RSSDI

# Indian Diabetes

EDUCATOR JOURNAL

## Theme of the Month

**Diabetes and Women 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

Longest Running Monthly Journal

In collaboration with USV

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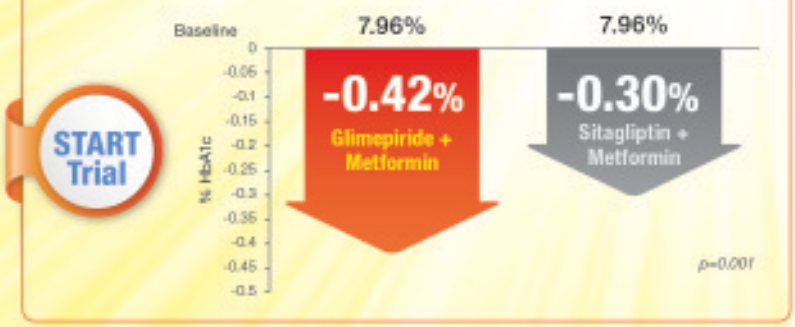


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1. Start trial- Derenjan TV et al., Indian J Endocrinol Metab. 2017 Sep-Oct; 21(5): 745–750. JAPI. 2. Diabetes Obes Metab. 2017; 19:1158–1192. 3. Data on file.

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

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

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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.

Diabetes affects women differently than men. Women may deal with the condition also differently. This month's IDEJ aims to propagate information about how diabetes affects women. Understanding the impact that diabetes has particularly on women can help in the development of specific treatment strategies and programs for the benefit of women and society at large.

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

Sincere Regards,

Dr. Sanjay Agarwal
RSSDI Secretary



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

# Expert Contributors
## of the month

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**Article:** How Diabetes Affects Women

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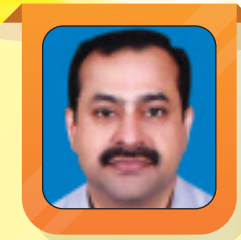
**Article:** Preexisting Diabetes and Pregnancy Care



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

# Women and Diabetes Special Issue-Celebrating National GDM Day

**Padma Shri Awardee**
**Dr. V. Seshiah**
Diabetologist at
Dr. V. Seshiah Diabetes
Research Institute
Dr. Balaji Diabetes Care Centre,
Chennai

Diabetes affects men and women equally; however, women are more seriously affected by its after effects. Women are also prone to gestational diabetes, diabetes after menopause, urinary tract infections, and vaginal yeast infections. In many countries, obesity is more common in women than in men. Obese women are especially prone to developing diabetes and diabetes, in turn, raises their risk of cardiovascular diseases significantly.

World Obesity Day observed on 4th March encourages practical solutions to help individuals achieve and maintain a healthy weight with proper treatment and reverse the obesity crisis. Whereas, International Women's Day is celebrated worldwide on 8th March to recognize women for their achievements, contributions, and leadership roles. The day is celebrated in support of gender equality and equal rights. Good reproductive health is a right of every woman and a matter of concern in India as the prevalence of gestational diabetes (GDM) continues to see rise, both in urban and rural women.

Dr. V. Seshiah, Senior Diabetologist and the Bhishma Pitamah of pregnancy diabetes in India has made groundbreaking contributions in the area of gestational diabetes. His inputs to GDM have helped our nation gain recognition on a worldwide scale and he has been making significant and sustained contributions to the fight against pregnancy diabetes for many decades. In recognition of his contribution, his birthday **10th March has been declared "National Gestational Diabetes Awareness Day".** India's National Health Mission is the first government ministry to make this day official. The objective behind celebrating this day is to raise awareness about the link between maternal health and diabetes.

Women are responsible not only for one generation but for many generations and as per the Indian tradition where women are considered as 'Nari Shaktis' their health is a big responsibility for each one of us.

