuts and seeds are good for your heart and cholesterol and, contrary to concerns, do not contribute to weight gain. Try having nuts or seeds as a snack between meals, or add them to salads, cereals, or yogurt. Try nut butter on your toast as another option. 45 g is about a handful of nuts. If you are allergic to peanuts, tree nuts, try seeds.

5-10%

2. Plant protein, 50 g daily

Plant protein is becoming the easy option. It's a way to take action for your heart and the planet. Start by trying to get 10 g daily, which could look like 1¼ cup soymilk, ½ cup chickpeas, ½ cup ground soy, ½ big veggie burger. You could also try ½ cup edamame. Try replacing cow's milk with silky soymilk, ground beef with hearty ground soy or lentils or meat with tasty tofu strips in a stir-fry.

5-10%

3. Viscous (Sticky) fibre, 20 g daily

Choose breads and cereals high in oats, barley, and/or psyllium to get your viscous fibre (2–4 g per slice of bread or 4–6 g per cup of dry cereal). Emphasize fruits (apples, oranges, berries, persimmons) and vegetables (eggplant, okra) (1–2 g per serving).

The easiest way to add viscous fibre is a supplement (psyllium, PGX, pectin). Try adding 1–2 tsp psyllium product to water or pure psyllium husk to smoothies, soy yogurt or apple sauce (2–4 g per tsp).

5-10%

4. Plant sterols, 2 g daily

These occur naturally in plant foods (e.g., nuts, soybeans, peas, canola oil), but to get this amount will require a supplement or fortified foods like spreads, juices or yogurt.

5-10%

5. Oils (MUFAs), 45 g daily

Try heart-healthy oils rich in monounsaturated fatty acids (MUFAs). Extra-virgin olive oil should be the first choice. Other choices include canola, soybean or “high-oleic” sunflower oil and safflower oil. Aim for “extra-virgin” or “cold-pressed” oils (15 g per 1 tbsp oil). Avocados are also an excellent source of MUFAs (9 g per ¼ fruit).

5-10%

Figure 1: Components of portfolio diet

Supporting evidence

- **Lipid and CVD risk reduction:** Controlled trials show LDL-C reductions of ~14% with full adherence; a pooled analysis of three large US prospective cohorts (>210,000 participants) found higher adherence to portfolio diet is associated with a significantly lower risk of CVD, coronary heart disease (CHD), and stroke.
- **Mortality and early-life benefit:** Higher adherence to portfolio diet was associated with lower CVD mortality in a US NHANES cohort and a more favorable lipid/blood pressure profile in a young, multiethnic cohort.

Potential risks and limitations

- **Adherence challenges:** Sustained intake of multiple food groups can be harder to maintain than single-component diets.
- **Nutrient gaps and limited randomized controlled trials data:** A largely plant-based pattern may need attention to B12/iron/zinc status; most CVD outcome evidence is observational.
- **Clinical considerations:** The portfolio diet is a food-based, guideline-concordant strategy for CVD prevention, particularly hyperlipidemia. The individual components of the portfolio diet should be individualized according to the nutritional status, biochemical parameters, clinical profile, and therapeutic goals. Given its LDL-C-lowering efficacy approaching low-to-moderate intensity statin therapy, it should be an adjunct to, not a replacement for, guideline-directed lipid-lowering pharmacotherapy.

Resources:

1. Glenn AJ, Guasch-Ferré M, Malik VS, *et al.* Portfolio Diet Score and Risk of Cardiovascular Disease: Findings From 3 Prospective Cohort Studies. *Circulation*. 2023;148(22):1750-1763. doi:10.1161/CIRCULATIONAHA.123.065551
2. Chen V, Chiavaroli L, Glenn AJ, *et al.* Portfolio diet and LDL-C in a young, multiethnic cohort: cross-sectional analyses with cumulative exposure modeling. *BMC Public Health*. 2025;25(1):1761. Published 2025 May 13. doi:10.1186/s12889-025-22479-9
3. Lawson Centre for Child Nutrition, with the Canadian Cardiovascular Society and St. Michael's Hospital, What is Portfolio diet, Available at: <https://childnutrition.utoronto.ca/portfolio-diet>. Accessed on 7th August 2026
4. Kavanagh ME, Zurbau A, Glenn AJ, *et al.* The portfolio dietary pattern and risk of cardiovascular disease mortality during 1988-2019 in US adults: a prospective cohort study. *BMC Med*. 2025;23(1):287. Published 2025 May 21. doi:10.1186/s12916-025-04067-1
5. Kavanagh ME, Chiavaroli L, Sievenpiper JL, *et al.* Portfolio diet for prevention and management of type 2 diabetes mellitus and cardiovascular disease. In: Preedy VR, Patel VB, eds. *Handbook of Public Health Nutrition: International, National, and Regional Perspectives*. Springer, 2025. doi:10.1007/978-3-031-32047-7_109-1

