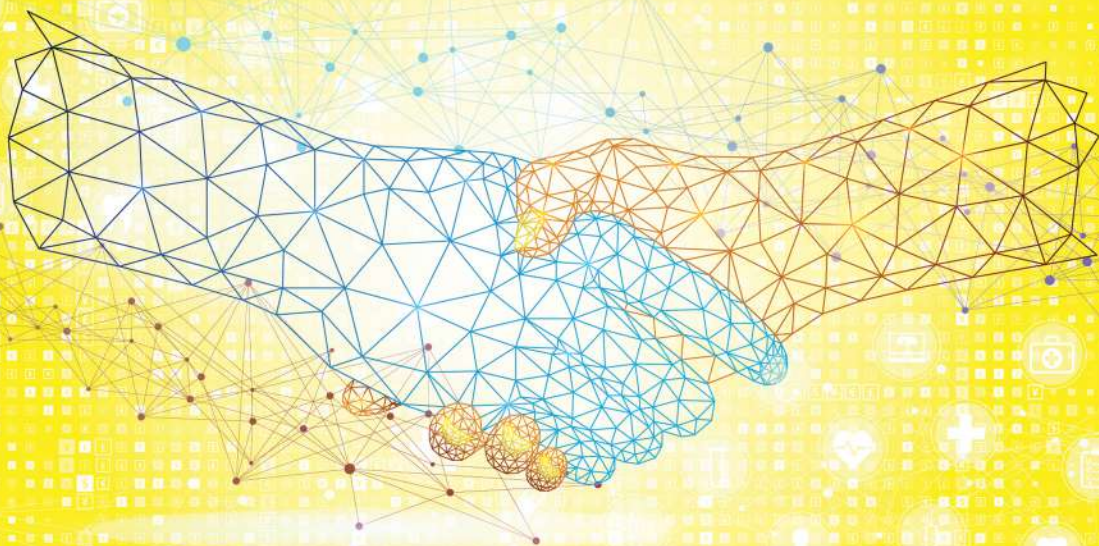


RSSDI Indian Diabetes & Metabolic EDUCATOR JOURNAL



Theme of the Month

Lifestyle Considerations in Metabolic Health

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

2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026

India's Longest Running Monthly Journal

In collaboration with





1st time in India
 To keep the members of
 diabetes care team abreast with
 DSME and DSMS concepts

EDITORIAL BOARD

Chief Editors

Dr. Sunil Gupta, Nagpur
 Dr. Pratap Jethwani, Rajkot

Editorial Board

Dr. Vipul Chavda, Ahmedabad
 Dr. Sadeep Suri, Hisar
 Dr. Arun Kumar Kedia, Raipur
 Dr. Ajith Kumar, Thiruvananthapuram
 Dr. Dheeraj Verma, Jaipur
 Dr. Abhishek Raha, Lumding
 Dr. Soumyaranjan Mohanty, Dhenkanal
 Dr. Balaji Chidambaram, Kumbakonam
 Ms. Sheryl Salis, Mumbai

Advisor

Dr. Sanjay Agarwal, Pune

NATIONAL ADVISORY BOARD

President	Dr. Anuj Maheshwari
Immediate Past President	Dr. Vijay Viswanathan
President Elect	Dr. Sunil Gupta
Secretary General	Dr. Rakesh Parikh
Hon. Treasurer	Dr. Pratap Jethwani
Vice President	Dr. Aravinda J.
Vice President	Dr. N. K. Singh
Hon. Joint Secretary	Dr. Manoj Chawla
All India Member	Dr. Anil Kumar Virmani
	Dr. Arvind Gupta
	Dr. Jothydev Kesavadev
	Dr. Narayan Deogaonkar
	Dr. Rajesh Kesari
	Dr. Vijaya Kumar G.
	Dr. Narsingh Verma, Central Zone
	Dr. Braj Kishore Singh, East Zone
	Dr. Sanjay Kumar Bhadada, North Zone
	Dr. K. N. Manohar, South Zone
	Dr. Lotika Purohit, West Zone
	Dr. Dinesh Agarwal, North-east Zone
Co-opted Members	Dr. Sanjay Agarwal
	Dr. Jayanta Kumar Panda
	Dr. Amit Gupta
	Dr. Rutul Gokalani
Patrons of RSSDI	Dr. Sarita Bajaj, Prayagraj
	Dr. Daya Kishore Hazra, Agra
	Dr. Ashok K. Das, Puducherry
	Dr. Sidhartha Das, Cuttack
	Prof. Samar Banerjee, West Bengal
	Dr. Prasanna Kumar, Bangalore
	Dr. P. V. Rao, Hyderabad
	Dr. Jitendra Singh, New Delhi
	Dr. V. Mohan, Chennai
	Dr. Shashank Joshi, Mumbai

Scan the QR code to access
 full library of IDMEJ -
<https://usvmed.com/>





FOREWORD



As a leading scientific organization, RSSDI actively promotes research and enhances professional clinical expertise through symposia, workshops, and educational programs. Through its active state chapters, RSSDI expands its outreach to encourage comprehensive metabolic health. Some highlights include the implementation of the Rural Outreach Village Adoption Program, through which more than 100 villages are being adopted, with a focus on healthy dietary practices, regular physical activity, and lifestyle modifications to help prevent complications. The highlights of April included the annual conferences of Kerala, Gujarat (DIABETICA), and Telangana, all of which saw enthusiastic participation and provided a dynamic platform for the exchange of knowledge, innovation, and discussions on equitable diabetes care. RSSDI is pleased to collaborate with USV in the collective vision of establishing India as a global benchmark in diabetes and metabolic care.

The Indian Diabetes and Metabolic Educators Journal (IDMEJ), previously known as the Indian Diabetes Educator Journal (IDEJ), is India's first and longest-running monthly publication dedicated to diabetes education since its establishment in April 2015. Over the years, the Indian Diabetes and Metabolic Educators Journal has evolved into a valuable academic platform for promoting awareness, sharing evidence-based insights, 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 (DSME/S) while broadening its focus to include the wider spectrum of metabolic disorders. With a strong and growing digital presence, the journal currently engages more than 53,000 doctors and 29,000 diabetes educators across India.

The June edition of the Indian Diabetes & Metabolic Educators Journal focuses on "Lifestyle Considerations in Metabolic Health." Lifestyle factors including nutrition, physical activity, sleep, stress, screen time, and everyday habits significantly influence the prevention and management of metabolic disorders. This issue provides diabetes educators with practical, evidence-based insights to help individuals incorporate sustainable lifestyle measures that support better glycaemic control and overall metabolic wellness. Key areas of focus include balanced nutrition, regular movement, sleep hygiene, stress reduction, and behavior change strategies. Through a preventive approach, this edition aims to encourage healthier lifestyle choices that contribute to improved long-term metabolic health and quality of life.

We express our sincere appreciation to the contributors who made this issue possible, and formally dedicate this work to the relentless efforts of clinical professionals committed to elevating India into a global leader in exemplary diabetes care.

Sincere Regards,

Dr. xxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx



CHIEF EDITOR'S NOTE

As a Chief Editor, I am pleased to present this issue on “Lifestyle Considerations in Metabolic Health.” Lifestyle behaviours continue to play a central role in the prevention and management of metabolic disorders, influencing outcomes far beyond diet and physical activity alone.

This edition highlights several emerging and clinically relevant aspects of lifestyle and metabolic health, including the impact of meal timing, sedentary behaviour, sleep, stress, gut health, and evolving dietary practices on metabolic function. It also brings attention to environmental factors that may contribute to metabolic dysfunction and increasing disease burden.

With the growing prevalence of metabolic disorders globally and in India, there is an increasing need for practical, evidence-based strategies that support holistic and sustainable metabolic care. Through this issue, we remain committed to strengthening diabetes and metabolic health education by equipping healthcare professionals including diabetes educators with actionable insights that can be translated into everyday clinical practice.

My sincere thanks to all contributors and the RSSDI community for their continued dedication to advancing metabolic health awareness, education, and clinical excellence in India.

