

RSSDI Indian Diabetes

EDUCATOR JOURNAL



Theme of the Month

Diabetes, Fitness and Yoga

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

2015

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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, Hypomagnesaemia 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

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FOREWORD

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

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

International Yoga Day is celebrated on June 21st every year to emphasize the significance of yoga and its favorable effect on our mind and body. This month's IDEJ aims to propagate the benefits of yoga for blood glucose management. This issue also covers the various other physical activities that contribute to the fitness of a person living with diabetes. Understanding the importance of fitness in the life of people with diabetes and the newer technologies to track it will help diabetes educators to motivate them better.

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

Sincere Regards,

Dr. Sanjay Agarwal
RSSDI Secretary

Disclaimer: This Journal provides news, opinions, information and tips for effective counselling of people with diabetes. This Journal intends to empower your clinic support staffs for basic counselling of people with diabetes. This journal has been made in good faith with the literature available on this subject. The views and opinions expressed in this journal of selected sections are solely those of the original contributors. Every effort is made to ensure the accuracy of information but Hansa Medcell or USV Private Limited will not be held responsible for any inadvertent error(s). Professional are requested to use and apply their own professional judgement, experience and training and should not rely solely on the information contained in this publication before prescribing any diet, exercise and medication. Hansa Medcell or USV Private Limited assumes no responsibility or liability for personal or the injury, loss or damage that may result from suggestions or information in this book.

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Issue No. 99, June 2023

Table of Content

Cover Story: Therapeutic Benefits of
Yoga for Type 2 Diabetes

01

Dr. Umesh Masand

Frequently Asked Questions on
Diabetes and Exercise

18

Dr. Tejaswi V.

Exergaming - A Motivator for Exercise
in People with Diabetes

05

Dr. R. K. C. Mishra

Diabetes and Swimming

20

Dr. Jinen Shah

Sports Drinks - Yes or No?

07

Dr. Rajendra B. Patel

Running Marathons While Living
with Diabetes

23

Dr. Pradip Dalwadi

Care of Athletes with Type 1 Diabetes

09

Dr. Ambika Prasad Yadav

Diabetes Educator Tip of the Month

25

Ms. Zeal Doshi

What's Trending?
The Evolution of Technology and
Exercise - Where We Stand?

13

Dr. Satish Chander Wasoori

Exercising for Better Sleep

26

Dr. Ravikumar V. Ryakha

Diabetes-friendly Features of
Smartwatches

16

Dr. V. Balaji Tulse Dass

Dia-Games

28

Cover Story: Therapeutic Benefits of Yoga for Type 2 Diabetes



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Yoga: Origin and definition

India is one of the world's ancient civilizations, with a vibrant variety and rich cultural heritage. Yoga has its roots in India and originates from the Sanskrit term 'yuj' (युज्) meaning "yoke or union," and has been practiced for over 5,000 years. Currently, yoga is a pan-Indian holistic physical and spiritual wellness approach practiced over the globe.

"To perform every action artfully is yoga." - Swami Kripa

Yoga and diabetes

Of the several major types of yoga, the most commonly practiced forms include:

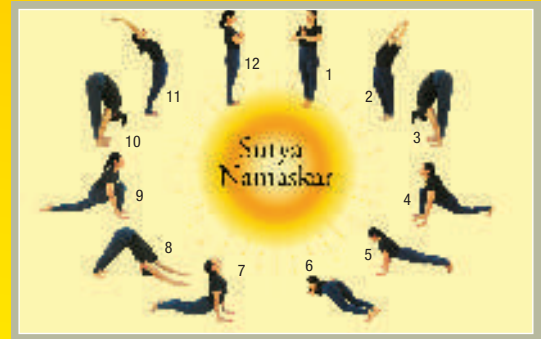
- *Raja* Yoga (royal or classical)
- *Hatha* Yoga, sometimes referred to as the yoga of activity
- *Mantra* Yoga - emphasizes using certain noises or chants to bring about mental and spiritual transformation



**Kapalbhati
pranayama**

Hatha Yoga Pradipika and *Gheranda Samhita* speak about cleansing processes or *shatkarmas*. Among these, the practices of *Vaman dhauti* (induced vomiting for stomach purging), *Kapalbhati* (frontal brain purification, which is a breathing technique with aggressive exhalations and effortless inhalations), and *Shankhaprakshalana* (intestinal cleansing) aid in boosting the production of insulin and controlling blood glucose levels. Studies have found that practicing *Vaman dhauti* (emetic therapy) is thought to boost glucose uptake by lowering levels of circulating free fatty acids in the body, reducing insulin resistance, and promoting the function of insulin.

Hatha and *Raja* yoga highlight specific postures (asanas), including both active and relaxing or restorative poses. *Surya Namaskar* is one such dynamic set of yoga poses carried out in an ordered manner. A vigorously performed, brisk *Surya Namaskar* raises cellular demands for oxygen and glucose. Through brain signaling, insulin production is induced to meet these needs. A study by Sreedevi A. *et al.* (2017) showed that doing the *Surya Namaskar* for 25 minutes, coupled with other yoga poses and a deep relaxation technique, significantly reduced diastolic blood pressure and hip circumference in perimenopausal women, with positive results for glycemic outcomes.



Asanas (Yoga postures)

It highlights the connection between the body, mind, and consciousness by focusing on breathing and movement coordination. They encompass relaxing and doing stretches or twists. Studies [Manjunatha S. *et al.* (2005), Mullur RS. *et al.* (2016)] examined the effects of four specific asana combinations on the pancreatic release of insulin: *Dhanurasana* + *Matsyendrasana*, *Halasana* + *Vajrasana*, *Naukasana* + *Bhujangasana*, and *Setubandhasana* + *Pavanamuktasana*. They observed that the pancreatic β -cells were more sensitive to the glucose signal, which was the result of a sustained change brought about by a long-term effect of the asanas. It was concluded that as little as 10 minutes of yoga intervention in addition to conventional medical help could significantly strengthen metabolic health.



“Anybody can breathe therefore anyone can practice yoga.” - T.K.V. Desikachar

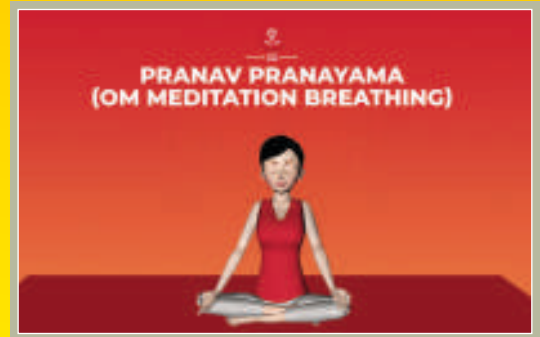
Pranayama (Yogic breathing)

A controlled or balanced yogic breathing practice modulates the rate and pattern of breathing, thus regulating the heart rate and its variability. The *Bhramari pranayama* (humming bee breath) vibrations have a calming and soothing impact on the mind and may be highly beneficial in enhancing both physical and mental health. People with diabetes may benefit from right nostril breathing, which is thought to have a sympathetic stimulation impact.

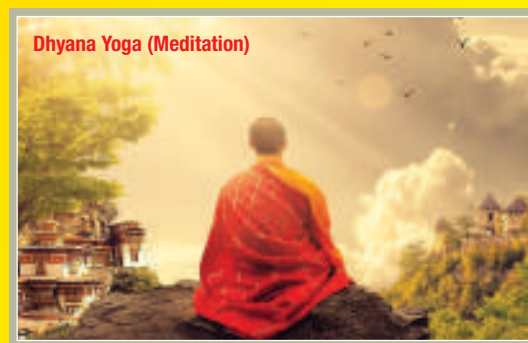


Mantra chanting

Chanting the “Aum” mantra causes the brain to stabilize, negative thoughts to disappear, energy to increase, and mental and physical relaxation to occur within minutes of practice. An integrated relaxation response is produced by *Pranava pranayama* (chanting “Aum”) while in the supine position, and this response may be useful in the treatment of diabetes and hypertension. Evaluation of the mind-sound resonance technique's immediate effects in persons with type 2 diabetes revealed its potential use in improving cognitive function.