RSSDI Indian Diabetes
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# Table of Content

# Cover Story: How Diabetes Affects Women

**Dr. V N Shah**

**MD General Medicine, FACE (USA)**

Senior Consultant Diabetologist, Zydus Hospitals and Healthcare Research Pvt. Ltd, Ahmedabad

Men and women both experience the effects of diabetes, but women are more severely affected by its after effects. Women in India generally lead difficult lives. Women with diabetes have the same joys and problems as other women, but they also have to deal with a chronic illness that presents them with a number of social and emotional hurdles every day of their lives. In certain parts of India women's health is still not taken seriously, due to gender bias leading to poor quality of life for them.

## The Adolescent Years

Adolescence is a period of significant physical and psychological changes. An adolescent girl with diabetes may find managing it difficult due to these changes. Regardless of the degree of commitment to the diabetes care regimen, physical changes may make it harder to control diabetes. Psychological changes affect how one manages diabetes and its treatment plan.

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| **Complications** | Adolescent girls with diabetes who are at risk of diabetic ketoacidosis receive suboptimal care in India as compared to boys with diabetes and also have poorer survival rates. |
| **Weight gain and eating disorders** | Anorexia nervosa and Bulimia nervosa are common eating disorders among adolescent girls with diabetes. For many adolescent girls, the emphasis on weight control is psychologically challenging and may also serve as a trigger for eating disorders among young people with diabetes. |
| **Menstruation** | Menarche is associated with unstable and challenging glycemic management. Girls in puberty demand more insulin. Maintaining proper perineal hygiene to avoid genitourinary infections is a related concern. |

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| **Mental health** | Adolescent girls with diabetes are also at risk for depression. Teenagers perceive having diabetes as a threat to their future and health as well as a controlling or limiting aspect of their lives. |
| **Social stress** | The health behaviors of adolescent girls with diabetes are significantly influenced by family and social support. When a child is diagnosed with diabetes, it has a wide impact on the family. Parents' worries for a girl kid also include the challenge of finding a compatible match for her marriage. |
| **Action points** | The transition from parental duty to adolescent freedom occurs throughout the delicate period of adolescence. To improve the health of the adolescent girl child, she needs parental, family, and social support for diabetes management. |

## The Reproductive Years

The reproductive years in the life of a woman with diabetes are very crucial for glycemic control. A healthy pregnancy and its outcome require proper care and good glycemic control from before conception to post-delivery to ensure good health for the mother and child.

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| **Lifestyle factors** | Women with diabetes who are of reproductive age experience stress on both a biological and social level. Access to a modified diet regime or place and time for physical activity may be a challenge. |
| **Pregnancy** | Careful diabetes control in the three months before and throughout pregnancy can minimize the risk of congenital abnormalities in the progeny by 10-fold. Women with diabetes should be made aware of the significance of enhanced diabetes treatment during this time of her life. There is a need for regular follow-ups post-delivery too to ensure good health and early diagnosis and care of diabetes in case of gestational diabetes (GDM) during pregnancy. |
| **Genitourinary health** | Sexually transmitted infections are far more common in women with diabetes, and these infections can cause infertility, chronic pelvic discomfort, and other problems. Women with diabetes frequently experience pruritus vulvae and urinary tract infections, both of which can result in prolonged hyperglycemia. Sexual dysfunction affects women with diabetes more commonly than it does women without diabetes. Women with diabetes experience lower orgasm and arousal. |
| **Chronic complications** | Because up to 25% of all instances of diabetic nephropathy among women can be detected during pregnancy, diabetic nephropathy may be identified in women a little sooner than in men throughout the reproductive years. Even at these earlier ages, diabetes eliminates the CVD protection seen in women without diabetes. |

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| **Mental health** | Women with diabetes have a higher chance of developing depression than women without diabetes. The coexistence of these two conditions may have negative interactions that lead to poor metabolic control. |
| **Action points** | It is important to determine whether there are any risk factors for the emergence of microvascular and macrovascular problems in women with diabetes of reproductive age. Various healthcare systems must be set up and operated in a way that will permit enhanced detection of risk factors and when necessary management of these risk factors. |

## The Middle Years

For those who have recently been diagnosed with diabetes as well as many others who have previously been diagnosed, the middle years (45–64 years) are a period of adjustment since the advent of macrovascular, microvascular, and other issues are prominent in this phase of life.