Sincere Regards,

Dr. Pratap Jethwani

XXXXXXXXXXXXXXXXXXXX

Expert Contributors

of the month



Dr. Deepak Varshney

MBBS, MD (Medicine), Fellow Diabetes India

Consultant Physician and Diabetologist, Sukh Devi Diabetes Heart Care and Diagnostics, Aligarh

Article: Chrono Nutrition and Metabolic Health: Aligning Meal Timing with Circadian Biology



Dr. Satish Chander Wasoori

**MD (Medicine), MD (Endocrinology),
Fellow of American college of Endocrinology**
Senior Consultant Diabetologist and Endocrinologist,
Paras Hospitals, Gurgaon

Article: Sedentary Behaviour and Non-Exercise Activity Thermogenesis (NEAT): The Missing Link in Metabolic Risk Management



Dr. Ambika P. Yadav

MBBS, MD (Medicine), CCAGAI (USA), MIMA, MAPI

Consultant Physician Internal medicine,
Asha and Internal Hospital, Varanasi

Article: Sleep, Stress, and Metabolic Health:
The Neuroendocrine Connection



Dr. Shashank Jalak

MBBS, MD (Medicine)

Consulting Physician & Diabetologist,
Shree Chaitanya Hospital, Baramati

Article: Monosodium Glutamate (MSG) and Liver Health



Sheryl S. Salis

**Registered Dietitian, Certified Diabetes Educator, Certified
Insulin Pump Trainer, Certified Sports Nutritionist-USA, FODMAP
Dietitian-Australia, Certified Onco-Nutritionist,**
Founder of Nurture Health Solutions, Mumbai

Article: Interview of the Month with Sheryl S. Salis



Dr. Parthasarathy B

MBBS, MD (General Medicine), Fellowship (Diabetology)

Consulting Physician and Diabetologist,
Dr. Mohan's Diabetes Specialities Centre, Chennai

Article: Drug Spotlight: Sulphonylureas

Expert Contributors of the month



Dr. Pratiksha Patil

MBBS, D. Diabetology, FCPS (Medicine)
Consultant Diabetologist, Pratham Speciality Clinic, Mumbai

Article: Trending Diets: Intermittent Fasting



Dr. Sweekruti Jena

MBBS, MD (Medicine), DM (Endocrinology)
Consultant Endocrinologist, Care Hospital, Bhubaneswar

Article: Gut Microbiome as a Lifestyle Target in Metabolic Disorders



Dr. Kamal Kumar Koushal

**MD (Med), PG Dip. (HOD and Respiratory Diseases, Harvard),
FIDM (Diabetes), FICC (Cardiology), CCEBDM (Diabetes)**
Consultant Physician and Diabetologist, Ganga and Bimla Devi
Clinic, Purnea

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



Dr. Md. Misbah Ullah

MBBS, MD, PGD (Geriatric Med.)
Consultant Physician and Elder Care Specialist,
Al Hanif Clinic, Purnea

Article: Frequently Asked Questions on Lifestyle Considerations
in Metabolic Health

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

Table of Content

Cover story: Chrono nutrition and
Metabolic Health: Aligning Meal
Timing with Circadian Biology
Dr. Deepak Varshney

01

Trending Diets: Intermittent Fasting

Dr. Pratiksha Patil

14

Sedentary Behaviour and Non-Exercise
Activity Thermogenesis (NEAT): The
Missing Link in Metabolic Risk Management
Dr. Satish Chander Wasoori

03

Gut Microbiome as a Lifestyle Target in
Metabolic Disorders

Dr. Sweekruti Jena

16

Sleep, Stress, and Metabolic Health:
The Neuroendocrine Connection

Dr. Ambika P. Yadav

05

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

Dr. Kamal Kumar Koushal

18

Monosodium Glutamate (MSG) and
Liver Health

Dr. Shashank Jalak

07

Frequently Asked Questions on
Lifestyle Considerations in Metabolic
Health

Dr. Md. Misbah Ullah

20

Interview of the Month with
Sheryl S. Salis

Sheryl S. Salis

09

Did you know? Environmental
Obesogens, may Promote Fat
Accumulation and Metabolic
Dysfunction

23

Drug Spotlight: Sulphonylureas

Dr. Parthasarathy B

12

Role Play

24

Cover story: Chrono Nutrition and Metabolic Health: Aligning Meal Timing with Circadian Biology



Dr. Deepak Varshney

MBBS, MD (Medicine), Fellow Diabetes India
Consultant Physician and Diabetologist,
Sukh Devi Diabetes Heart Care and
Diagnostics, Aligarh

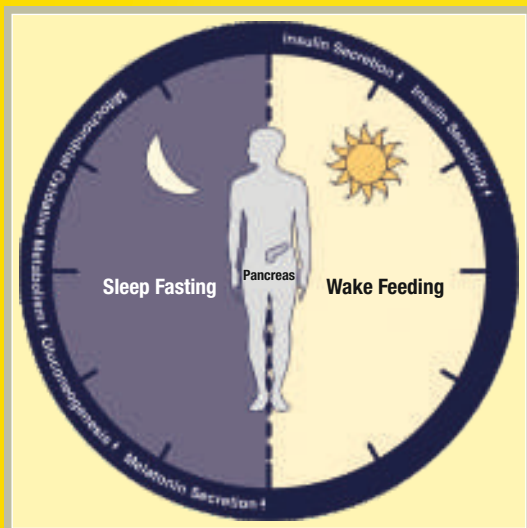
Chrono nutrition examines how meal timing, frequency, and regularity influence health. Individuals are often categorized into morning (early) and evening (late) chronotypes; evening types are linked to poorer dietary habits, late-night eating, and greater metabolic risk, while morning types generally show better well-being. These

patterns align with the body's circadian rhythm, a 24-hour cycle regulating physiological functions in response to light and darkness. Metabolic health is optimized when eating patterns align with this rhythm and impaired when they do not.

The cycle is essential for memory regulation, tissue repair, and metabolic regulation and it also shapes eating behaviour, digestion, body temperature, and hormonal balance. Disruptions in sleep can impair daily functioning and are associated with a higher risk of chronic conditions such as obesity, diabetes, depression, etc.



Circadian control of metabolism



Metabolism is regulated by daily hormonal rhythms involving insulin, leptin, ghrelin, cortisol, and melatonin. Insulin sensitivity is highest in the morning, favouring earlier meals, while evening melatonin reduces glucose tolerance and insulin secretion. Leptin promotes satiety and ghrelin stimulates hunger, linking circadian rhythm to appetite regulation. Individual chronotype, whether morning or evening, shapes hormonal rhythms and metabolic outcomes. Morning types align better with peak insulin sensitivity, while evening types often eat during periods of high melatonin, increasing the risk of poor glucose control and weight gain.

Consequences of misaligned eating patterns

Emerging evidence shows that meal timing significantly affects energy balance, glucose metabolism, and body composition. Metabolic consequences of misaligned eating patterns include:

Skipping breakfast and obesity risk: Skipping breakfast leads to higher calorie intake later in the day, leading to overeating and poorer glucose control.

Late-night eating and weight gain: Late-night eating misaligns food intake with circadian metabolism, when the body is primed for storage rather than energy use, leading to reduced thermogenesis and higher glucose levels. It also often coincides with poor sleep and hormonal shifts ($\uparrow$ ghrelin, $\downarrow$ leptin), promoting overeating and fat accumulation.

Intermittent fasting (IF): IF involves structured periods of fasting and feeding, with benefits largely driven by caloric restriction and fasting duration. It suggests that nutrient timing influences metabolic responses beyond just total calories, affecting hormonal rhythms, glucose control, and substrate utilization.³

Time-restricted eating (TRE): TRE is a type of IF, that involves limiting food intake to a consistent 6–10-hour window aligned with the active phase (ranging between 8 am to latest 6/8 pm), helping synchronize metabolism with circadian rhythms. It may improve insulin sensitivity, blood pressure, and metabolic health even without intentional calorie restriction largely by reducing late-night eating.

Clinical and practical implications: Clinical recommendations should balance circadian biology with real-world feasibility, emphasizing earlier caloric intake, a consistent 10–12-hour daytime eating window, and avoidance of late-night meals.

Therefore, aligning meal timing with circadian biology offers a practical and effective approach to improving metabolic health. Beyond focusing on what and how much we eat, chrono nutrition emphasizes when we eat as a key determinant of metabolic outcomes.