“The body benefits from movement, and the mind benefits from stillness.” - Sakyong Mipham



Dhyana (Meditation)

It has been revealed that it causes physiological changes in the brain. Visualization and concentration on the pancreas during meditation have shown positive impacts on blood glucose and are advised in the management of diabetes. People with diabetes and coronary heart disease are recommended to practice mindfulness for improved sleep, more relaxation, and more accepting responses to the condition and the experience of living with it.

Precaution and risk factors

The recommendations for the duration, type, and frequency of yoga practice have not been clearly defined, and studies have investigated various lengths and frequencies for practicing yoga. Yoga should be learned under the supervision of a qualified yoga instructor. For people with diabetes who are at risk of complications, fast-paced yoga practices and intense activities in high temperatures are not advised. Extreme practices should be avoided by beginners. People taking medication to control diabetes should carefully monitor their bodies' response to any new exercise regimen.

Yoga practice can cause significant harm if the warning signs of pain and discomfort are ignored. Yoga practitioners shouldn't ever exert more physical effort than they can handle. Although doing yoga on an empty stomach is normally advised, individuals who are taking diabetic medications may have small snacks to avoid hypoglycemia. People with diabetes are recommended to enter and come out of poses gradually, pausing for a breath or two if needed while performing yoga poses.

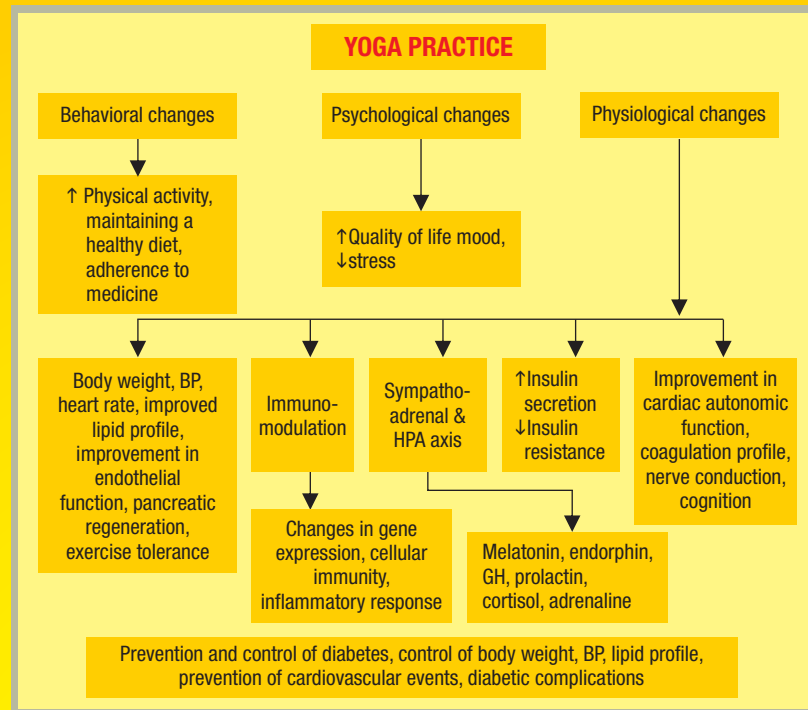


Figure. 1. Advantages of yoga practice in type 2 diabetes.

Abbreviations: BP: Blood pressure; HPA: Hypothalamic-pituitary-adrenal; GH: Growth hormone.

Yoga as a therapy in healthcare

Yoga has been practiced for thousands of years, but yoga as therapy is still a relatively new and developing trend in the medical field. Numerous studies have looked into how yoga practice affects biochemical, electrophysiological, cellular, genetic, neuromuscular, and radiological aspects. This has made it easier for yoga to be used practically in treating a variety of disorders, and it is now acknowledged on a global scale as a therapeutic option.

Resources:

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Exergaming - A Motivator for Exercise in People with Diabetes



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Indians are reported to be more sedentary and less physically active than their counterparts around the world. Even among physically active participants who exercise during their free time, exercise intensities are not up to par with the recommendations. The benefits of exercise for diabetes are manifold, but lack of time and

motivation are the most common defenses for not exercising. This has led to an increasing prevalence of obesity, especially among the youth. In this perspective, it is significant to highlight that a 12-country study that also included India found that children aged 9 to 11 spent a rising amount of time engaging in screen-based activities, which may also result in obesity and a dysmetabolic state.

This is where exergames seem to have an excellent scope to boost activity levels. Exergaming comes from joining two words: exercise and games. So basically, it is technology-driven physical activities, such as video games or virtual reality (VR) games, that require participants to be physically active as a part of the game.

In today's rapidly changing modern lifestyle, screen time is associated with increased sedentary behavior. Exergaming is a cutting-edge strategy to enhance sedentary people's motivation for daily exercise. During exergames, the participant interacts with the game scenario. This stimulates sensorial, cognitive, motor, and psychological functions. It is a fun, engaging, and interactive form of exercise. It also pushes players to excel in various succeeding levels of the game and allows for competition with other people playing the same game across the globe. This aspect of having fun while doing physical activity drives more compliance, especially among the youth. It helps to overcome the traditional barriers of exercise being boring or a compulsory part of the routine.

With technology continuously evolving, newer gaming devices as well as applications enter the market. In today's tech-savvy generation, exergames can be a good beginning to physical activity. Any form of physical activity promotes better blood glucose control, so it can be explored for various age groups of people living with diabetes. However, monitoring blood glucose levels while one plays these games, restrictions on the time allowance for these games, having a balanced diet, etc. should be part of routine counseling.



Exergames examples



Games that make you walk: Ingress Prime, Fitness RPG: Walking games, Wokamon: Walking games

Games that cover a full body workout: 7-Minute superhero workout, YUR - Make fitness a game, Tuby Fitness games at home



Games that make you dance: BeatX: Rhythm game, Starri - Move to the music



Games that provide functional workout and running: Active arcade, Zombies, Run! 11



Exergaming is a novel approach to boosting exercise and putting digital technology to good use for the benefit of bringing about positive lifestyle changes.

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Sports Drinks - Yes or No?



Dr. Rajendra B. Patel

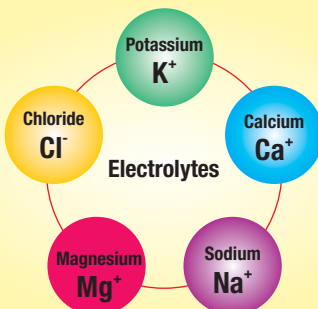
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Good hydration is a very important aspect of exercise performance as well as good health. Most exercises cause some level of sweating, which causes the loss of salt and water from the body. Fluid replacement is necessary to prevent dehydration and reduce fatigue. Inadequate fluid intake will have a negative impact on blood glucose levels, muscle

metabolism, cardiovascular health, and temperature regulation. Sports drinks are designed to maintain hydration levels during and after exercise as it is an efficient way to replenish electrolytes lost, supply carbohydrates, prevent dehydration and sustain endurance capacity.

Composition of sports drink

Sports drinks can generally be categorized as hypotonic, isotonic, or hypertonic based on their formulation. The composition usually contains:



Electrolytes: During exercise, there is a loss of potassium, magnesium, sodium, chloride, calcium, and phosphorus through sweat. Replenishing these electrolytes during prolonged exercise is crucial because they aid in the normal control of blood pressure, healthy nerve and muscle function, and the recovery of damaged muscular tissue.

Carbohydrates: Sports drinks often contain sugars like glucose-fructose (high-fructose corn syrup), sucrose, or maltodextrin that contain carbohydrates ranging from 5 g to 14 g per 240 ml. Compared to liquids with lower carbohydrate content, those containing more than 8% (8 g per 100 mL) of the total volume may slow gastric emptying and intestinal absorption during exercise.