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| **Lifestyle factors** | Women who are in their midlife tend to gain weight for a variety of reasons. These women occasionally become less concerned with personal care and believe that preserving their bodies is no longer necessary. |
| **Chronic complications** | Women with diabetes have a death rate (from all causes) that is nearly triple to that of women without diabetes between the ages of 45 and 64. In addition, compared to the population without diabetes, women have a substantially lower survival advantage over men. Women are more likely than men to suffer from specific medical conditions, such as obese/overweight, osteoarthritis, cholelithiasis, hypothyroidism, rheumatoid arthritis, and other autoimmune or connective tissue disorders. |
| **Malignancy** | It has been discovered that women with a history of GDM have a greater prevalence of pancreatic cancer and hematological malignancies. Women who have diabetes run the risk of getting cancers that are estrogen-dependent or estrogen-responsive. This relationship could be brought on by insulin, obesity, diabetes in general, or specific anti-diabetic medications. |
| **Action points** | In primary care settings, "opportunistic" glucose screening for women aged 45 to 64 should be made routine because one-third or more of all cases of diabetes in this group of patients go untreated. Diabetes screening ought to be a crucial component of post-menopausal care for women. |

## The Older Years

Due to lack of mobility or physical strength, other chronic illnesses, income insecurity, lack of health insurance, and lack of social support, women with diabetes in this age group are the most vulnerable. Among women of 65 years of age and older, diabetes is one of the most common underlying causes of death.


DIABETES IN OLDER PEOPLE

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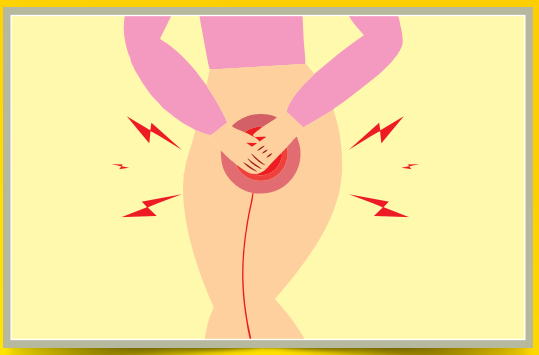
| **Lifestyle factors** | Due to several cultural factors, young Indian women are frequently discouraged from engaging in strenuous exercise, which results in them being less physically active as seniors than the men. With age-related decline in metabolism, total body adiposity–another known risk factor for diabetes and its complications increases. Older women are more likely than older men to be overweight. |
| **Geriatric disability** | Even when necessary, many Indian women choose not to wear glasses or hearing aids for social or financial reasons. A person's ability to properly inspect their foot, read syringe markings, or deliver an insulin injection may be affected by visual impairment. Hearing impairments can interfere with a person's ability to understand and communicate with healthcare professionals who want to discuss diabetes self-care with the patient. Chronic illnesses that impair hand dexterity and movement might also have an impact on meal preparation. |
| **Chronic complications** | Older women with diabetes have a higher chance of being hospitalized than men do. A higher percentage of older women than older men are affected by vision issues like cataracts and glaucoma which are caused by diabetes. |
| **Urinary symptoms** | High blood glucose levels lead to frequent urination and can exacerbate preexisting urinary incontinence. Incontinence can have a negative impact on the quality of life for older women. It can also cause embarrassment and social isolation. |
| **Action points** | For older women with diabetes, access to adequate care and services must be guaranteed. It is necessary to consider issues with transportation, insurance coverage, and linguistic, mental, physical, and cultural limitations. |

Women who have diabetes have significant obstacles that come their way. For optimal women's health, the endocrine community must work in conjunction with local communities and other sectors to create and implement programs that are women-centric for the effective management of diabetes in Indian women.