Resources:

1. Mentzelou M, Papadopoulou SK, Psara E, *et al.* Chrononutrition in the Prevention and Management of Metabolic Disorders: A Literature Review. *Nutrients*. 2024;16(5):722. Published 2024 Mar 1. doi:10.3390/nu16050722
2. Reddy S, Reddy V, Sharma S. Physiology, Circadian Rhythm. [Updated 2023 May 1]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK519507/>
3. Alum EU. Circadian nutrition and obesity: timing as a nutritional strategy. *J Health Popul Nutr*. 2025;44(1):367. Published 2025 Oct 17. doi:10.1186/s41043-025-01102-y

Sedentary Behaviour and Non-Exercise Activity Thermogenesis (NEAT): The Missing Link in Metabolic Risk Management



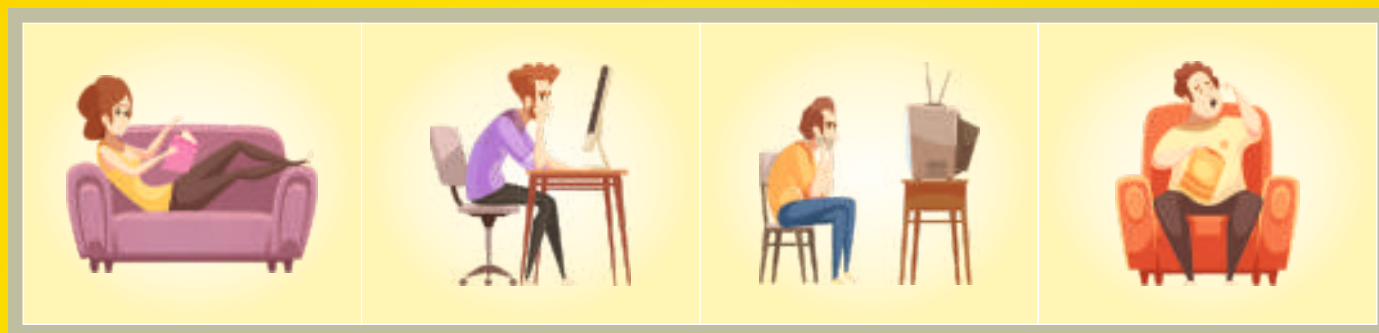
Dr. Satish Chander Wasoori

**MD (Medicine), MD (Endocrinology),
Fellow of American college of
Endocrinology**

Senior Consultant Diabetologist and
Endocrinologist,
Paras Hospitals, Gurgaon

In today's modern lifestyle, prolonged sitting has become the norm. Whether at work, during travel, or at home, individuals spend a large proportion of their day in sedentary activities. Sedentary behaviour is defined as any waking activity performed in a sitting or reclining posture with very low energy expenditure (≤ 1.5 metabolic equivalent tasks).

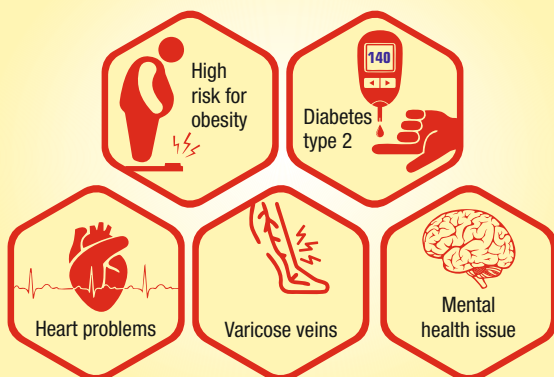
Sedentary behaviour has emerged as risk factor for metabolic disorders. This has shifted the focus from only “exercise” to overall daily movement patterns



Sedentary behaviour and metabolic risk

The Dangers of a Sedentary Lifestyles

High Risk For:



Excessive sedentary time is strongly associated with adverse cardiometabolic outcomes. Prolonged sitting increases the risk of obesity, type 2 diabetes (T2DM), cardiovascular disease, and even all-cause mortality. Prolonged sitting disrupts glucose uptake, increases insulin resistance, and contributes to chronic low-grade inflammation key drivers of metabolic diseases. These risks are independent of physical activity. This means that even if a person exercises for 30–60 minutes daily, long uninterrupted sitting

NEAT: The missing link

NEAT refers to the energy expended during daily activities that are not structured exercise such as walking, standing, household work, or even fidgeting. NEAT plays a crucial role in total daily energy expenditure and metabolic regulation. Individuals with higher NEAT levels tend to have better weight control, improved insulin sensitivity, and lower cardiometabolic risk. Sedentary lifestyles significantly reduce NEAT. Desk jobs, screen time, and mechanized transport have replaced natural movement patterns, leading to a substantial decline in daily energy expenditure. Improving metabolic health requires more than just scheduled workouts. Reducing sedentary time and increasing NEAT should be key components of lifestyle interventions. Simple strategies include:

- Taking short movement breaks every 30–60 minutes, such as standing, stretching, or brief walking
- Using stairs instead of elevators or escalators whenever feasible
- Standing while working, reading, or during phone calls
- Conducting walking meetings instead of seated discussions
- Performing light stretching or mobility exercises during screen time



Resources:

1. Henson J, De Craemer M, Yates T. Sedentary behaviour and disease risk. BMC Public Health. 2023.
2. Sedentary behaviour and cardiometabolic health: Integrating molecular mechanisms. Metabolism. 2025.
3. Von Loeffelholz C, Birkenfeld AL, Feingold KR, et al. Non-exercise activity thermogenesis in human energy homeostasis. In: Endotext [Internet]. Updated 2022. Accessed May 5, 2026
4. Aripa F, Nguyen A, Pau M, et al. Movement Behavior and Health Outcomes among Sedentary Adults: A Cross-Sectional Study. Int J Environ Res Public Health. 2023;20(5):4668. doi:10.3390/ijerph20054668

Sleep, Stress, and Metabolic Health: The Neuroendocrine Connection



Dr. Ambika P. Yadav

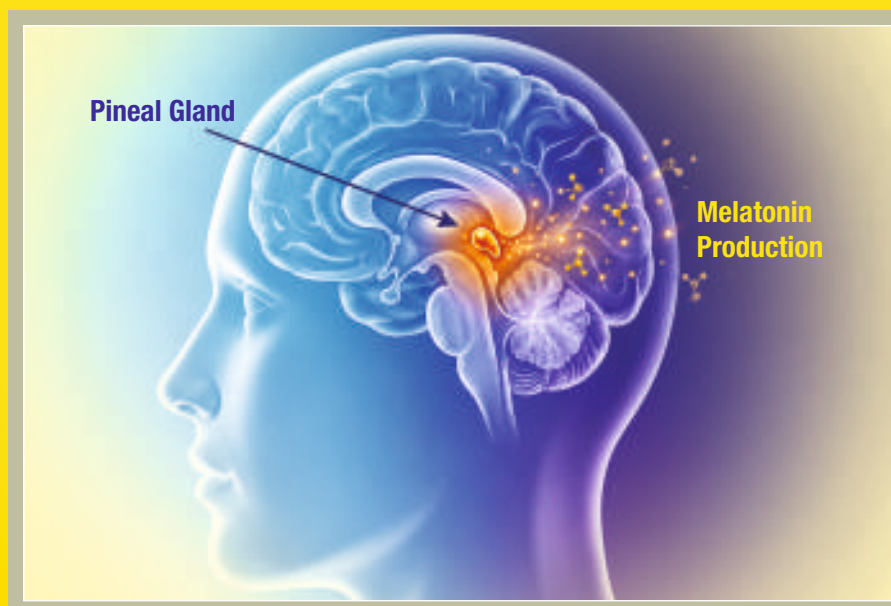
**MBBS, MD (Medicine), CCAGAI (USA),
MIMA, MAPI**

Consultant Physician Internal medicine,
Asha and Internal Hospital, Varanasi

Sleep is a fundamental biological process essential for restoration, memory consolidation, energy balance, emotional regulation, and immune function. It shares a bidirectional relationship with metabolism, sleep deprivation disrupts metabolic homeostasis, while metabolic dysfunction can impair sleep quality and duration.

Melatonin, a neuro-hormone secreted by the pineal gland, plays a central role in regulating the sleep–wake cycle and circadian rhythm. Disruptions in sleep patterns, particularly those caused by irregular schedules or light exposure at night, can adversely impact metabolic health. Beyond sleep regulation, melatonin also influences metabolic processes, particularly within adipose tissue. Once considered merely an energy storage site, adipose tissue is now recognized as a dynamic endocrine organ that secretes adipokines, cytokines, and hormones involved in metabolic regulation. Stress-related neuroendocrine responses, especially those mediated by cortisol, can further impair adipose tissue function and increase metabolic risk.