Caffeine: Nowadays, most sports drinks contain caffeine, which can raise the blood glucose level by triggering the release of stored glucose from the liver. For a person with diabetes, that release of extra glucose may spike the blood glucose level significantly.



The majority of sports drinks may also include citric acid, low-calorie sweeteners, and artificial and natural fruit flavors.

Can people with diabetes consume sports drinks?



It depends on the intensity and type of physical activity. The majority of people do not exercise for long or vigorously enough to need sports drinks. For the average exerciser, drinking water is more than adequate to maintain proper hydration throughout the day and during a workout. Sports beverages with electrolytes and carbohydrates, on the other hand, can be useful for preserving hydration levels over prolonged forms of activity (like long-distance running, cycling, high school soccer tournaments, long hikes, etc.). They can also be useful for preventing hypoglycemia by sipping on these drinks intermittently for gradual carbohydrate intake. Thus, it's best that an

individual with diabetes always consult their diabetes healthcare team before deciding whether a sports drink will assist in controlling blood glucose levels while working out.

Resources:

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Care of Athletes with Type 1 Diabetes



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People with type 1 diabetes (T1D) need to exercise regularly to maintain good health and longevity. Nowadays, many individuals with T1D seek to train and compete as well. Type 1 athletes perform exceptionally well despite all the challenges they face. Athletes with T1D can exhibit good glucose levels and exercise performance by titrating insulin

dosages, frequent monitoring of glucose levels, proper nutrition, and being constantly in touch with the diabetes care team.

The National Athletic Trainer's Association (NATA) recommends the following care for type 1 athletes: It is comprised of the diabetes care plan, athletic training kits, physical examination before the event, prevention of hypoglycemia (recognition and treatment), prevention of hyperglycemia (recognition and treatment), administration of insulin, travel plan, athletic injury, and glycemic control.

RECOMMENDATION

Diabetes care plan



The plan should include blood glucose monitoring and insulin therapy guidelines, a list of medications, guidelines for the management of hyperglycemia and hypoglycemia, emergency contact information, and a medical alert tag which the athletes should always carry.

Supplies for athletic training kits

Supplies to treat diabetic emergencies should be available at all games and events (glucose monitoring equipment, supplies to treat hypoglycemia, including hypo tablets, sugary fluids, etc., ketones testing kits, containers for disposing needles, spare batteries for CGM devices).



Preparticipation physical examination

The examination must include a sports history, an assessment of the level of diabetes self-care knowledge and skills, screening for diabetes complications, and the impact of the sport on blood glucose and blood pressure.



Insulin therapy



The objective is to normalize blood glucose levels without causing hypoglycemia/hyperglycemia and weight gain. Intensive insulin therapy is the standard care that uses basal and bolus insulin doses to normalize blood glucose levels. Insulin pumps – continuous subcutaneous insulin infusion (CSII) and multiple daily injections (MDI) are the primary methods for delivering the same.

Insulin adjustments: For athletes using an MDI regimen, adjustments in mealtime bolus insulin are to be considered in cases of activity performed within 3 hours of meal ingestion to prevent hypoglycemia. The intensity of activity should be considered as well. In the case of the CSII regimen, the pump must be suspended 60 minutes prior to activity, to allow circulating insulin to reduce. Suspending the pump for more than 90 minutes may lead to hyperglycemia. In the case of activities with a duration of one hour or more, small boluses of short-acting insulin given during activity can prevent hyperglycemia.

Glycemic control and targets

Monitoring HbA1c levels every 3-4 months is a must for all athletes. The American Diabetes Association (ADA) recommends HbA1c levels of 7% for adults on intensive insulin therapy and 7.5% for children and adolescents.

- Type 1 athletes must always monitor blood glucose levels before activity, aiming for a target between 120-180 mg/dl.
- If blood glucose levels are between 90-149 mg/dl, a carbohydrate snack of 0.5-1.0 g/kg/h and reducing basal insulin at the onset of activity is recommended.
- If blood glucose levels are between 150-249 mg/dl, an extra carbohydrate snack is recommended only if blood glucose levels drop below 150 mg/dl.
- If blood glucose levels are below 90 mg/dl, an additional carbohydrate snack of 15-30 g is recommended at the time of the activity.
- Testing for ketones is recommended if blood glucose levels are above 250 mg/dl.

- If blood glucose levels are between 250-349 mg/dl and ketones are detected or if blood glucose levels are above 350 mg/dl and even in the absence of ketones, no activity is recommended.
- If blood glucose levels are between 250-349 mg/dl and no ketones are detected, a mild-moderated activity can be recommended as blood glucose levels are expected to drop.

Hypoglycemia

Hypoglycemia (blood glucose levels dropping below 70 mg/dl) is an acute complication associated with people who are on intensive insulin therapy. Hypoglycemia prevention uses a 3 steps approach – blood glucose monitoring, carbohydrate supplementation, and insulin adjustments. Many athletes experience late-onset post-exercise hypoglycemia at night. This needs additional bedtime snacks and frequent blood glucose monitoring.



Hyperglycemia



Hyperglycemia (blood glucose levels >180 mg/dl) with or without ketones can occur in type 1 athletes. Monitoring blood glucose levels frequently as well as administering small boluses of rapid-acting insulin or temporary increase in basal rate of insulin can be done to manage such kind of hyperglycemia.

Nutritional recommendations

Consumption of carbohydrates up to 3-10 g/kg/d (for extremely prolonged activity up to 12 g/kg/d. Consumption of proteins up to 1.2-2.0 g/kg/d for strength training and endurance exercises. Consumption of fat up to 20-35% of total energy intake.



Travel plan

Before starting the travel, a medical prescription must be taken from a physician, stating the need for diabetes supplies, medications, and equipment. If traveling by flight, airplane authorities must be notified regarding diabetes and all the medications and diabetes equipment that the athlete will be carrying during travel. Prepackaged snacks must be carried during travel in case the need arises.

DIABETES TRAVEL CHECKLIST

- ✓ Doctor's letter
- ✓ Download carb-counting apps
- ✓ Carry Prepackaged snacks
- ✓ Medical ID
- ✓ Diabetes check-up before trip
- ✓ Insulin cooling bag
- ✓ Have doctor's contact details
- ✓ Spare testing monitor



Athletic injury



Type 1 athletes with trauma should maintain tight glucose control, to minimize the detrimental effects of trauma on glycemic control. ADA recommends adhering to guidelines for non-critical patients to be applied to athletes with injuries (Premeal blood glucose levels of 110 mg/dl and a post-meal blood glucose level of <180 mg/dl).

With recent advances in technology with regard to blood glucose monitoring devices and insulin administration techniques, athletes with T1D are able to give excellent performances in the events. Some T1D athletes are able to achieve gold medals in competitions with a proper diabetes care plan and the guidance of experts.

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What's Trending?

The Evolution of Technology and Exercise - Where We Stand?



Dr. Satish Chander Wasoori

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Senior Consultant Diabetologist & Endocrinologist, Paras Hospital & Veriezon Hospital, Gurgaon

With evolution, mankind has explored and developed new technologies to make daily living activities less labor intense, more efficient, and as a result, more sedentary. On the one hand it contributed to the increase in sedentary lifestyle across different age groups and socioeconomic levels. On the other hand, the widespread use of

fitness technology such as smartphone applications and wearable technologies offers innovative solutions to increase and promote physical activity (PA).

Positive impact



Growth of technologies: Since walking upright on two legs, new technologies have been developed to make life on Earth easier and more efficient. Around six to seven thousand years ago, the invention of the wheel and the horse or cattle-drawn cart was directed to make work and life less physically demanding. These inventions commenced a new era of trade and led to the development of other transportation modalities (land, air, and sea). The “revolution of telecommunication and electronics” instigated the extensive use of different household appliances designed to improve communication (telephones) and decrease manual labor (computers, washing machines, vacuum cleaners). Medical inventions also lead to early

diagnosis of disease, treatment, and management options. As a result, life expectancy, from 35-40 years of age for thousands of years, increased markedly to around 80 years in the twentieth century.