The Cardio-Renal-Metabolic Connection



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Cardiovascular disease (CVD), chronic kidney disease (CKD), and metabolic disorders such as obesity and type 2 diabetes are no longer viewed as distinct conditions. They are closely interconnected, with dysfunction in one organ system often accelerating damage in the others.

This complex relationship is referred to as the cardio-renal-metabolic connection. By recognizing these conditions as part of a single continuum rather than isolated diseases, healthcare professionals can identify at-risk individuals earlier and implement strategies that improve long-term

CARDIOVASCULAR-KIDNEY-METABOLIC (CKM) SYNDROME



Understanding the cardio-renal-metabolic connection

The heart, kidneys, and metabolic system work together to maintain normal physiological functions. Metabolic abnormalities such as obesity, insulin resistance, hypertension, dyslipidemia, and hyperglycemia can impair both CV and renal health. At the same time, declining renal function can worsen blood pressure control and increase CV risk, while cardiac diseases can reduce kidney perfusion and accelerate renal dysfunction.

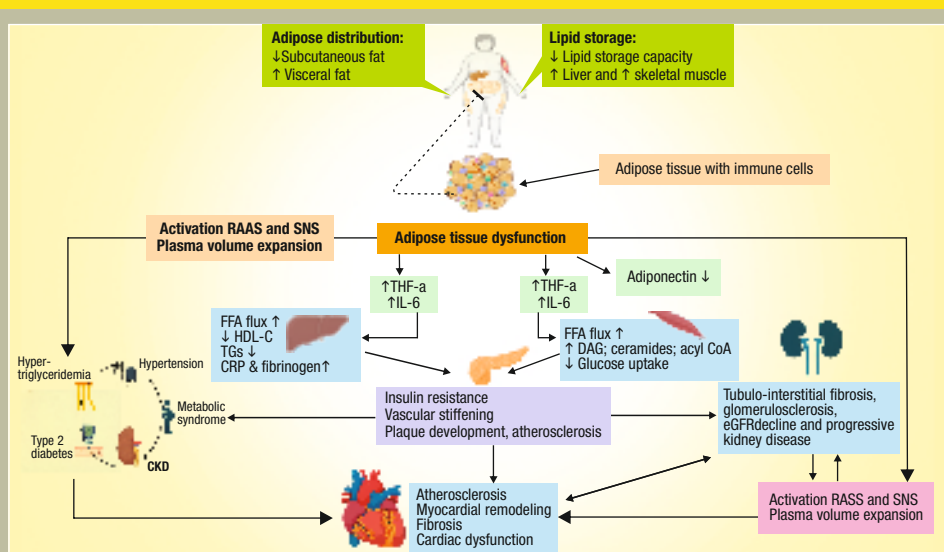


Figure 2: Key mechanisms driving the cardio-renal-metabolic connection (Mutruc, Victoria, et al., 2025)

This bidirectional relationship creates a cycle in which each condition contributes to the progression of the others. This encourages clinicians to move beyond organ-specific care and instead adopt a holistic approach that considers the shared mechanisms and overlapping risk factors underlying these disorders.

Underlying pathophysiological mechanisms

Several biological pathways drive the cardio-renal-metabolic connection. Chronic inflammation, oxidative stress, insulin resistance, and activation of the renin-angiotensin-aldosterone system (RAAS) contribute to vascular dysfunction and progressive organ damage. Excess visceral adiposity further worsens insulin resistance, dyslipidemia, and endothelial dysfunction.

Persistent hyperglycemia and hypertension damage the renal microvasculature, leading to albuminuria and declining kidney function. As kidney function deteriorates, sodium and fluid retention, neurohormonal activation, and vascular changes increase cardiac workload, explaining why CV and renal complications often develop together in individuals with diabetes.