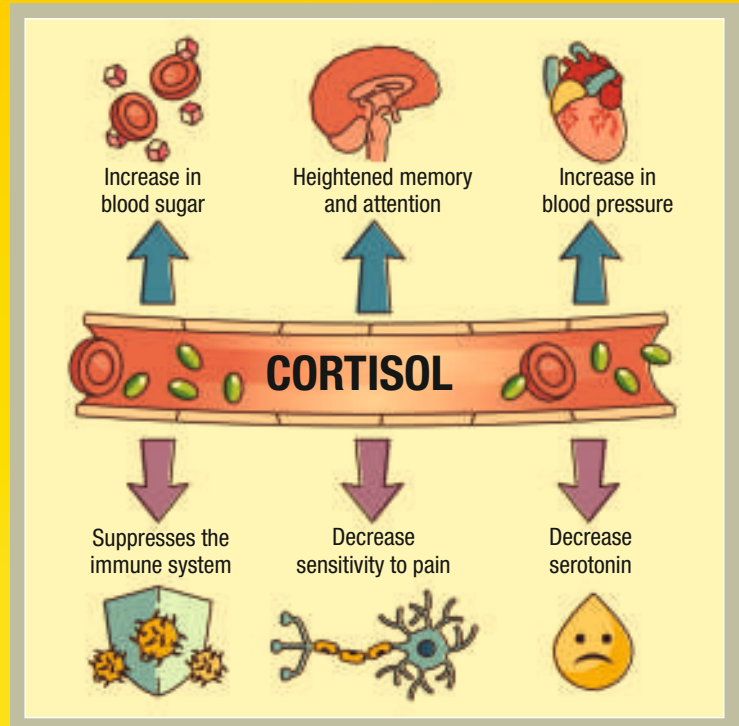
Melatonin has diverse effects on adipose tissue physiology, including regulation of adipogenesis, thermogenesis, and the browning of white adipose tissue. Emerging evidence suggests that its effects on insulin sensitivity may time-dependent, highlighting the complexity of its role in metabolic regulation. These findings underscore the importance of circadian timing in determining metabolic outcomes.



Circadian rhythms coordinate metabolic activities with environmental cues such as light–dark cycles and feeding–fasting patterns. Disruption of these rhythms, commonly seen with shift work, insomnia, or excessive exposure to artificial light at night, leads to a loss of temporal alignment in metabolic pathways. This misalignment negatively affects adipose tissue function, resulting in dysregulated lipid metabolism, increased fat deposition, and reduced energy expenditure. Impaired melatonin signaling is also associated with increased inflammation within adipose tissue, contributing to insulin resistance and broader metabolic dysfunction.

Chronic stress further compounds these effects. While acute stress responses are adaptive and necessary for maintaining homeostasis, prolonged activation of stress pathways can be harmful. Elevated cortisol levels can alter appetite regulation, promote central adiposity, and exacerbate inflammatory signaling. Evidence links chronic stress to poor glycemic control, weakened immune function, accelerated ageing, and increased risk of obesity and metabolic disorders.

The interaction between disrupted sleep, circadian misalignment, and chronic stress creates a complex neuroendocrine environment that promotes metabolic dysfunction. Melatonin serves as a critical link between environmental cues and physiological responses, particularly within adipose tissue. In conclusion, maintaining circadian alignment, ensuring adequate sleep, and managing stress are essential pillars of metabolic health. Addressing these interconnected factors can provide meaningful opportunities for preventing and managing metabolic diseases.



Resources:

1. Ratwani M, Bisht S, Prakash S. Association between sleep disturbance and metabolic dysfunctions in adipose tissue: Insights into melatonin's role. *Biochem Biophys Res Commun.* 2025;770:151978. doi:10.1016/j.bbrc.2025.151978
2. Duan D, Kim LJ, Jun JC, *et al.* Connecting insufficient sleep and insomnia with metabolic dysfunction. *Ann N Y Acad Sci.* 2023;1519(1):94-117. doi:10.1111/nyas.1492
3. Kivimäki M, Bartolomucci A, Kawachi I. The multiple roles of life stress in metabolic disorders. *Nat Rev Endocrinol.* 2023;19(1):10-27. doi:10.1038/s41574-022-00746-8
4. Zambrano C, Tena Garitaonandia M, Salmerón D, *et al.* Melatonin decreases human adipose tissue insulin sensitivity. *J Pineal Res.* 2024;76(5):e12965. doi:10.1111/jpi.12965

Monosodium Glutamate (MSG) and Liver Health



Dr. Shashank Jalak

MBBS, MD (Medicine)

Consulting Physician & Diabetologist,
Shree Chaitanya Hospital, Baramati

Introduction

MSG, commonly known as ajinomoto, is a widely used flavour enhancer that gives food its characteristic umami taste, one of the five basic tastes, alongside sweet, sour, bitter and salty. MSG is commonly used in restaurant meals, added to

processed foods and packaged snacks to improve the palatability. Despite the long history of use and approval by global authorities such as the World Health Organization (WHO) and Food and Drug Administration (FDA), concerns have been raised about its potential health effects- particularly on liver function. An increase in the oxidative stress is considered a key mechanism underlying MSG-induced damage to various organs, including the liver.



MSG-induced liver changes

With the consumption of MSG, there may be increased generation of reactive oxygen species (ROS) that affects the liver's antioxidant defence system, inducing a state of oxidative stress. Animal studies have reported changes in hepatotoxicity markers, along with structural and cellular alterations in the liver that may compromise its functional integrity.

- **Tissue changes:** MSG intake may lead to vacuolization (formation of spaces in hepatocytes), fat accumulation (steatosis) and fibrosis in the liver (scarring due to an increase in collagen fibres).
- **Membrane issues:** It may cause defects in membrane permeability and the cell's ability to maintain its volume (homeostasis). Overall these changes may lead to cell death through apoptosis.

In comparison to animal studies, no strong clinical evidence directly linking normal MSG intake to liver damage in humans has been found. The observed toxic effects were also due to the high dosages used in the studies and are unlikely to be reflective of typical human consumption levels that are much lower.

Authorities like the Joint FAO/WHO Expert Committee on Food Additives (JECFA), the FDA, and the European Food Safety Association (EFSA) consider MSG to be generally recognized as safe (GRAS). They have also determined an acceptable daily intake (ADI) of 14 mg per pound (30 mg per kilogram) of body weight per day. This is far more than the amount one typically ingest following a normal diet. A typical serving of an MSG-enriched food contains less than half a gram of the additive. Other reasons to avoid eating foods with MSG are that they often highly processed convenience foods containing high amounts of sodium, fat, and other refined ingredients.

To optimize liver health, it is important to prioritize a balanced diet, regular physical activity and maintaining a healthy weight rather than focusing solely on MSG.

Resources:

1. Kasmara DP, Abdullah E, Harun Z, *et al.* Mini review of plant products as food supplement against MSG-induced liver injury: antioxidant, oxidative stress and histological prospects. *Frontiers in Pharmacology*. 2025; 16:1522814.
2. Sahin B, Elmas MA, Ozakpinar OB, *et al.* The effects of apocynin on monosodium glutamate induced liver damage of rats. *Heliyon*. 2023; 9(7):e17327.
3. Monosodium glutamate (MSG): What it is, and why you might consider avoiding foods that contain it. Available at: <https://www.health.harvard.edu/diet-and-nutrition/monosodium-glutamate-msg-what-it-is-and-why-you-might-consider-avoiding-foods-that-contain-it>. Accessed on 6th April.
4. Zangfirescu A, Ungurianu A, Tsatsakis AM, *et al.* A review of the alleged health hazards of monosodium glutamate. *Compr Rev Food Sci Food Saf*. 2019;18(4):1111-1134. doi:10.1111/1541-4337.12448



In T2DM with Comorbidities,

Tri Simplified **CaRe**

With

UDAPA-Trio

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

UDAPA-Trio Forte

Dapagliflozin 10 mg + Sitagliptin 100 mg + Metformin 1000 mg XR



1: Akodewas Mar-Jan 2026

Abridged Prescribing Information

Indication: It is indicated as an adjunct to diet and exercise to improve glycaemic control in adults with type 2 diabetes mellitus.

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; Urosepsis 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 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 diseases 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: ov@usv.in

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



USV Private Limited

Arvind Vitthal Gandhi Chowk, B. S. D. Marg, Govandi, Mumbai - 400 088. | Tel.: 91-22-2556 4048 | Fax: 91-22-2556 4025 | www.usvindia.com

Corvette Team

Interview of the Month with Sheryl S. Salis

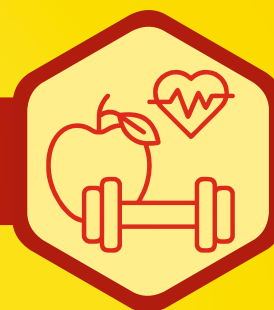


Sheryl S. Salis

Registered Dietitian, Certified Diabetes Educator, Certified Insulin Pump Trainer, Certified Sports Nutritionist-USA, FODMAP Dietitian-Australia, Certified Onco-Nutritionist
Founder of Nurture Health Solutions, Mumbai