Negative impact

Sedentary behavior: Physical activities previously were a part of the “standard” working day involving active transport, labor, etc., or part of domestic household duties (cleaning and cooking), which have been replaced or reduced by machines. The internet and its accessibility on mobile devices (phones, tablets) have also negatively impacted PA. Indeed, the overall reduction in PA, irrespective of the cause, and sedentary behaviors are strongly associated with the obesity epidemic. The prevalence of overweight or obesity has nearly tripled globally from 1975 to 2016. As per the latest



National Family Health Survey (NFHS-5, 2019-21), the prevalence of obesity (body mass index $\geq 25 \text{ kg/m}^2$) in men and women was reported to be 22.9% and 24% respectively in India. The consequences of obesity are diabetes, hypertension, cardiovascular diseases, psychological conditions, and other chronic diseases. Physical inactivity is both a precursor and a consequence of obesity. Physical inactivity also increases the risk of muscle mass and strength loss, falls, fractures, and cognitive decline. Though people may be living longer, they often live with a disability or chronic disease impacting their functional capacity, independence, and quality of life. As Abraham Lincoln, rightly said “And in the end, it's not the years in your life that count; it's the life in your years.”

Why exercise is medicine?

Extensive short-term and long-term functional, physical, cognitive, clinical, and mental health benefits are associated with maintaining a physically active lifestyle and reducing sedentary behaviors.

Technologies and active lifestyle - The way forward

An example of using technology to encourage PA is the pedometer, accelerometer, emergence of fitness bands, smartwatches, and accessories. With the help of technology and devices, we count and monitor steps, record body acceleration, monitor heart rate, remotely record/monitor physiological responses, monitor sleep statistics, track jogging and biking routes, workout data and share data. Additional health-related data have also increased engagement in PA significantly. There are some viable options for providing fitness trackers to large and diverse groups of people. Studies have shown that fitness trackers increased productivity and decreased the number of sick days taken, suggesting the powerful potential of adoption by companies in large numbers. Healthcare providers are now prescribing exercise to their patients with chronic health conditions such as diabetes, hypertension, or

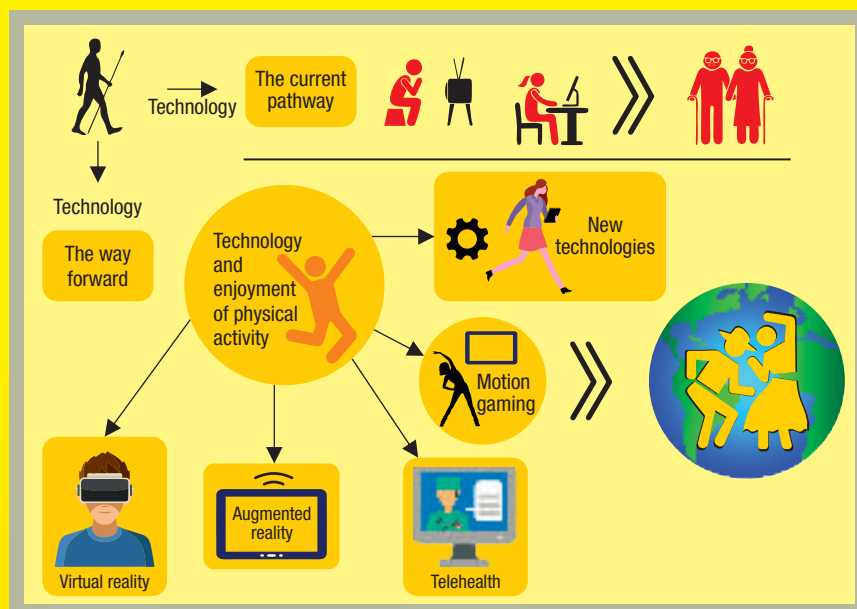


Figure 1: Technologies promoting physical activity

cardiovascular disease. With the help of fitness trackers, both healthcare providers and patients track day-to-day exercise, along with other metrics like diet, heart rate, or sleep.

Encouraging competition through data sharing, which further motivates individuals to do better. Recent advances in “exergaming” and virtual reality technologies present a captivating opportunity and a promising approach for changing individuals' responses to PA. Increasing the amusement of exercise through technology may lead to greater adoption of PA, reduce sedentary behavior, and improve overall well-being. Perhaps rather than, or in addition to, aiming at decreasing screen time, exploring the technologies that encourage movement is needed.

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Diabetes-friendly Features of Smartwatches



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Diabetes is a chronic metabolic disease that can be controlled by making lifestyle changes. In recent years, there has been a noticeable rise in the usage of smart devices to treat diabetes. By enabling better control of blood glucose levels and foreseeing the development of harmful events (hypo/hyperglycemia, etc.), these technologies have been developed to

make life easier for people with diabetes. Many smartwatch users rely on a popular set of health and wellness-related features. These smartwatches have sensors that continuously record data that is useful for those with diabetes, such as heart rate, blood pressure, sleep quality, etc.



Smartwatch features and functions for diabetics

Features	Functions	Benefits in diabetes management
Heart rate sensing and emergency alerts	Tracks heart rate during exercise. Detects an unusual activity in the heart rate and notifies the user.	A higher resting heart rate denotes an increased risk of cardiovascular issues. Therefore, monitoring heart rate aids in the prevention of cardiac issues.
Pedometers	It helps to count steps.	Helps create goals, measure progress, and conveniently monitor one's own level of fitness.
Physical activity trackers (for running, swimming, cycling, etc.)	Helps to measure and track various aspects of a particular physical activity. Mentions about calories burnt by doing that activity.	Improves glycemic control and cardiometabolic risk variables. Motivates to increase physical activity.
Blood pressure monitor	To regularly monitor the blood pressure through a revolutions per minute (RPM) program.	Hypertension is more common in people with diabetes than in those without. As a result, monitoring blood pressure using a smartwatch helps to diagnose any abnormality in time.
Sleep monitor	Count the number of hours of sleep. Rate the intensity of sleep from light, moderate, and deep sleep. Tells about the quality of sleep.	People with diabetes frequently experience sleep difficulties like insomnia, poor-quality sleep, and maybe excessively sleepy during the day. Lack of good sleep can increase blood glucose levels. Therefore, utilizing a sleep monitor will enable people with diabetes to keep track of the quantity and quality of sleep and take measures to improve it.

Features	Functions	Benefits in diabetes management
ECG (Electrocardiogram)	To measure the heart's electrical activity.	Asymptomatic people with diabetes make up the majority of those with cardiovascular involvement. In asymptomatic individuals, ECG anomalies are reported to be predictive of silent ischemia. A statistically significant elevated risk of cardiac death and morbidity is linked to an aberrant ECG response. Because of this, wearing a smartwatch with having ECG feature enables the wearer to obtain measurements in just a few seconds and act quickly in an emergency.
Oxygen saturation	SpO ₂ sensors measure the blood oxygen saturation	SpO ₂ can help to detect sleep apnea and other respiratory conditions. Hypoxia (low tissue oxygenation) is thought to be a risk factor for the progression of diabetic complications.

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**CARDIO
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**A1C REDUCTION
ASSURES WEIGHT
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**ENSURES
ADHERENCE**

Abridged Prescribing Information

Indications: 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; Ketacidosis in Patients with Diabetes Mellitus; Uricospuria and Pseudotumor; 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 products;

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 diarrhea or vomiting, fever or reduced fluid intake), metformin should be temporarily discontinued and contact with a healthcare professional is recommended.