Clinical implications and management

Many individuals with obesity, prediabetes, or type 2 diabetes develop CV and renal abnormalities long before symptoms can appear. Early identification of risk factors through routine assessment of blood pressure (BP), lipid profile, renal function, CV risk, eGFR, and urine albumin-to-creatinine ratio (UACR) enables timely intervention and helps identify individuals who may benefit from therapies that protect multiple organ systems.

Lifestyle modification remains the cornerstone of management. Healthy eating, regular physical activity, weight management, smoking cessation, stress management, and adequate sleep should be combined with individualized pharmacological therapy when appropriate.

The importance of early detection and collaborative care

Early detection of CV and renal risk factors allows timely intervention before irreversible organ damage occurs. Effective management requires coordinated, individual-centred care through collaboration among physicians, cardiologists, nephrologists, endocrinologists, dietitians, and diabetes educators.

Recognizing this close relationship has led to a more integrated approach to care. Combining early screening, lifestyle modification, evidence-based pharmacotherapy, and multidisciplinary management can reduce complications and improve long-term outcomes in individuals with diabetes and related metabolic disorders.

Resources:

1. Singh A, Kesani H, Verma S, *et al.* Cardio-Renal Metabolic Syndrome: An Integrated Approach to Prevention and Management. *Cureus*. 2025;17(10):e94134. Published 2025 Oct 8. doi:10.7759/cureus.94134
2. Ndumele CE, Rangaswami J, Chow SL, *et al.* Cardiovascular-Kidney-Metabolic Health: A Presidential Advisory From the American Heart Association. *Circulation*. 2023;148(20):1606-1635. doi:10.1161/CIR.0000000000001184
3. Mutruc V, Bologa C, Șorodoc V, *et al.* Cardiovascular–Kidney–Metabolic Syndrome: A New Paradigm in Clinical Medicine or Going Back to Basics? *Journal of Clinical Medicine*. 2025; 14(8):2833. <https://doi.org/10.3390/jcm14082833>

Diabetes Educator Toolkit:

Skill of the Month: Goal Setting



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Goal setting is a fundamental skill for diabetes educators (DEs), enabling them to support individuals in making realistic and meaningful lifestyle changes. By developing personalized and achievable goals, DEs empower individuals to actively manage their condition and improve long-term health outcomes.

Five simple steps for effective goal setting

1. Identify the challenge: The first step is to understand the individual's perspective and identify the primary concern that needs attention. Open-ended questions encourage discussion and self-reflection.

- Which part of managing your diabetes has been going well for you?
- Which area of your diabetes management would you most like to improve?

2. Understand thoughts and emotions: Understanding the individual's thoughts and emotions helps the DE to assess the problem and also their readiness for change.

Guiding questions that can help to initiate the conversation:

- What has been going through your mind regarding your current situation?
- How has this challenge affected your daily routine or diabetes management?

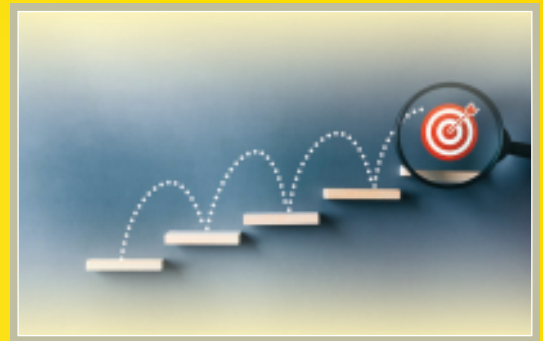
3. Set a meaningful goal: The next step is to help the individual identify a realistic and achievable goal that aligns with their priorities while assessing their motivation and commitment to achieve it. Guiding questions to facilitate this discussion:

- If you could change one thing, what would you like to improve first?
- What goal feels most realistic for you at this stage?

4. Develop an action plan: The DE and the individual should work together to identify realistic, manageable steps that can be incorporated into the individual's daily routine.

Suggested prompts that can help with the discussion:

- What is one small change you feel ready to start with?
- Looking back, what has been most effective in helping you make similar changes?