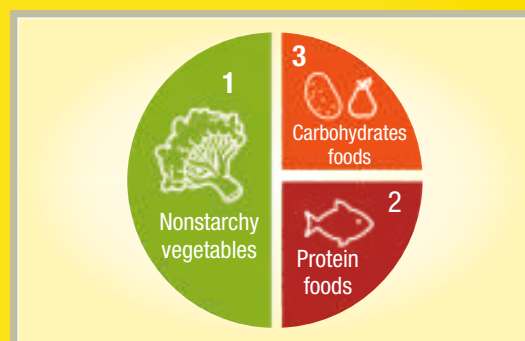
Sheryl Salis is the Founder and Director of Nurture Health Solutions and a highly accomplished Registered Clinical and Sports Dietitian, Naturopath, Certified Diabetes Educator, FODMAP Dietitian, Certified Insulin Pump Trainer, and Author. With over 25 years of experience in dietetics and diabetes education, she has earned top ranks in post-graduation and RD exams. An ISPAD Advisory Council member and leader of its Special Interest Group in Nutrition, Sheryl received the prestigious Allan Drash Fellowship in 2021. She has authored the award-winning book "Diet in Diabetes Simplified" and co-authored the ISPAD 2022 Nutrition Guidelines for Type 1 Diabetes. Sheryl's contributions to education are extensive, serving as a course director, visiting faculty, and trainer. Her accolades include the IAPEN National Award and Mahila Vikas Mandal Vigyan Puraskar, among others. A sought-after speaker and media expert, she frequently presents at conferences and publishes

Theme-Lifestyle Considerations in Metabolic Health



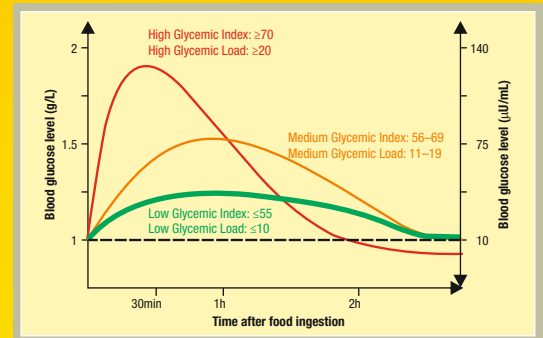
1. How does the macronutrient imbalance commonly observed in the Indian diet impact metabolic health, and what evidence-based dietary principles can help support optimal metabolic health?

Indian plates are usually dominated by carbohydrates and fats. This high-carbohydrate, high-fat combination, coupled with low protein and fiber intake, is a primary driver of insulin resistance and visceral adiposity. To support metabolic health, one must move away from short-term trends and focus on consistent, evidence-based principles. This includes building a strong nutritional foundation through the inclusion of healthy carbohydrates in the form of whole grains, millets, and minimally processed foods in moderation, while increasing the intake of good-quality protein (legumes, dairy, eggs, and lean meat) and dietary fiber to achieve a balanced macronutrient profile. Following the correct food order and limiting ultra-processed foods rich in added sugars and fats can help maintain steady postprandial glucose levels and significantly improve long-term metabolic health.



2. Glycemic index (GI) and glycemic load (GL) are two critical factors that influence a meal. What practical methods can be used to lower the overall GI and GL of a meal?

GI indicates how quickly a food raises blood glucose levels, while GL reflects the overall impact on blood glucose based on both the quality and quantity of carbohydrates consumed. Some effective ways to reduce the GI of a meal include focusing on food structure and preparation methods. Choose whole grains over finely milled flours, broken wheat over semolina, and whole fruits instead of fruit juices. Techniques such as the “cook and cool” method for starches can increase resistant starch formation, thereby lowering the GI of the meal. To manage both GI and GL effectively, the most practical approach is to avoid consuming carbohydrate-rich foods in isolation. Always pair carbohydrates with fiber, protein, and healthy fats, as this slows glucose absorption and helps lower the overall glycemic impact of the meal. Additionally, reducing the carbohydrate portion size and replacing it with protein- and fiber-rich foods can help lower the GL of the meal.



3. Dietary trends such as “low-carb” diets and intermittent fasting (IF) have been widely discussed. What is your perspective on these approaches for long-term metabolic management?

Low-carbohydrate diets and IF are popular approaches, but they may not be suitable for everyone. Carbohydrates remain an essential source of energy, and extremely low-carbohydrate diets or prolonged fasting windows can sometimes lead to glucose fluctuations and compromise metabolic stability. While these approaches may support short-term weight loss when appropriately monitored, robust long-term evidence for their sustainability and safety is still evolving. It is important to recognize that these dietary strategies are not one-size-fits-all solutions. Individuals with diabetes, in particular, may require medication adjustments when following low-carbohydrate diets or IF to reduce the risk of hypoglycemia and maintain glycemic control. Therefore, any restrictive dietary regimen should be undertaken only under the guidance of qualified healthcare professionals, with close coordination among the diabetes care team to ensure that the plan is safe, individualized, and metabolically appropriate.



4. How do glucagon-like peptide-1 (GLP-1) receptor agonists (RA) support metabolic health, and are any dietary modifications important while using these therapies?

For individuals on GLP-1 RA therapy, nutritional management should be focused more towards a nutrient-dense, muscle loss prevention approach which complements the medication's role in glucose regulation and appetite control.

This should involve giving priority to low-glycemic carbohydrates to support stable blood glucose levels paired with adequate intake of high-quality protein to help maintain lean body mass. As delayed gastric emptying is a hallmark of this treatment, it is important to limit foods high in fat which are the primary causes for gastrointestinal discomfort causing nausea and reflux. Overall, a thoughtful approach where one should focus on small nutrient dense meals to improve tolerance to the medication and also supports better metabolic outcomes, including improved glycemic control and long-term cardiometabolic health.



5. How do modern lifestyle factors such as sedentary life, stress, and screen time influence health?

Modern lifestyle factors such as physical inactivity, chronic stress, prolonged screen time, and poor sleep, significantly impacts metabolic and overall health. A sedentary lifestyle reduces energy expenditure and muscle activity, increasing the risk of obesity, insulin resistance, and cardiovascular disease. Chronic stress can elevate cortisol levels, which may worsen glucose control, appetite regulation, and fat accumulation, particularly around the abdomen. Excessive screen time is often associated with reduced physical activity, disrupted sleep, mindless eating, and poor mental well-being. Together, these factors contribute to rising rates of obesity, type 2 diabetes (T2DM), metabolic syndrome, and other lifestyle-related disorders.



Drug Spotlight: Sulfonylureas



Dr. Parthasarathy B

**MBBS, MD (General Medicine),
Fellowship (Diabetology)**

Consulting Physician and Diabetologist,
Dr. Mohan's Diabetes Specialities Centre,
Chennai

Sulfonylurea enhances peripheral glucose utilization and pancreatic insulin production to improve glycemic management. Sulfonylureas are recognised by current clinical guidelines such as the Research Society for the Study of Diabetes in India (RSSDI) recommendations as cost effective solution for some people with diabetes where customised

therapy is necessary. It is suggested for those with type 2 diabetes (T2DM) whose lifestyle changes are not enough to improve blood glucose control. They mainly target insufficient insulin production, which is a fundamental flaw in the pathogenesis of T2DM.

Mechanism of action of sulfonylurea

- Attaches itself to adenosine triphosphate (ATP)-sensitive potassium channels sulfonylurea receptor-1 in plasma membrane of pancreatic beta cells
- Membrane depolarization and calcium influx result from the closure of these channels.
- Insulin production is stimulated by elevated intracellular calcium.
- Improved insulin sensitivity and increased peripheral glucose absorption are possible extra pancreatic effects.

Forms

- Oral tablets (usually in strengths of 1, 2, 3, and 4 mg) Because of their better safety profiles, newer sulfonylureas such glimepiride and gliclazide are favoured.

Advantages

- A significant decrease in fasting blood glucose and hemoglobin A1C (HbA1c) values
- An affordable treatment for long term glucose control

Clinical considerations

- Moderate weight gain and hypoglycemia risk
- When renal or hepatic impairment occurs, a dose change may be necessary.
- Sulfonylureas should be administered cautiously during acute sickness or when oral intake is restricted.

Drug snapshot

Drug Group	Specific Drug	Effects	Adverse Effects	Contraindications
Sulfonylureas	Glimepiride Gliclazide Glibenclamide Glipizide	HbA1c ↓	Body weight ↑ Hypoglycemia ↑ Lack of durable effect	Hypersensitivity to the drug or sulfonamide derivatives Type 1 diabetes Diabetic ketoacidosis.

Nutrition-drug related key takeaways

- Increased risk for weight gain so calorie restriction should be advised
- Low-carbohydrate diets, ketogenic diets, and prolonged fasting should be avoided to prevent hypoglycemia.