### Resources:


1. Magon, Navneet. (2014). Women's Health & Diabetes. Available at https://www.researchgate.net/publication/260267362_Women's_Health_Diabetes
2. Kesavadev J, Abraham G, Chandni R, *et al.* Type 2 Diabetes in Women: Differences and Difficulties. *Curr Diabetes Rev.* 2022;18(8):e081221198651. doi:10.2174/1573399818666211208110759

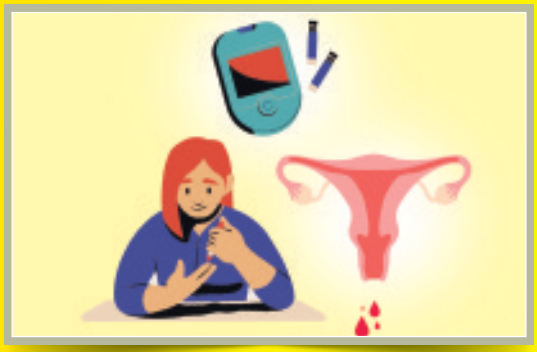
# Frequently Asked Questions



1. I am a 48-year-old woman, with type 2 diabetes mellitus for the past 8 years. I have noticed that I suffer very frequently from urinary tract infections (UTI) & yeast infections. I heard from a friend that this could be due to my diabetes, is that true? Also is there any way to prevent it from reoccurring?

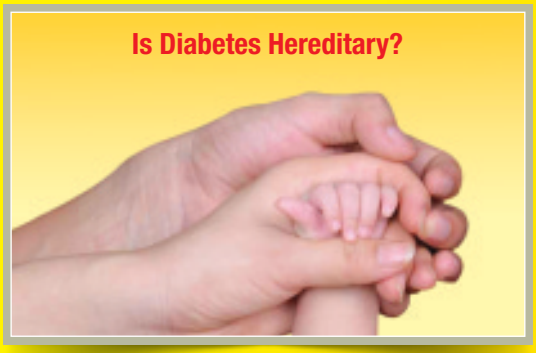
**Ans.** More than 50% of women suffer from UTI and vaginal yeast infections at some point in their lives, but those who have diabetes are more susceptible. Elevated glucose levels in the urine can give rise to the growth of disease-causing pathogens. Also, long-standing diabetes complications like neuropathy (nerve damage) of the urinary tract leads to urinary retention which causes poor bacterial clearance and increases the risk of infection. Uncontrolled blood glucose levels reduce immunity which makes one more susceptible to infections. So, the most important thing to prevent the reoccurrence of UTI is to keep the blood glucose levels within the target range. Other than this, make sure you consume enough water and keep yourself well hydrated. Avoid wearing tight-fitting undergarments made of non-breathing materials. You should maintain good personal hygiene and always remember to wipe front to back after using the washroom. If an infection still develops, seek medical help immediately.

2. My 13-year-old daughter has type 1 diabetes. She has recently achieved menarche and has a regular menstrual cycle. However, we have observed that there have been fluctuations in her blood glucose levels a few days prior to and during her menstrual cycle. Is there any connection between the two, and what should be done in this situation?



**Ans.** Yes, there is a connection between menstruation and fluctuations in blood glucose levels. Hormonal changes during this time are responsible for this change. During the ovulation period, when the progesterone levels spike, temporary insulin resistance is observed, which then reduces post-menstruation. Thus, during the luteal phase, she may experience insulin resistance. You may also notice that there is usually an increase in appetite and food cravings, which makes it harder to regulate blood glucose levels.

Some simple ways in which she can manage and regulate her blood glucose during menstruation are- check her blood sugar frequently and record the results to look for patterns. Insulin requirement may go up in the days leading up to her period. If necessary, discuss modifying her dosage with your physician during these times. Exercising on a regular basis, eating the correct foods in the right portions, and getting enough sleep can all be beneficial.




3. I am a 31-year-old female with type 1 diabetes, my husband and I wish to have a child but, I am worried that since I have type 1 diabetes, will my baby also develop the same, and will it hamper the fetus's growth?