5. Review and reflect: Regularly reviewing progress helps reinforce positive behaviours, identify barriers, and refine the action plan when needed.

- What did you learn from this experience?
- What would you like to do differently moving forward?

Effective goal setting is an ongoing, collaborative process that helps individuals build confidence, overcome barriers, and sustain meaningful changes in diabetes self-management.

Resources:

1. Fisher L, Polonsky WH, Hessler D, *et al.* A practical framework for encouraging and supporting positive behaviour change in diabetes. *Diabet Med.* 2017;34(12):1658-1666. doi:10.1111/dme.13414
2. Bailey RR. Goal Setting and Action Planning for Health Behavior Change. *Am J Lifestyle Med.* 2017;13(6):615-618. Published 2017 Sep 13. doi:10.1177/1559827617729634
3. Balconi M, Angioletti L, Acconito C. Self-Awareness of Goals Task (SAGT) and Planning Skills: The Neuroscience of Decision Making. *Brain Sci.* 2023;13(8):1163. Published 2023 Aug 3. doi:10.3390/brainsci13081163

Frequently Asked Questions on Cardiometabolic Continuum Care



Dr. Rahul Parashar

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1. I am a 40-year-old lawyer with a demanding job, and I feel stressed most days. Although my blood pressure (BP) and cholesterol levels are currently normal, can chronic stress still increase my risk of developing heart disease? What can I do to protect my heart?

Answer: Yes, chronic stress can increase your risk

of heart disease over time. It causes the release of hormones like cortisol and adrenaline, which can raise heart rate and blood pressure. Over time, this may increase the risk of hypertension, diabetes, and cardiovascular disease (CVD). Stress can also influence your lifestyle habits. Managing stress doesn't have to be complicated. Start with these simple habits:

- Stay physically active: Aim for at least 30 minutes of moderate-intensity exercise or 10,000 steps daily, while staying active throughout the day by incorporating regular movement, such as taking short walking breaks during work. Choose activities that you enjoy, as enjoyable activities are more sustainable and can become a positive part of your daily routine rather than an added burden.
- Prioritize stress management and sleep: Incorporate stress-management practices such as deep breathing, meditation, or yoga, and aim for 7–8 hours of quality sleep each night.
- Incorporate immediate de-stressing techniques: Include quick, accessible activities that promote relaxation and psychological well-being, such as backward counting, listening to music, deep breathing exercises, brief mindfulness pauses, or engaging in short, enjoyable distractions. These can be used during acute stress to restore calm and improve emotional regulation.
- Avoid unhealthy coping habits: Avoid smoking, excessive alcohol consumption, emotional eating, and excessive caffeine intake as strategies for managing stress.

Protecting your heart isn't only about maintaining normal test results. Managing chronic stress is equally important because a healthy mind often supports a healthy heart.

2. I'm a 28-year-old lifestyle influencer, and I'm constantly exposed to new diet trends on social media for heart health like mediterranean diet, low-carb diet, intermittent fasting etc. With so much conflicting information, which eating pattern is actually the best for protecting my heart?

Answer: Instead of following viral diet trends, focus on a balanced eating pattern that is sustainable. The mediterranean and Dietary Approaches to Stop Hypertension (DASH) diets have the strongest scientific evidence, and are highly recommended, particularly for people with high BP. To keep your heart healthy, follow these simple eating habits:



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- **Build a balanced plate:** Fill ½ your plate with salad and non-starchy vegetables, ¼ with whole grains like wheat, oats, quinoa etc and ¼ with a source of protein such as pulses, beans, fish, poultry, tofu, or low-fat dairy.
- **Choose healthy fats:** Choose nuts, seeds, avocado, monounsaturated fatty acid (MUFAs) rich vegetable oils such as rice bran or groundnut oil, while limiting fried foods, butter, processed meats, and other sources of saturated fat.
- **Cut back on ultra-processed foods:** Limit sugar-based drinks and packaged foods, and focus on fresh, minimally processed foods.

Heart health is built through long-term dietary habits, not short-term diets. You don't need to follow every new diet trend, instead focus on balanced meals and healthy food choices that you can enjoy and maintain for life.

3. I am a 35-year-old working professional. I have recently started medication for high BP. I have switched from regular salt to pink or black salt and I have also started including ready-to-eat diet snacks that are available to improve my health. What else can I do to keep my heart healthy?