Resources:

- Chawla R, Madhu SV, Makkar BM, *et al.* RSSDI-ESI Clinical Practice Recommendations for the Management of T2DM Mellitus 2020. *Indian J Endocrinol Metab.* 2020;24(1):1-122. doi:10.4103/ijem.IJEM_225_20
- Kalra S, Khandelwal D. Modern sulfonylureas strike back – exploring the freedom of flexibility. *European Endocrinology.* 2018;14(2):20-22. Accessed March 16, 2026. <https://pdfs.semanticscholar.org/a196/ef4970f628d1396736bf8368f23c817bcbcd.pdf>
- Kalra S, Bahendeka S, Sahay R, *et al.* Consensus Recommendations on Sulfonylurea and Sulfonylurea Combinations in the Management of T2DM Mellitus - International Task Force. *Indian J Endocrinol Metab.* 2018;22(1):132-157. doi:10.4103/ijem.IJEM_556_17
- Weinberg Sibony, R., Segev O., Dor S., *et al.* (2023). Drug Therapies for Diabetes. *International journal of molecular sciences*, 24(24), 17147. <https://doi.org/10.3390/ijms242417147>
- Ganesan K, Rana MBM, Sultan S. Oral Hypoglycemic Medications. [Updated 2023 May 1]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-Available from: <https://www.ncbi.nlm.nih.gov/books/NBK482386/>
- RSSDI 2025 Nutrition Guidelines For Individuals With T2DM.

Trending Diets: Intermittent Fasting



Dr. Pratiksha Patil

MBBS, D. Diabetology, FCPS (Medicine)
Consultant Diabetologist,
Pratham Speciality Clinic, Mumbai

IF refers to structured eating patterns that alternate between periods of normal food intake and energy restriction. Common approaches include time-restricted eating (e.g., 16:8), alternate-day fasting, and periodic fasting.

Metabolic impacts of IF: IF promotes a metabolic shift from glucose to fat utilization, thereby improving insulin sensitivity and facilitating weight reduction. Shortened eating windows may also enhance β -cell responsiveness and support better circadian alignment, contributing to improved metabolic regulation.

Potential benefits

- **Improved insulin sensitivity:** IF may reduce insulin resistance and enhance insulin signalling pathways.
- **Weight reduction:** Spontaneous calorie restriction associated with IF can decrease adiposity, thereby improving overall metabolic health.
- **Better glycemic control:** Evidence suggests reductions in HbA1c and fasting blood glucose levels in some individuals.
- **Reduced oxidative stress and inflammation:** IF may support mitochondrial function and modulate inflammatory cytokines.

Potential risks and limitations

- **Risk of hypoglycemia:** Prolonged fasting may increase the risk, particularly in individuals on insulin or insulin secretagogues.
- **Nutritional inadequacy:** Poorly planned fasting regimens can lead to micronutrient deficiencies.
- **Adherence challenges:** Sustaining IF may be difficult due to lifestyle patterns, cultural eating habits, and individual preferences.
- **Heterogeneous evidence:** Clinical outcomes vary depending on individual metabolic status, type and duration of fasting, and overall dietary quality. Long-term evidence on safety and sustainability remains limited.

16:8 Intermittent fasting schedule



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

Clinical considerations

Intermittent fasting in individuals with diabetes should be undertaken under medical supervision, with regular glucose monitoring and appropriate medication adjustments. Fasting regimens must be nutritionally balanced and planned with a qualified dietitian to ensure adequacy and prevent deficiencies. While IF can support weight loss and improve metabolic health, it should be individualised and used cautiously, as long-term safety and efficacy data remain limited.



Resources:

1. Patterson RE, Sears DD. Metabolic Effects of Intermittent Fasting. *Annu Rev Nutr.* 2017;37:371-393. doi:10.1146/annurev-nutr-071816-064634
2. Welton S, Minty R, O'Driscoll T, *et al.* Intermittent fasting and weight loss: Systematic review. *Can Fam Physician.* 2020;66(2):117-125.
3. Vitale R, Kim Y. The Effects of Intermittent Fasting on Glycemic Control and Body Composition in Adults with Obesity and T2DM: A Systematic Review. *Metab Syndr Relat Disord.* 2020;18(10):450-461. doi:10.1089/met.2020.0048
4. Anton, S.D., Moehl, K., Donahoo, W.T., *et al.* (2018), Flipping the Metabolic Switch: Understanding and Applying the Health Benefits of Fasting. *Obesity*, 26: 254-268. <https://doi.org/10.1002/oby.22065>
5. Corley BT, Carroll RW, Hall RM, *et al.* Intermittent fasting in T2DM mellitus and the risk of hypoglycemia: a randomized controlled trial. *Diabet Med.* 2018;35(5):588-594. doi:10.1111/dme.13595

Gut Microbiome as a Lifestyle Target in Metabolic Disorders



Dr. Sweekruti Jena

MBBS, MD (Medicine), DM (Endocrinology)

Consultant Endocrinologist, Care Hospital,
Bhubaneswar

The gut microbiome, comprising trillions of microorganisms in the gastrointestinal tract, is a key regulator of metabolic health and a modifiable lifestyle target in conditions such as obesity, type 2 diabetes (T2DM), and metabolic syndrome. These conditions are driven by insulin resistance, dyslipidemia, chronic inflammation, and disrupted energy metabolism.

Gut dysbiosis and metabolic endotoxemia

A major mechanism linking the microbiome to these conditions is gut dysbiosis, where an imbalance in microbial composition alters metabolic signalling and increases gut permeability. This leaky gut promotes systemic inflammation through metabolic endotoxemia a process involving the leakage of bacterial components, specifically lipopolysaccharides (LPS), from the gut into the systemic circulation. This presence of endotoxins in the blood serves as a primary driver for chronic low-grade inflammation and subsequent insulin desensitization.



Microbial metabolites and metabolic regulation

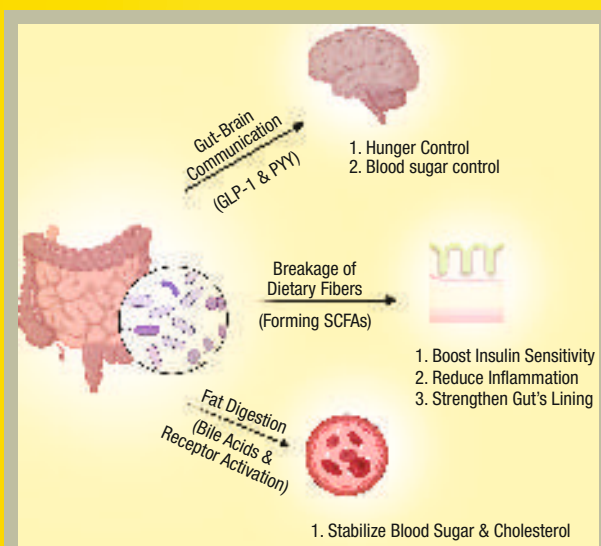


Fig 1: Gut microbiota and nutrient metabolism

One of the key ways the gut microbiome influences metabolism is through the production of bioactive metabolites. Short-chain fatty acids (SCFAs), such as butyrate, produced by microbial fermentation of dietary fiber, play a crucial role in regulating glucose homeostasis, appetite, and insulin sensitivity.

Furthermore, specific bacteria such as *Akkermansia muciniphila* have been identified as vital microbe in maintaining the integrity of the mucin layer and improving glucose metabolism.

Lifestyle factors as key modulators

Diet, physical activity, and psychological well-being are the most influential modulators of gut microbial composition. Integrating these factors is essential for restoring microbial balance.

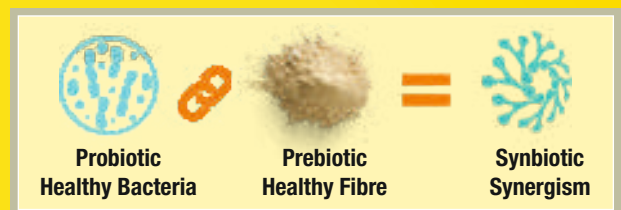
- **Dietary intervention:** Diets high in fat and low in fiber are associated with reduced microbial diversity and a decline in beneficial bacteria such as *Lactobacillus* and *Bifidobacterium*. In contrast, fiber-rich diets enhance microbial diversity and promote the growth of beneficial microbes, leading to improved metabolic health.
- **Physical activity:** Regular exercise has been shown to increase microbial diversity and enhance the abundance of beneficial bacteria, thereby improving insulin sensitivity and reducing systemic inflammation.
- **Sleep and stress:** Chronic stress and sleep disturbances disrupt the gut-brain-micro biome axis. These factors often act synergistically with poor diet and sedentary behaviour to worsen metabolic outcomes through cortisol-mediated changes in microbial balance.

Microbiome-targeted therapeutic approaches

Therapeutic strategies targeting the gut microbiome have gained considerable attention in clinical practice. Interventions such as:

- **Prebiotics:** Non-digestible compounds that induce the growth or activity of beneficial microorganisms.
- **Probiotics:** Live micro-organisms intended to provide health benefits when consumed.
- **Synbiotics:** Products that combine prebiotics and probiotics in a synergistic form.