**Ans.** You can definitely have a healthy pregnancy even with type 1 diabetes and it is not necessary that your child develops type 1 diabetes. The risk may be higher but many children with parents having type 1 diabetes do not get diabetes in their lifetime. However, you definitely need to plan in advance and take certain precautions to have a safe pregnancy with normal fetal growth. The most important thing if you are

planning to conceive is good glucose control with HbA1c <6.5%. High blood glucose levels can harm the growth of the baby, especially in the first 8 weeks. Visit your diabetes care team so that they can help you achieve tight glucose control as well as start you on folic acid and other required supplements. Other than achieving glycemic targets, focus on good nutrition, diabetes education, exercise routine, and screening for diabetes complications. You must undergo dilated eye examination before pregnancy, as chances of retinopathy are high during pregnancy with diabetes. Once you conceive, you must monitor the blood glucose levels frequently and maintain the fasting blood glucose below 95 mg/dL and 1 hr post meal <140 mg/dL and 2 hr post meal <120 mg/dL. Ideally, the A1C target in pregnancy is <6% without hypoglycemia. If this care is taken, the baby's growth will be normal and the chances of a large baby, premature birth, and other complications during pregnancy will significantly go down. Take help from a qualified dietitian and get a balanced diet chart customized for you now with updates as you conceive and progress through pregnancy. Your insulin needs will go up during pregnancy due to hormonal changes which is normal and you must adhere to the dosage adjustments by your doctor. If these precautions are taken, you can deliver safely and have a healthy baby.

4. I am a 31-year-old pregnant woman living with diabetes. I am taking insulin injections. Is it safe for me to breastfeed my baby once born?

**Ans.** You can and should breastfeed your baby even if you have diabetes and are taking insulin injections as insulin does not pass into the breast milk. There is no risk to the baby and breastfeeding has innumerable benefits for both mother and child. Remember during breastfeeding, your requirement for insulin may reduce so adjust the dose accordingly, with your doctor's help. All the best and enjoy the journey of motherhood.

# PCOS and Diabetes


**Dr. Mudita Dhingra Dua**

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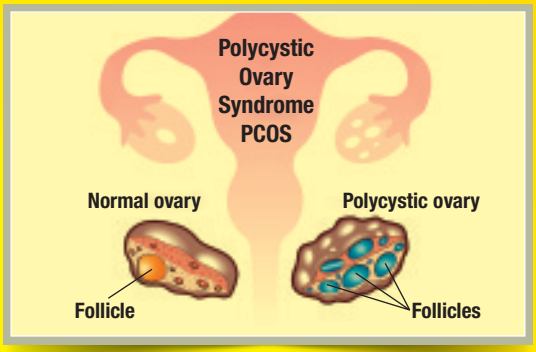
Polycystic ovary syndrome (PCOS) is a condition in which the ovaries produce more androgens than normal and as a result, create a hormonal imbalance. It also includes the formation of small cysts in the ovaries. PCOS affects not just women of reproductive age but also adolescents and postmenopausal women. Due to the nature of the condition, PCOS has a negative impact on a woman's ability to conceive and maintain a healthy reproductive system. In addition, due to its link to other lifestyle disorders, PCOS also contributes to severe metabolic and cardiovascular morbidity.




## Prevalence of PCOS in India

A recent review published in 2022, estimated the pooled prevalence of PCOS in Indian women. PCOS is highly prevalent among Indian women. The prevalence of PCOS was found to be close to 10% using Rotterdam's criteria and Androgen Excess Society (AES) criteria, while it was 5.8% using the National Institutes of Health (NIH) criteria.

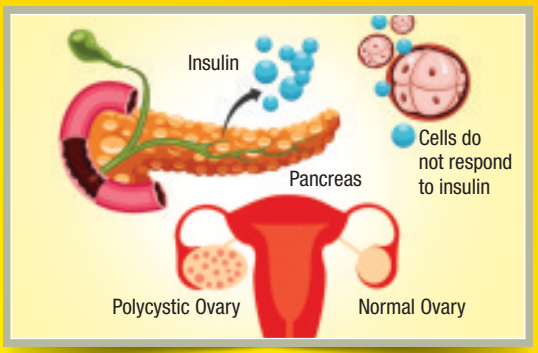
However, having said that, in adolescent girls, it's challenging to diagnose PCOS because of various overlapping physiological parameters like cysts in ovaries and irregular menses in the initial years of menarche. In addition, transvaginal ultrasound is also not recommended in non-sexually active adolescent girls. Hence, diagnosing PCOS in an adolescent girl is not an easy job, especially in the era of google doctor where people are overloaded with misinformation on social media and by influencers. It is imperative to deal with adolescent girls and families with the utmost empathy and sensitive manner, to avoid stigma and psychological impact on the family, and focus on a healthy lifestyle along with teaching the importance of treating PCOS.