Contraindications: Hypersensitivity to the active substance of Dapagliflozin, Sitagliptin & Metformin or to any of the excipients listed. Any type of acute metabolic acidosis (such as lactic acidosis, diabetic ketoacidosis). Diabetic ketoacidosis. Severe renal failure (eGFR < 30 mL/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: January 01, 2023

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In Uncontrolled Obese T2DM,

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

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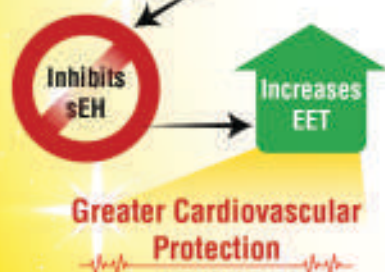
Glycomet-GP 3/850
Metformin Hydrochloride 850 mg SR + Glimepiride 3 mg

January 2023*

ESC*

European Society of Cardiology

Long term continuous usage
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Meta analysis of
21 well established
trials*



5% Reduction of Weight
Vs Baseline Weight²

100%
Availability

20-50%*
Affordable
vs other brands

Appropriate to add
along with Newer AHAs

1. Glimepiride use is associated with reduced cardiovascular mortality in patients with type 2 diabetes and chronic heart failure, a prospective cohort study | European Journal of Preventive Cardiology | Oxford Academic (oup.com) 2. Ther Adv Endocrinol Metab 2020; Vol 11:1-12 DOI: 10.1177/2042018820926000 # Data on file *As compared to non-glimepiride group
EET: Epoxyeicosatrienoic acid; sEH: soluble Epoxide Hydrolase; AHAs: antihyperglycemic agents; T2DM: Type 2 Diabetes Mellitus

Prescribing Information

Information: Metformin hydrochloride (as prolonged release) and glimepiride tablets. Glycomet-GP 0.5/Glycomet-GP 0.5 Forte/Glycomet-GP 1/Glycomet-GP 1.5/500 Glycomet-GP 2/Glycomet-GP 2/850/Glycomet-GP 3/Glycomet-GP 3/850/Glycomet-GP 4/Glycomet-GP 4/850/Glycomet-GP 1 Forte/Glycomet-GP 2 Forte/Glycomet-GP 3 Forte/Glycomet-GP 4 Forte. **Contraindications:** Glycomet-GP 0.5mg: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500mg and glimepiride IP 0.5mg. Glycomet-GP 0.5 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 0.5mg. Glycomet-GP 1: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500 mg and glimepiride IP 1 mg. Glycomet-GP 1.5/500: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 1 mg. Glycomet-GP 2: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500 mg and glimepiride IP 2 mg. Glycomet-GP 2/850: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 2 mg. Glycomet-GP 3: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 3 mg. Glycomet-GP 3/850: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 3 mg. Glycomet-GP 4: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500 mg and glimepiride IP 4 mg. Glycomet-GP 4/850: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 4 mg. Glycomet-GP 1 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 1mg. Glycomet-GP 2 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 2mg. Glycomet-GP 3 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 3mg. Glycomet-GP 4 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 4mg. **Indications:** 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 2500mg 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, cholelithiasis and (usually 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, cold erythema, decrease in Vit B12 absorption, very rarely lactic acidosis, Harelytic anemia, Reduction of thyroxine level in patients with hypothyroidism, Hypomagnesaemia 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. Sufferers 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, intravenous administration of iodinated contrast agents), acute or chronic disease which may cause renal 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

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Enhancing Patient Care: A Doctor's experience on the MyCARE Patients Support Program



Dr. Shardul Kothary

M.B.B.S., D. Diabetology (Gold Medalist)
Consultant Diabetologist, Sushrusha Hospital,
Advance Diabetes Care Centre, Diabetes
Speciality Clinic,
Somaia Hospital, Mumbai

A 39-year-old male with type 1 diabetes (T1D) is being managed by Dr. Shardul Kothary (Mumbai). He has had T1D for the last 5 years.

Here is what Dr. Shardul has to say:

I have been managing him with insulin therapy for the last one year. He is compliant in terms of insulin, however, his dietary pattern was very erratic. I always explained to him that blood glucose control can be achieved when all four pillars of diet, exercise, monitoring, and insulin are well adhered to. However, he would agree in the clinic, but once back in his routine, he would neglect the lifestyle management aspect completely. Chronic hyperglycemia had led to weight loss and sarcopenia as well. I felt this patient required holistic education on self-management of diabetes. This is where I took help from the My Care Diabetes Educator (DE), Tanvi Gharat.

Tanvi took a detailed history of the patient. She educated him on various aspects of diabetes management, including the right insulin technique. She explained the importance of diet and started educating him about carbohydrate counting. This gave him more flexibility in his routine. She planned a customized meal plan which was suitable for him and explained how insulin and food need to match to help control the postprandial blood glucose peak. We both studied the patient's CGMS reports and noted several hypoglycemic episodes too. The DE made him and his family aware of the signs and symptoms of hypoglycemia and also the right way to correct it. She also emphasized the ways to prevent hypoglycemia after analyzing the CGM report and his lifestyle. Since the primary goal was also weight gain, exercise, and adequate protein intake were formulated into the plan.

Frequent follow-ups and step-by-step counseling showed great results. His blood glucose fluctuations started reducing, and his time in range improved significantly. He was now more aware and motivated to manage his blood sugar levels. Improved glycemic control over time also resulted in healthy weight gain.



Ms. Tanvi Shirish Gharat

**National Diabetes Educator Program and
Type 1 Diabetes Education certificate
course**
Certified Diabetes Educator

Here is what Tanvi has to say:

The team approach, timely education along with Dr. Shardul Kothary's medical intervention, has helped in improving outcomes and in empowering people with self-management skills.



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20 weeks personalised and hand-holding support for people with diabetes initiated with Insulin.
Aims to empower PWD* with information and knowledge they need to ensure a better quality of life while managing their diabetes.



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*PWD: People with Diabetes

Frequently Asked Questions on Diabetes and Exercise



Dr. Tejaswi V

MBBS, MD (General Medicine), DM (Endocrinology)

Consultant Endocrinologist & Diabetologist,
Kauvery Hospital, Bengaluru

1. My 14-year-old daughter was diagnosed with type 2 diabetes a few months ago. She is part of her school's athletic team. Ever since she was diagnosed, she has stopped taking part in the sport. Is it safe for her to continue with her athletics? If yes, are there any precautions that we need to take?

Ans. Yes, it is perfectly safe for your daughter to continue her sports. Any physical activity is very beneficial to individuals with diabetes because it improves the body's sensitivity to insulin. There are certain precautions that you may need to take, like frequent monitoring of blood glucose levels before, during, and after exercise, to help the healthcare team guide you on the medication dosage and timings as well as on the diet to be consumed pre and post-workout. Special care must be taken for adequate hydration. If the training or the race is up to 60 minutes only, water should suffice, but if the training is longer then coconut water or sports drink may be required. Keeping a food and exercise log and monitoring frequently can help you to get an idea of how the body reacts to the sport, and accordingly, corrective action can be taken.



2. I am 67-year-old and was diagnosed with diabetes almost 16 years ago. I have developed retinopathy, due to uncontrolled blood glucose levels. I have started doing yoga but read an article stating individuals with retinopathy should not do yoga. Is it true?



Ans. Regular yoga practice has been shown to have a positive effect on blood glucose control. It improves concentration and boosts mental well-being. Yoga enhances the uptake of glucose by muscle cells, lowering blood sugar levels, enhancing circulation, and lowering the risk of cardiovascular disease. Yoga can also lower hyperglycemia brought on by stress. However, certain inverted poses such as *Sarvangasana* (shoulder stand) and *Sheershasana* (headstand) cause blood to rush or pool into the head and upper body and increase the risk of hemorrhage or retinal detachment. Thus, these kinds of yoga poses should be avoided in people with diabetes who have developed retinopathy or performed with extreme caution after an ocular evaluation.

3. I am a 45-year-old man, I was diagnosed with diabetes a few years ago, I read about the importance of physical activity and have been exercising regularly, my blood glucose levels are also under control, and I am aiming to build muscle mass. I read about whey protein, for muscle building, is it safe for me to consume? If yes, how much?