These approaches have shown potential in reducing inflammation, improving lipid metabolism, and enhancing insulin sensitivity. In conclusion, the gut microbiome represents a key therapeutic arm in metabolic health and should be targeted alongside diet, physical activity, sleep, and stress management for a holistic approach in metabolic disorder



Resources:

1. Al Jnainati M, Govindarajan A, Tyagi S, *et al*. Harnessing microbiome therapy to treat metabolic syndrome. *AACE Endocrinol Diabetes*. 2026.
2. Singh A, Verma A, Ashraf S, *et al*. Role of gut microbiota in the pathogenesis of metabolic syndrome: an updated comprehensive review from mechanisms to clinical implications. *Ann Med Surg (Lond)*. 2025;87(9):5851-5861. doi:10.1097/MS9.0000000000003656
3. Ezenabor EH, Adeyemi AA, Adeyemi OS. Gut Microbiota and Metabolic Syndrome: Relationships and Opportunities for New Therapeutic Strategies. *Scientifica*. 2024;2024(1):4222083. doi:10.1155/2024/4222083

Diabetes Educator's Toolkit:

Skill of the Month: Questioning



Dr. Kamal Kumar Koushal

MD (Med), PG Dip. (HOD and Respiratory Diseases, Harvard), FIDM (Diabetes), FICC (Cardiology), CCEBDM (Diabetes)
Consultant Physician and Diabetologist,
Ganga and Bimla Devi Clinic, Purnea

Counselling is an essential aspect of diabetes self-management education (DSME). Counselling by a DE provides necessary support required and helps in better management of the condition and adherence to self-management. DE enables people with diabetes to take charge of their health and be in control. Questioning is one such skillset of a

diabetes educator which helps to understand the goals and needs of the person living with diabetes.

Questioning as a skill

- Questioning allows DE to understand individual needs, lifestyles and challenges. It helps with providing individual support and personalized education.
- Asking open ended questions. Open ended questioning requires more detailed answers. Open ended questions give clarity and let people express their emotions and challenges. Eg: "What are you doing to do so that you improve your workout"? Instead of raising the question, "Do you regularly work out at the gym?"
- "What are you doing to reduce your blood glucose levels."? Rather than asking, "Have you cut back on your intake of chocolate and mithai.?"



- Instead of asking irrelevant, too many, or judgmental questions, a DE should communicate in a straightforward, encouraging, and patient-centered manner.
- Environment /setup affects the questions that are being asked. A peaceful, private, courteous and welcoming setting, encourages the person with diabetes to be comfortable and share personal information.
- Gathering information after questioning must lead to some action, just gathered information no action means poor practice, DE can on the basis of targeted questions help individuals set achievable and realistic health goals.

People living with diabetes need a supporting health care system, with efficient communication skills who can help them. Questioning is one such skillset which allows the DE to gather information regarding individuals with diabetes, understand their needs, lifestyles, challenges faced by them. Questioning helps the DE to build trust and rapport with individuals with diabetes, empowering the individuals with diabetes to take charge of their lives, set realistic goals and manage their condition better with better health outcomes.

Resources:

1. American Diabetes Association. Mental Health and Diabetes: A Workbook for Healthcare Professionals, Chapter 1. American Diabetes Association; 2020. Accessed April 18,2025. https://professional.diabetes.org/sites/default/files/media/ada_mental_health_workbook_chapter_1.pdf
2. Powers MA, Bardsley J, Cypress M, *et al.* Diabetes Self-management Education and Support in T2DM: A Joint Position Statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. *Clin Diabetes*. 2016;34(2):70-80. doi:10.2337/diaclin.34.2.70

Frequently Asked Questions on Lifestyle Considerations in Metabolic Health



Dr. Md. Misbah Ullah

MBBS, MD, PGD (Geriatric Med.)

Consultant Physician and Elder Care Specialist,
Al Hanif Clinic, Punea

1. I am 45 years old, working in IT, and spend almost 10–12 hours a day in front of a screen. I have type 2 diabetes (T2DM) and recently diagnosed high blood pressure. My sugar levels, triglycerides, and blood pressure (BP) are high. I often skip breakfast, eat late dinners, and sleep less than 5 hours due to work. How can I improve my health and manage all

these conditions better? I can't change much about my work routine.

Answer: Your current lifestyle habits are significantly affecting your blood glucose, blood pressure, and lipid levels. Long sitting hours, skipping breakfast, late dinners, and poor sleep are all adding to the problem. However, with gradual and consistent changes, these can be effectively managed. The first step is to regularize your routine.

- **Don't skip breakfast:** Choose a quick, protein-rich option (egg roll, fruit with curd/yogurt, sprouts). Skipping breakfast can lead to overeating later. Aim to finish dinner by 9–9:30 pm and keep it light. Include a small evening snack (makhana with roasted chana, ragda, or a protein shake) to prevent overeating at dinner.
- **Prioritise sleep:** Gradually increase sleep to at least 6 hours, as inadequate sleep worsens insulin resistance, blood pressure, and appetite control.
- **Break sedentary time:** Incorporate 2–3 minutes of movement every hour (standing, stretching, short walks). Avoid prolonged sitting, these small breaks improve metabolic health even without formal exercise.
- **Improve diet quality:** Reduce refined carbohydrates and sugars, increase protein intake, add fibre (salads, vegetables) to meals, avoid late-night snacking and high-fat, high-sugar foods that raise triglycerides.
- **Monitor regularly:** Track blood glucose and blood pressure, and follow up with your doctor for timely medication adjustments.
- **Stay consistent:** Small, sustainable daily changes can significantly improve glucose control, lipid profile, and blood pressure even with a demanding schedule.



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

2. I am 52 and postmenopausal. I've been gaining weight, especially around my abdomen, and feel tired most of the time. My hemoglobin A1C (HbA1c) is 6.2%. I also struggle with emotional eating, low activity, and stress. What can I do to manage my weight and prevent diabetes?

Answer: Weight gain after menopause is common due to hormonal shifts, and a slower metabolism. An HbA1c of 6.2% indicates prediabetes, but with timely lifestyle changes, progression to diabetes can often be prevented.

- **Eat balanced, structured meals:** Include vegetables, whole grains, healthy fats, and adequate protein in each meal to improve satiety and reduce cravings. Limit refined carbohydrates, sugary foods, and ultra-processed snacks.
- **Address emotional eating:** Identify triggers such as stress or fatigue, and gradually replace them with healthier coping strategies like walking, relaxation techniques, or planned meal timings to avoid impulsive eating.
- **Increase physical activity:** Aim for 30–45 minutes of daily activity (brisk walking, cycling), along with strength training 2–3 times/week to preserve muscle mass and improve metabolism.
- **Focus on sleep and stress:** Poor sleep and chronic stress contribute to abdominal fat gain, target ~7 hours of sleep and include stress management practices like yoga or breathing exercises.
- **Stay consistent and monitor:** Track weight and glucose levels periodically. Even modest, sustained changes can support weight loss, improve energy levels, and help prevent diabetes.



3. I am 35 with a body mass index (BMI) of 29 and have been struggling with my weight for a while. I have tried certain diets online, but they've been very restrictive and I have ended overeating later on. I often feel low on energy, have frequent cravings, and can't maintain a consistent exercise routine. I've been told keto diet is good for weight loss. How can I follow this diet, will this help me lose weight?

Answer: Keto diet is a very low-carbohydrate, high-fat diet that can lead to short-term weight loss. However, in the Indian context, where most staple foods are carbohydrate-based, it can be difficult to follow and sustain. Given your pattern of restrictive dieting and overeating, keto may also worsen cravings and rebound eating.

- **Understand limitations of keto:** Its restrictive nature makes long-term adherence challenging, and in some individuals, very low carbohydrate intake (no roti/rice) may affect energy levels, mood, and mental functioning.
- **Focus on sustainability:** A balanced, calorie-controlled diet is more practical and easier to maintain long term.
- **Structure your meals:** Reduce high carbohydrate intake and include protein and fibre in each meal to improve satiety and reduce cravings.
- **Avoid long gaps:** Regular meal timings help prevent overeating later in the day.
- **Keep activity realistic:** Aim for 20–30 minutes of daily movement; consistency matters more than intensity. You don't need strict keto for weight loss. A moderate, sustainable reduction in carbohydrates with balanced nutrition is more practical and effective long term.



Did You Know?