## Clinical Features of PCOS

Oligomenorrhoea, hirsutism, severe acne, obesity, Acanthosis nigricans, and hair loss are some of the clinical signs of PCOS. It significantly contributes to psychological issues including anxiety and depression.

## Pathophysiology of PCOS

PCOS is a condition with a complicated multifaceted pathophysiology that is still being studied. The hypothalamic-pituitary axis, insulin secretion and action, and ovarian function are the three key organ systems involved in the pathophysiology of PCOS. Obesity and insulin resistance have been related to PCOS, even though its etiology is uncertain. Since excess insulin causes the ovaries to produce androgens, which can cause anovulation, the link with insulin function is expected.




It can also occur due to untreated hypothyroidism, high prolactin levels, elevated cortisol level (Cushing Syndrome), and some primary adrenal gland disorder. Hence, baseline tests are very important to establish the etiology of PCOS.

## Comorbidities and PCOS

Women with PCOS have a higher frequency of several comorbidities such as anovulation, infertility, etc. However, they are not just limited to the gynecological field. Women with PCOS are also prone to obesity, dyslipidemia, hypertension, metabolic syndrome, fatty liver, and type 2 diabetes mellitus (T2DM). Both obese and non-obese women can develop PCOS, however, the former group is more likely to exhibit insulin resistance (IR) markers.

## Diabetes and PCOS

Although the exact etiology of PCOS is unclear, it appears to be caused by a combination of genetic predisposition and environmental variables (Environmental Disrupting Chemicals), which are consistent with the development of IR. IR then triggers hyperinsulinemia, which boosts ovarian androgen synthesis by raising the frequency of luteinizing hormone in the pituitary and activating the transcription of the GnRH gene in hypothalamus cells.

Insulin also causes hyperandrogenemia by causing the ovarian cells' mitogenic pathways to be directly activated and by boosting the transcription of StAR protein and many important steroidogenic enzymes. The main disturbance underlying PCOS's typical clinical symptoms is hyperandrogenemia.

In addition, increased ovarian production of androgens may in turn worsen IR, thus perpetuating a vicious cycle of IR-hyperinsulinemia-hyperandrogenemia. Indeed, androgens may not only interfere with insulin signaling directly but also trigger lipolysis, increasing free fatty acids (FFA) in circulation, and favoring IR.

Additionally, androgens appear to boost glycolytic and less insulin-sensitive type II muscle fibers (TIIMF) while decreasing highly oxidative and insulin-sensitive type I muscle fibers (TIMF), encouraging the growth of IR. Additionally, obesity seems to amplify all the processes in this cycle by boosting androgen synthesis in the subcutaneous adipose tissue, adrenal glands, and ovaries.

Leptin contributes as well by interfering with ovarian physiology and encouraging a long-lasting inflammatory state throughout the body. Ultimately, all PCOS-related endocrine-metabolic abnormalities support chronic inflammation and IR, predisposing individuals to the emergence of comorbid conditions like type 2 diabetes mellitus and cardiovascular disease. Thus, women with PCOS are at a higher risk of developing diabetes. Approximately half of the women with PCOS develop either diabetes or prediabetes before the age of 40.

All women diagnosed with PCOS must undergo regular screening for diabetes. If they conceive, they also have a higher chance of developing gestational diabetes. Lifestyle management which includes a healthy diet and regular exercise forms the cornerstone for the management of PCOS which helps in preventing diabetes too. Exercise in PCOS is effective when done in a combination of yoga, strength training, and cardio workout.