Answer: It's great that you're taking your medication regularly and making efforts to eat healthier. However, pink salt, black salt, and regular white salt all contain sodium and have a similar impact on BP management. Switching to pink or black salt does not provide any significant advantage for controlling BP. Therefore, it is important to limit the intake of all types of salt, including pink and black salt. Similarly, foods labelled as "diet," "low-fat," or "healthy" are not always heart healthy. They may still be high in sodium, unhealthy fats, or added sugars. Here are a few simple changes you can make:

- Reduce your sodium intake by limiting packaged foods, instant meals, pickles, sauces, and restaurant foods and not just by changing the type of salt.
- Read nutrition labels and choose products lower in sodium, saturated fat, and added sugars.
- Choose fresh and minimally processed healthy snacks like fruits, unsalted nuts, roasted chana, sprouts, or homemade options instead of packaged snacks.
- Take your medication regularly, stay physically active, and monitor your BP.

Heart health isn't about one "healthy" ingredient. It's your overall diet, regular exercise, medication, and healthy habits that will make a difference.

Nutrition facts

Serving Size 1/4 Cup (30g)
Servings Per Container About 38

Amount per serving

Calories 200 Calories from fat 150

% Daily value*

Total fat 17g 26%

Saturated fat 2.5 g 13%

Trans fat 0 g

Cholesterol 0 mg 0%

Sodium 120 mg 5%

Total carbohydrate 7g 2%

Dietary fiber 2g 8%

Sugars 1g

Protein 5g

• Vitamin A 0% • Vitamin C 0%

• Calcium 4% • Iron 8%

*Percent daily values are based on a

2,000 calorie diet

Look for sodium on the food label. A product is considered low in sodium if it contains no more than 0.12 g/120mg of sodium per 100 g for solids or per 100 mL for liquids.

Superfood: Psyllium Husk

Psyllium Husk (*Plantago Ovata*) is also called Isapgol, Ghoda jeeru in Gujarati, Isabgol in Hindi, and Isabgala in Marathi. India leads in the production and export of psyllium in the world's commercial market. From the seed coat of psyllium (*P.ovata*), a clear, colourless and gel forming mucilage is considered a good source of both soluble and insoluble fiber. It is commonly used as a bulk-forming laxative to treat hemorrhoids and constipation. The table given below provides an overview of the numerous health benefits associated with psyllium husk.



Health benefits	Function
Digestive health	The gel-forming ability helps retain water, which helps increase the stool water content and soften it, providing the laxative effect. (Doses > 10g/day for > 4 weeks were found to be more effective in one study).
Diabetes	Helps control blood glucose levels by slowing digestion and glucose absorption. (A study demonstrated improvement in HbA1c levels with doses >10 g/day).
Cholesterol management	The soluble fiber binds the bile acids by forming a gel in the gut, thereby reducing cholesterol absorption and helping lower LDL cholesterol, triglycerides and total cholesterol levels.
Diarrhea	Soluble fiber absorbs water and forms a gel in the intestines, which helps to thicken the stool and may provide relief from diarrhea.
Weight management	The presence of fiber contributes to satiety, reduces hunger pangs and overall caloric intake. (Meta-analysis findings reported psyllium husk before meals, 7–15 g/day mean 10.8 g/day) resulted in significant reductions in body weight.
Gut health	It provides fiber that helps the beneficial bacteria to thrive well, improving the gut health and enhancing nutrient absorption.
Detoxification	Facilitates natural detoxification processes in the body through an increased rate of defecation and evacuation of wastes and toxins from the body.

Nutritional value

10g gives 35kcal, 8gcarbs, and 7g fiber.

Recommended dosage

5-10g with sufficient water, as advised by the healthcare professional for adults.

How to consume

Mix psyllium husk in water and consume immediately to prevent clumping. Increase dosage gradually as per tolerance and as advised, if new to fiber supplements. Consume in prescribed amounts as excessive use may lead to abdominal discomfort and diarrhea.