Ans. Yes, whey protein is safe to consume, even for people with diabetes, as it is a good quality source of protein, thus aiding in muscle building. Studies have shown that the best time to consume whey is within 30 minutes post a strenuous workout with water, as it is best absorbed by the body. Whey protein also slows down stomach emptying, thus keeping one full for long periods of time. When consumed prior to meals or with high glycemic index meals, whey aids in insulin secretion and the secretion of gut hormones, which help to lower postprandial blood glucose levels. The amount required will depend on your protein consumption throughout the day from all the protein sources and your daily requirement of protein based on your age, physical activity, etc. If the diet is unable to provide the required amount of protein per day, whey supplementation can be considered. A customized meal plan by a qualified dietitian will help you with the amount and distribution of protein throughout the day.



4. I am 24-year-old and have been diagnosed with pre-diabetes. I have a job which requires me to travel very frequently. I exercise and gym regularly. At times when I travel it is easier for me to carry my post-workout snack instead of looking for one in an unknown place. I wanted to know if I could consume an energy/protein bar. Are they the same?



Ans. Yes, as a healthier alternative, you could consider energy/protein bars. But you need to read the label carefully to select the right one. An energy bar is not the same as a protein bar. Their nutrient composition differs from each other. An energy bar is dense in calories but low or moderate in protein, whereas a protein bar gives around 10-20 g of protein per serving. At times, some bars may give up to 30 g of protein per serving. What is important to note is that many times these bars contain added sugar, maltodextrin, or high fructose corn syrup, which may increase the risk of diabetes and other metabolic conditions. So, while choosing the right bar, read the nutritional label and ingredients carefully. Opt for one without added sugar or

maltodextrin and one which has higher protein, moderate carbohydrate, and good-quality fat. While comparing different bars, go for one with the least calories per serving and more fiber. This will help you stay satiated for a longer time.

Diabetes and Swimming



Dr. Jinen Shah

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People with diabetes are always encouraged to exercise. They usually opt for simple exercises such as brisk walking or going to the gym and not sports, out of fear of hypoglycemia and the inability to manage the deranged sugars. Swimming is one of the safest cardio exercises, and when done well helps burn calories and enhances the

musculoskeletal system. It is also refreshing and helps in stress management. Diabetes should not stop any individual from swimming. People with diabetes need to take care of the following if they opt to swim:

Type of swimming and its effect on blood glucose levels



Long-distance swimming lowers blood glucose levels as compared to short sprints. It is challenging to foresee the effect of swimming on blood glucose, particularly if the swimmer is taking part in multiple sports. They can manage their levels by testing as frequently as feasible.

Effect of swimming on insulin

Insulin-dependent individuals are at higher risk of hypoglycemia post-exercise as insulin sensitivity may increase for a few hours. The amount of basal or bolus might have to be adjusted while they swim. For instance, the closer their last meal or snack was to their swim, the more probable it is that they will need to lower their bolus dose.



Diabetes kits

Many insulin pumps, glucose monitors, and flash glucose monitors are water-resistant. An individual's insulin pump can be turned off for up to an hour. Since every model is unique, it is essential for the swimmer and their healthcare team to check with the monitor's manufacturer.



Swimming and eating



Our muscles require carbohydrates as fuel when we work out. Whether the swimmer actually needs a snack or not can depend on how long he/she plans to swim for, how intense the session will be, and what's happening with their blood glucose levels.

Before: A gap of 3-4 hours should be maintained between the last meal and the swim session. Some people with diabetes may need to eat a carbohydrate-containing snack 1-2 hours before a swim to avoid the risk of hypoglycemia

During: Sports drinks or gels containing glucose can provide carbohydrates while swimming for a longer span (over an hour). However, their need needs to be discussed with the healthcare team.

Post: Carbohydrate and protein snacks should be included post-swim. A balanced meal of wholegrains, vegetables or salad, fish or chicken, beans or pulses will give the body everything it needs for recovery post-exercise.

Caution with feet and eyes

It is crucial to pay special attention to the extremities of the body, as individuals with diabetes are at a higher risk of developing microvascular complications. Protective eyewear should be worn while swimming to prevent irritation or infection of the eyes. Feet must be covered while walking around the pool or in the shower area, to prevent cuts, blisters & sores. Swimmers should check for changes in foot color or absence of sensation while swimming to identify any early warning indications of major foot issues.



Hypo and hyperglycemia

- Depending on the type and intensity of the exercise, each swimmer's blood glucose levels may be affected differently.
- To ensure they exercise safely, the swimmer's diabetes healthcare team should discuss with them their blood glucose targets before, during, and after swimming.
- If the swimmer is swimming or engaging in other forms of exertion, they might not be able to recognize the signs of hypoglycemia. This is due to the similarity in how exerting oneself and experiencing a hypo can feel.
- In case of a severe hypo attack, one should be mindful and treat by following the “15-15 g rule”. A severe hypo should never be followed by any type of exercise for at least 24 hours.
- Individuals with diabetes who are swimmers must carry the diabetes ID card with instructions clearly mentioned about what to do if they are unconscious due to a hypoglycemic episode.

Taking the above precautions, swimming is an excellent physical activity for people with diabetes. If the person with diabetes hasn't done swimming before or is completely sedentary, it is best to get fitness approval from the treating doctor to go ahead to take the plunge.

Resources:

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2. Emma Hook. Swimming when you have diabetes. *Diabetes UK*. <https://www.diabetes.org.uk/guide-to-diabetes/managing-your-diabetes/exercise/swimming-diabetes>. Accessed April 13, 2023.
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Running Marathons While Living with Diabetes



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Regular exercise can be of great help for people with diabetes (PWD) because it increases the body's sensitivity to insulin. But PWD refrains from long-distance running as they believe that it might result in hypoglycemia during or after the activity. But the good news for PWD is that marathons can be run safely and successfully by PWD. For a run or race to

be successful, proper planning, training, and nutrition are essential. Therefore, PWD needs to implement a few key tactics to maximize performance and avoid unanticipated occurrences, including a sharp rise or fall in blood glucose levels (BGL) when running.

Monitoring blood glucose levels and nutrition



Whether one is living with type 1 or type 2 diabetes, monitoring glucose levels closely before, during, and after a run is essential. Before jogging or running, if the BGL is less than 100 mg/dL, they must eat at least 15-30 g of carbohydrate snacks to avoid hypoglycemia. If the BGL is greater than 250 mg/dL, they must wait until the BGL falls below this level. Those who experience light-headedness, fainting, nausea, weariness, or a loss of muscle control should either reduce the exercise or cease it altogether.

Hydration

Running can lead to sweating especially in a tropical warm and highly humid environment which can lead to dehydration. Therefore, it is recommended to hydrate in little amounts frequently throughout marathons. For longer events, sports drinks may be useful to hydrate and keep BGL consistent.



Footwear

Shoes must have sturdy straps. They should promote improved circulation. Must be adaptable, comfortable, and capable of easing pain and stiffness. When running a marathon, socks must be made of polyester or a cotton blend as these materials assist to avoid blisters during a run.



Injection site



Insulin users should refrain from injecting insulin into muscles that will be worked throughout the marathon, such as the thighs. Before exercising, an injection into the thighs might boost and speed up the absorption of insulin, which may result in hypoglycemia. Also, PWD must talk to their doctor about how to balance the appropriate dosage of insulin or medication while planning, practicing, and running the marathon. During a marathon or right after exercising, PWD might experience hyperglycemia. If the BGL continues to stay high, a correction dose of insulin may be required.

Resources:

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3. Pérez Pico AM, Mingorance Álvarez E, Martínez Quintana R, Mayordomo Acevedo R. Importance of Sock Type in the Development of Foot Lesions on Low-Difficulty, Short Hikes. *Int J Environ Res Public Health*. 2019;16(10):1871. Published 2019 May 27. doi:10.3390/ijerph16101871
4. Younk LM, Mikeladze M, Tate D, Davis SN. Exercise-related hypoglycemia in diabetes mellitus. *Expert Rev Endocrinol Metab*. 2011;6(1):93-108. doi:10.1586/eem.10.78
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6. Smart Carmel. Section 2 - List and pictures of carbohydrate foods commonly eaten in India - separated into breakfast and snack items, main courses, breads, rice preparations and desserts. In: *Healthy eating and carbohydrate counting for children and adults with Type 1 Diabetes*. 1st ed. Sydney, Australia: Toggle - Digital Creative Agency; 2021:23-40.