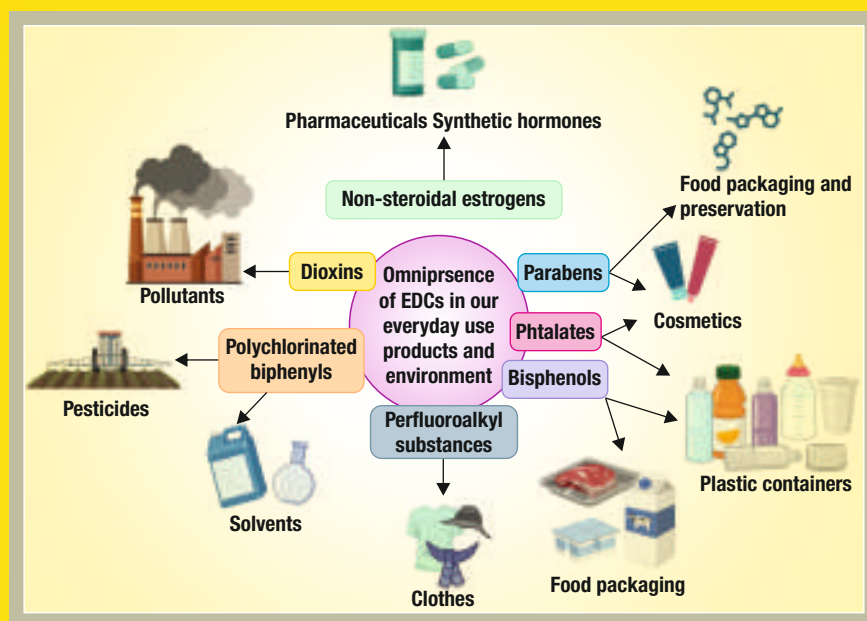
Exposure to environmental 'obesogens' chemicals found in plastics and pollutants, can promote fat accumulation and metabolic dysfunction independent of diet and physical activity.

With the global rise in obesity and metabolic disorders, it is important to look beyond diet and physical activity alone. In addition to genetic and lifestyle factors, environmental chemicals, known as “obesogens”, may increase susceptibility to weight gain and metabolic dysfunction.

What are Obesogens? Obesogens are chemicals commonly found in everyday products such as plastics, food packaging, cosmetics, cleaning agents, and personal care items. These substances can promote the accumulation of white adipose tissue (WAT) and disrupt normal metabolic regulation. Obesogens act as endocrine-disrupting chemicals (EDCs), interfering with hormonal pathways that regulate metabolism. One key mechanism involves activation of receptors like peroxisome proliferator–activated receptor gamma (PPAR γ), which promotes fat cell development and storage. They can also alter metabolic rate, influence appetite regulation, disrupt gut microbiota, and affect multiple organs including the liver, pancreas, brain, and adipose tissue.

Common obesogens include: Bisphenol A (BPA), phthalates (e.g., DEHP), tributyltin (TBT), and triphenyl phosphate (TPHP).

Environmental exposures are an often-overlooked contributor to metabolic health. Obesogens are commonly present in certain plastics, food packaging, and fragranced or chemical-heavy products, so checking labels (e.g., BPA/phthalates/tributyltin) and reducing plastic use, especially with heat, can help minimise exposure.



Resources:

1. Jaskulak M, Zimowska M, Rolbiecka M, *et al.* Understanding the role of endocrine disrupting chemicals as environmental obesogens in the obesity epidemic: A comprehensive overview of epidemiological studies between 2014 and 2024. *Ecotoxicol Environ Saf.* 2025;299:118401. doi:10.1016/j.ecoenv.2025.118401
2. Kladnicka I, Bludovska M, Plavinova I, *et al.* Obesogens in Foods. *Biomolecules.* 2022;12(5):680. Published 2022 May 9. doi:10.3390/biom12050680

Role Play

Scenario: A 45-year-old shopkeeper with type 2 diabetes (T2DM), and hypertension, visits a diabetes educator (DE) with complaints of fatigue, abdominal weight gain, and poor blood glucose control. He spends most of the day sitting at his shop with minimal physical activity. He frequently consumes tea with sugar, and fried snacks while working. Body mass index (BMI): 30 kg/m²; waist circumference: 104 cm; blood pressure (BP): 150/92 mmHg; hemoglobin A (HbA1c): 8.2%; He seeks guidance on improving his health through practical lifestyle changes but feels he has “no time” for exercise.

Mr. XYZ: Hello, doctor! I am a shopkeeper. I feel tired most of the time, have gained weight around my abdomen, and my sugar and blood pressure levels are high. Are these problems connected?

DE: Hello, yes, they are closely linked. Sedentary lifestyle, stress, irregular and unhealthy meals can increase blood glucose levels, blood pressure levels and weight.

Mr. XYZ: I have to sit at the shop all day, and with some customers or business associates, I need to have tea and snacks.

DE: I understand. Social eating and tea breaks are common in your line of work, and you do not have to avoid them completely. Instead, make healthier choices whenever possible. Opt for tea with less or no sugar, avoid frequent fried snacks, and choose healthier options like roasted chana, chana moong jor, nuts, sprouts, etc. Also, try to control portion sizes by including buttermilk, plain lemon water, and avoid repeated snacking throughout the day.

Mr. XYZ: What kind of meals should I have? For breakfast, I usually have tea with roti or biscuits. For lunch, I carry roti and vegetables. Dinner is usually dal-rice or khichdi.

DE: Your meal pattern is simple, but a few modifications can make it more balanced that will support glucose control. For breakfast, instead of only tea with roti or biscuits, try adding a protein source such as eggs, sprouts, paneer, or unsweetened curd, and avoid biscuits. For lunch, continue roti and vegetables, but include dal, curd, or another protein source for better satiety and glucose control. Dinner with dal-rice or khichdi is acceptable, but keep rice portions moderate and add a vegetable on the side or to the khichdi. Reduce roti and rice portions at lunch and dinner and include small bouts of exercise during the day. This will support glucose control and weight management.

Mr. XYZ: I don't get time for exercise during the day.

DE: You do not have to exercise for 1 hour at a stretch. Short activity breaks are also effective. Stand and walk around the shop every hour, stretch between customers, and take a 10–15-minute walk after meals. You can divide your activity into 3–4 small sessions of 10–15 minutes each throughout the day. Even post-meal walking for 10–15 minutes has been shown to reduce post-meal glucose levels.

Mr. XYZ: Okay, this sounds doable.

DE: Very good. Consistent small lifestyle changes can significantly improve blood glucose levels, blood pressure levels, and overall well-being with time

NOTES

This image shows a single sheet of bright yellow paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

In T2DM Across Continuum,

Choose the Leader

Glycomet®-GP

Metformin Hydrochloride 500/850/1000 mg SR + Glimepiride 0.5/1/2/3/4 mg

Glycomet®-GP 0.5
Metformin Hydrochloride 500 mg SR + Glimepiride 0.5 mg

Glycomet®-GP 1
Metformin Hydrochloride 500 mg SR + Glimepiride 1 mg

Glycomet®-GP 2
Metformin Hydrochloride 500 mg SR + Glimepiride 2 mg

Glycomet®-GP 2/850
Metformin Hydrochloride 850 mg SR + Glimepiride 2 mg

Glycomet®-GP 3/850
Metformin Hydrochloride 850 mg SR + Glimepiride 3 mg

Glycomet®-GP 3 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 3 mg

Glycomet®-GP 4 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 4 mg

Glycomet®-GP 0.5 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 0.5 mg

Glycomet®-GP 1 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 1 mg

Glycomet®-GP 2 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 2 mg

**LEADING
CONFIDENCE**

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 Vitamin B12 absorption, very rarely lactic acidosis, hemolytic anemia, reduction of thyroxine level in patients with hypothyroidism, Hypomagnesaemia in the context of diarrhea, Hypomagnesaemia in the context of diarrhea, Hypomagnesaemia in the context of diarrhea. **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 in 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 consult 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, serial 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. Adult 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 12, 2023

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

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



USV Private Limited

Arvind Vithal Gandhi Chowli, B. S. D. Marg, Govandi, Mumbai - 400 068. | Tel.: 91-22-2558 4048 | Fax: 91-22-2558 4025 | www.usvindia.com

Corvette Team

Scan the QR code to access full library of IDEJ -
<https://usvmed.com/>



This content and the information in this booklet is only for reference exclusively meant for the registered medical practitioners. Physicians and other qualified medical practitioners shall use their discretion and professional judgment in prescribing the right drug to the patients. USV Private Limited does not provide any medical advice, endorse, encourage or promote use of drugs without having the right advice from the registered medical practitioner. The views expressed by the authors are their own and USV disclaims all liabilities arising from use of the information. Copying, distribution and circulation of this booklet without the prior written consent of USV and RSSDI is strictly prohibited.