Resources:

1. Kassa MG, Teferi DA, Asemu AM, *et al.* Review on psyllium husk: nutritional, functional, health benefits, food industry applications, waste treatment, and potential negative effects. *CyTA - Journal of Food*. 2024; 22(1).
2. How to Use Psyllium Husk. Available at <https://www.webmd.com/digestive-disorders/psyllium-husk-use>. Last accessed on 7th August 2026
3. Van der Schoot A, Drysdale C, Whelan K, *et al.* The Effect of Fiber Supplementation on Chronic Constipation in Adults: An Updated Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Am J Clin Nutr*. 2022; 116(4):953-969. doi:10.1093/ajcn/nqac184
4. Gholami Z, Clark CCT, Paknahad Z. The effect of psyllium on fasting blood sugar, HbA1c, HOMA IR, and insulin control: a GRADE-assessed systematic review and meta-analysis of randomized controlled trials. *BMC Endocrine Disorders*. 2024; 24(1):82. Published 2024 Jun 6. doi:10.1186/s12902-024-01608-2
5. Gibb RD, Sloan KJ, McRorie JW Jr. Psyllium is a natural nonfermented gel-forming fiber that is effective for weight loss: A comprehensive review and meta-analysis. *J Am Assoc Nurse Pract*. 2023;35(8):468-476. Published 2023 Aug 1. doi:10.1097/JXX.0000000000000882

Role Play

Scenario: A 40-year-old man seeks nutrition counseling following a recent heart attack. He has a 3–4 year history of diabetes and hypertension, on medications, but rarely monitored his blood glucose or blood pressure (BP) regularly due to being asymptomatic and considered himself healthy. To stay fit, he recently started marathon training and adopted a one meal a day eating pattern. He also has a strong family history of cardiovascular disease (CVD), is a long-term smoker, and works in a high-pressure, demanding job with significant stress. He wants to understand why he developed a heart attack and requires guidance on adopting a heart-healthy diet and lifestyle to reduce his future CVD risk.

Mr. XYZ: Hello doctor! For a few years, having been diagnosed with diabetes and hypertension, I have been regular with my medications. Despite that, I had a heart attack. What could be the reason?

Diabetes educator (DE): A heart attack can occur when the blood flow to the heart is severely reduced or blocked, usually due to fatty (cholesterol build up) plaque in the arteries. In your case, several factors likely contributed, including family history, diabetes, hypertension, irregular monitoring, long-term smoking and chronic stress. Absence of symptoms does not indicate that diabetes and BP are in control. How often do you monitor your blood glucose levels or blood pressure?

Mr. XYZ: I wasn't frequently monitoring, maybe once in two months, as I didn't have any symptoms.

DE: Well, it is important to understand that both these conditions are "silent killers." High blood glucose and high BP together fastens the hardening and narrowing of your arteries. Regular monitoring helps you identify poor control, make suitable dietary modifications, help the doctor adjust the treatment plan accordingly and prevent sudden medical emergencies. You mentioned the one-meal-a-day diet. Why did you choose this approach?

Mr. XYZ: I started following this diet thinking eating only a day would help me reduce my day's caloric intake and help me stay fit, especially since I also had started training for marathons.

DE: I understand your viewpoint, but the one-meal-a-day diet makes it difficult to consume all the necessary nutrients that a person requires throughout a day in just a single meal. Eating a huge amount of food after long hours can cause large fluctuations in blood glucose levels. In addition, depending on your diabetes medications, prolonged fasting can increase the risk of hypoglycemia. You should follow a timely eating pattern comprising three balanced main meals and two healthy mid meal snacks (if required) in the day.

Mr. XYZ: What dietary and lifestyle modifications should I follow to reduce my risk of future CV events?

DE: Opt for a healthy plate method: half filled with non-starchy vegetables, one-quarter with whole grains and one-quarter with protein rich foods. Restrict the intake of saturated fats, refined carbohydrates, sugary drinks and highly processed foods. Avoid excess use of table salt and limit the intake of packaged foods as they are high in sodium. Seek guidance for smoking cessation as it promotes thrombosis (formation of a blood clot) and increases the risk of recurrent CV incidents. For exercise or physical activity, medical clearance and supervision is necessary and should proceed only according to cardiac rehabilitation recommendations. Adopt relaxation techniques such as breathing exercises and following a proper sleep schedule to manage work-related stress.

Mr. XYZ: Thank you doctor for such a valuable insight into various aspects.

DE: You're welcome. Take care. All the best.

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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.

Last updated: March 13, 2023

*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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