Diabetes Educator Tip of the Month



Contributed by
Name: Ms. Zeal Doshi

**Msc. Clinical nutrition and dietetics,
Certified diabetes educator**

How to Choose a Fitness Tracker?

Fitness-tracking wearables and applications significantly transform the way people maintain their quest for personal fitness. They are a great help for people living with diabetes to manage several aspects which impact blood glucose control such as activity, sleep, and diet, and help to track progress. A

fitness tracker or a smartwatch is a form of electronic gadget that tracks a variety of human activities, such as the number of steps taken, the consequent heart rate, oxygen saturation, and sleep quality. Some fitness trackers can also be connected to devices that measure blood glucose levels. Any person using a wearable fitness tracker must enter physiological information such as weight, height, and gender in order for the tracker to make sense of the data it gathers. Processing the data generated by the fitness tracker is facilitated by this personalization. The following points should be considered while purchasing a fitness tracker which suits your need:



- **Battery life:** It should last up to several days without charging.
- **Features:** A smartwatch should offer fitness features, step counting, heart rate, ECG, and SpO₂ monitoring.
- **Workout type:** The fundamental benefit of specialized exercise monitoring devices is that they record specific exercises with more accuracy than broader, multipurpose ones.
- **Water resistance:** Working out means sweating, so waterproof or water-resistant models work better for vigorous exercise. Most devices are waterproof up to a certain depth, but some can be submerged in water without any damage, which helps in tracking swimming or water sports.
- **Compatibility:** Some trackers might only work on specific devices, so it's important to check that the phone or tablet is compatible with the device. Currently, smartwatches cannot monitor blood glucose levels directly, but they can be linked to an external continuous glucose monitoring system (CGMS) so the sensor or device used to measure blood glucose isn't always compatible with all trackers or smartwatches. So, if a CGM is used, its sensor type should be compatible with the smartwatch you plan to buy.
- **GPS:** It helps users to create different routes for walking, running, cycling, and track the distance traversed so an integrated geo-location tracker linked to local maps and routes can be useful.
- **Accuracy:** The accuracy of a tracker depends on the model used and the data input.

Fitness trackers can be used to transition towards a healthier way of living, but they cannot replace medical check-ups for heart, sleep, or stress-related disorders.

Resources:

1. <https://techexactly.com/blogs/top-25-must-have-features-in-your-fitness-gym-app/>
2. <https://www.cashify.in/smartwatch-features-to-consider-while-buying-it>

Exercising for Better Sleep



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Sleep is a basic human need and is crucial to a person's mental and physical well-being. Virtually all bodily systems are affected by poor or inadequate sleep, and chronic sleep disturbances predispose an individual to cardiovascular diseases, psychiatric disorders, and early mortality. Epidemiological and experimental studies have reported that short

duration and poor sleep quality also result in metabolic and endocrine alterations that may increase body weight and fat mass. Sleep restriction affects the level of stress hormones such as cortisol, leading to decreased insulin sensitivity and glucose intolerance.

India reports around seven million new cases of diabetes every year. According to a study, sleep disorders are commonly seen in people with diabetes. Inadequate or poor sleep is a risk factor in the development of type 2 diabetes (T2D) and can make managing the condition more difficult. People with diabetes suffer from sleep issues due to underlying causes, such as obstructive sleep apnea, restless leg syndrome, and increased nighttime urination.

Exercise and its health benefits, such as increased stamina, fitness levels, improved mental health and immune system, and weight loss, are well-known. Of the many ways to enhance sleep quality, exercise as one of the non-pharmacological methods has gained immense popularity amongst researchers. As per studies, exercise helps increase melatonin secretion, improves serotonin levels, and decreases (β -amyloid peptide ($A\beta$)) concentration which is responsible for the progression of Alzheimer's disease leading to better sleep quality. Factors promoting sleep are mentioned below:



Timing



During an exercise, the body temperature increases, signaling the body to stay awake. However, post-cessation of activity, the core body temperature falls after about 30-90 minutes, easing sleep. Chemicals such as endorphins are released during aerobic exercises that trigger an activity in the brain that keeps some people awake. Hence, such individuals should refrain from exercising close to their sleeping routine and wind up at least 1-2 hours prior. However, despite the different biological responses to exercise, other people may not find that the time they exercise makes any difference. A study (Christopher E. Kline, 2014) has also found that even though physical activity levels may improve sleep, improving sleep has not resulted in increased levels of physical activity.

Duration

Engaging in at least 30 minutes of moderate-intensity aerobic exercise a day can improve sleep quality. As per a study (Jung Ah Lee *et al.* 2016) the incidence of T2D mellitus was higher in subjects with poor sleep quality but not in those with insufficient sleep duration. Thereby suggesting that sleep quality is a better predictive factor for this condition than sleeping hours.



Type of exercise



Aerobic exercises can help improve slow-wave sleep, the phase where the brain and the body rejuvenates. Studies have shown that aerobic exercise training in people with T2D improved sleep quality and quality of life. Yoga stimulates the production of endorphins, reducing stress levels and helping a person to sleep better at night. According to a study, (Mohsen Ebrahimi *et al.* 2017) the effect of 12 weeks of yoga compared to aerobic exercise (running on a treadmill) showed statistically significant results on the sleep quality score in women with T2D.

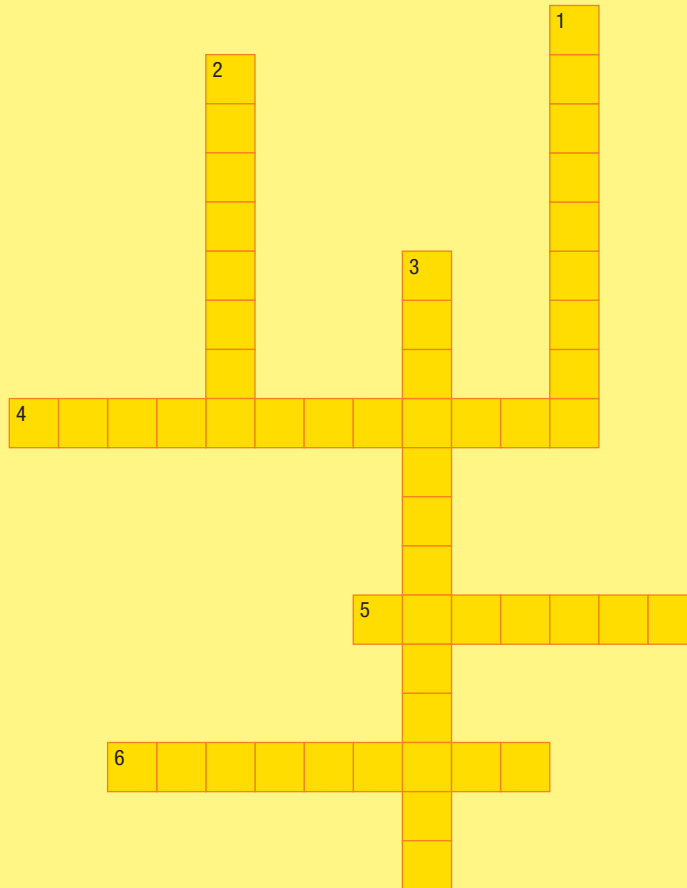
Studies have shown that exercise training improves sleep quality in middle-aged and older adults with sleep problems and older adults with T2D by regulating melatonin levels and circadian patterns. However, the effects of different exercise modalities (e.g. aerobic, resistance, and mind-body) on sleep quality and identifying the most effective exercise for improving sleep quality are limited and warrant more research.

Resources:

1. Jung Ah Lee, Sung Sunwoo, Young Sik Kim, Byung Yeon Yu, Hoon Ki Park, Tae Hee Jeon, and Byung Wook Yoo. The Effect of Sleep Quality on the Development of Type 2 Diabetes in Primary Care Patients. *J Korean Med Sci.* 2016; 31: 240-246. <http://dx.doi.org/10.3346/jkms.2016.31.2.240>
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6. Christopher E. Kline. The bidirectional relationship between exercise and sleep: Implications for exercise adherence and sleep improvement. *Am J Lifestyle Med.* 2014 Nov-Dec; 8(6): 375-379. Doi: 10.1177/1559827614544437
7. Han Zhang, Yefan Zhang, Sen Sheng, Yang Xing, Zhongchen Mou, Yanqiu Zhang. Relationship between Physical Exercise and Cognitive Impairment among Older Adults with Type 2 Diabetes: Chain Mediating Roles of Sleep Quality and Depression. *Psychology Research and Behavior Management.* Vol 16- 2023 Issue.

Dia-Games

Crossword



Across

4. Risk of this increases if insulin dosage is not reduced in accordance to new exercise regime
5. Something to always keep along while doing any exercise
6. Combination of exercise and video games

Down

1. Controlled or balanced yogic breathing practice
2. Great low impact exercise
3. Lack of good quality or quantity of sleep can cause this

Answers
Across: 4. Hypoglycemia, 5. Hypokit, 6. Exergames
Down: 1. Pranayama, 2. Swimming, 3. Hyperglycemia

NOTES

This image shows a single sheet of bright yellow paper. It features horizontal ruling lines spaced evenly across its surface, typical of notebook paper. The lines are thin and dark, contrasting with the vibrant yellow background. There are no margins, text, or other markings on the page.

NOTES

Start Early with

Metformin Hydrochloride 500 mg SR + Glimepiride 0.5 mg

Metformin Hydrochloride 1000 mg SR + Glimepiride 0.5 mg



Resulted in

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of **1.65%**

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Beat Diabetes

Win Life

For screening people with High & Moderate Risk of Diabetes

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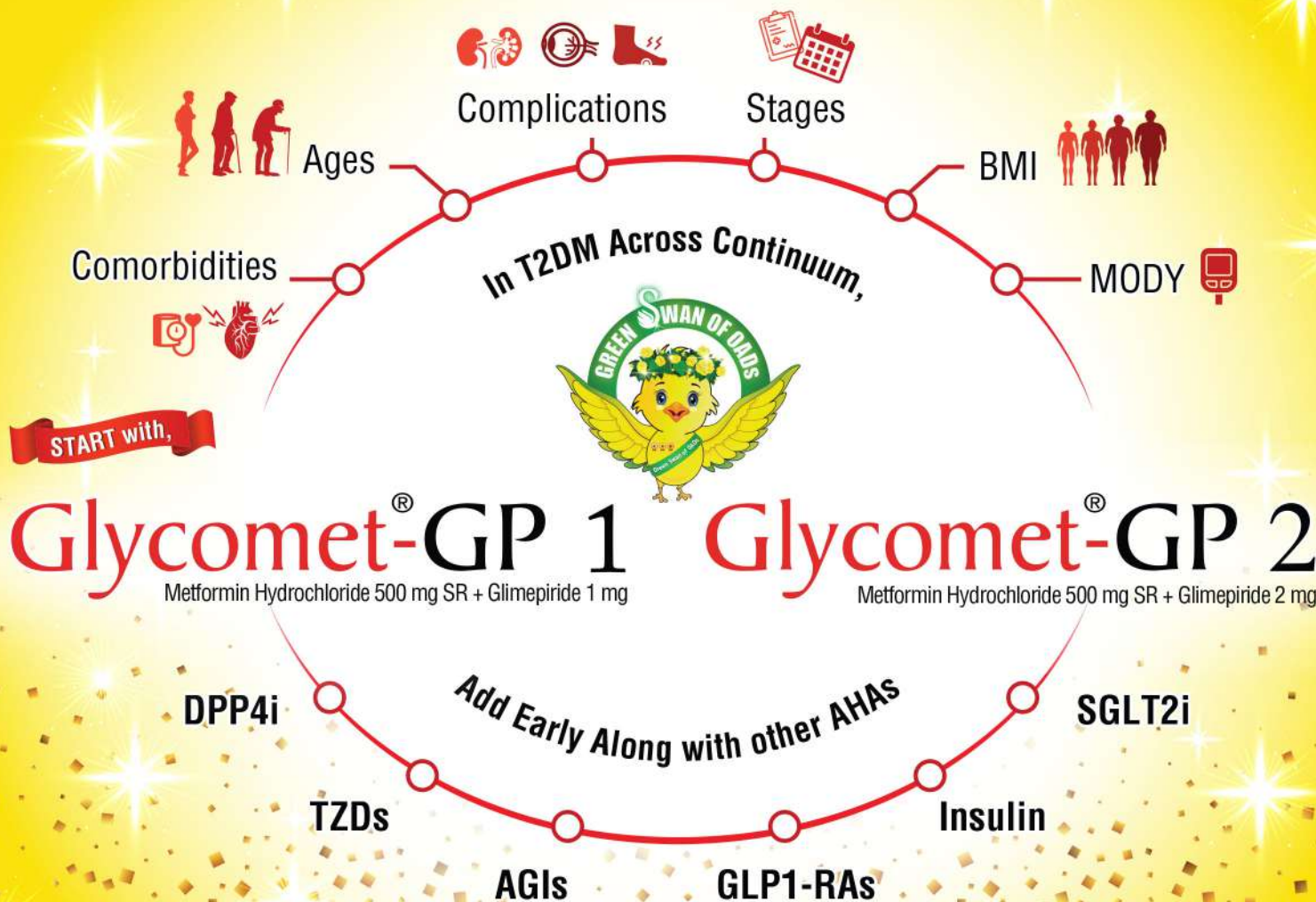


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* Data on File

1. Asian Journal of Diabetology, Vol. 23, No. 2, April-June 2022; YALAMANCHI SADASIYA RAO et al., 2. Asian Journal of Diabetology, Vol. 23, No. 2, April-June 2022; SAUMITRA RAY et al., 3. Cureus 2020; 12(9): e10.7759/cureus.1070
4. CMAR Data 5. Healthplix Data 6. Lim L-L, Lau ESH, Cheung JTK, et al. Real-world usage of sulphonylureas in Asian patients with type 2 diabetes using the Joint Asia Diabetes Evaluation (JADE) register. Diabetes Obes Metab. 2022;1-14. Doi:10. 1111/dom.14865;

Prescribing Information

Information: Metformin hydrochloride (as prolonged release) and glimepiride tablets. Glycomet-GP 0.5/Glycomet-GP 0.5 Forte/ Glycomet-GP 1/ Glycomet-GP 1/850/ Glycomet-GP 2/ Glycomet-GP 2/850/ Glycomet-GP 3/ Glycomet-GP 3/850/ Glycomet-GP 4/ Glycomet-GP 4/850/ Glycomet-GP 1 Forte/ Glycomet-GP 2 Forte/ Glycomet-GP 3 Forte/ Glycomet-GP 4 Forte Abridged Prescribing Information **Composition:** Glycomet GP 0.5mg: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500mg and glimepiride IP 0.5mg. • Glycomet GP 0.5 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 0.5mg. • Glycomet GP 1: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500 mg and glimepiride IP 1 mg. • Glycomet GP 1/850: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 1 mg. • Glycomet GP 2: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500 mg and glimepiride IP 2 mg. • Glycomet GP 2/850: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 2 mg. • Glycomet GP 3: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500 mg and glimepiride IP 3 mg. • Glycomet GP 3/850: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 3 mg. • Glycomet GP 4: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 500 mg and glimepiride IP 4 mg. • Glycomet GP 4/850: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 850 mg and glimepiride IP 4 mg. • Glycomet GP 1 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 1mg. • Glycomet GP 2 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 2mg. • Glycomet GP 3 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 3mg. • Glycomet GP 4 Forte: Each uncoated tablet contains metformin hydrochloride IP (as prolonged release form) 1000mg and glimepiride IP 4mg. **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, Hypomagnesaemia 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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