In addition, your doctor may prescribe a few medicines to regularize menstrual cycles and decrease the impact of androgens on hair follicles to reduce abnormal hair growth and insulin sensitizers. Only after metabolic and hormonal parameters are in control, one can go with laser treatments for permanent hair reduction.

To summarize, treating PCOS can be challenging both for the family and physicians. A team effort is necessary to prevent lifestyle disorders in women and young girls to deal with this rising epidemic which has transgenerational effects.

## Resources:


1. Bharali MD, Rajendran R, Goswami J, Singal K, Rajendran V. Prevalence of Polycystic Ovarian Syndrome in India: A Systematic Review and Meta-Analysis. *Cureus.* 2022;14(12):e32351. Published 2022 Dec 9.
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3. Rojas J, Chávez M, Olivar L, *et al.* Polycystic ovary syndrome, insulin resistance, and obesity: navigating the pathophysiologic labyrinth. *Int J Reprod Med.* 2014;2014:719050. doi:10.1155/2014/719050
4. Ganie MA, Vasudevan V, Wani IA, Baba MS, Arif T, Rashid A. Epidemiology, pathogenesis, genetics & management of polycystic ovary syndrome in India. *Indian J Med Res.* 2019;150(4):333-344. doi:10.4103/ijmr.IJMR_1937_17

# Did You Know?

**Women with type 1 diabetes experience a shorter reproductive period.**

In women with type 1 diabetes, insulin deficiency and hyperglycemia impair the normal activity of the female reproductive system thereby delaying menarche, causing early menopause, and premature ovarian and vascular aging, particularly if type 1 diabetes develops before menarche. In a study conducted by Yazdkhasti, M *et al.* (2019) it was seen that women with type 1 diabetes compared to those without diabetes, were more likely to experience menopause earlier in life due to the risk of early ovarian follicle depletion. In addition, women with type 1 diabetes are more likely to have irregular menstrual cycles and have menarche at later age than those without diabetes. Due to their late menarche age and earlier menopause start, these women have a roughly 6-year reduction in their reproductive span. Also, it is seen that women who go through early (between the ages of 40 and 45) or premature menopause (<40 age) have a higher chance of developing health complications sooner. Therefore, in order to avoid the impact of uncontrolled blood glucose levels on the reproductive period, it is important to keep blood glucose levels under control to enhance women's health and lower medical expenses.

## Resources:


1. Yazdkhasti M, Tourzani ZM, Roozbeh N, Hasanpour V, Saeieh SE, Abdi F. The association between diabetes and age at the onset of menopause: a systematic review protocol. *Syst Rev.* 2019;8(1):80. Published 2019 Apr 2. doi:10.1186/s13643-019-0989-5
2. Yi Y, El Khoudary SR, Buchanich JM, *et al.* Women with Type 1 diabetes (T1D) experience a shorter reproductive period compared with nondiabetic women: the Pittsburgh Epidemiology of Diabetes Complications (EDC) study and the Study of Women's Health Across the Nation (SWAN). *Menopause.* 2021;28(6):634-641. Published 2021 Mar 1. doi:10.1097/GME.0000000000001758

# Facts and Figures

A study by Bahl S. *et al.* (2022) analyzed data from a population-based cohort of pregnant women in South Delhi, India, to determine the incidence of **Gestational Diabetes Mellitus (GDM).**

**It was observed that:**

- 19.2% of the population-based cohort of pregnant women from urban and peri-urban low-to-mid-socioeconomic districts in South Delhi were diagnosed with GDM.
- 18% of women were underweight and 22.8% were overweight or obese, indicating a dual burden of malnutrition.
- Before pregnancy, 2.7% of women had prediabetes and 0.2% of women had diabetes.


**Resources:**


- Bahl S, Dhabhai N, Taneja S, et al. Burden, risk factors and outcomes associated with gestational diabetes in a population-based cohort of pregnant women from North India. *BMC Pregnancy Childbirth.* 2022;22(1):32. Published 2022 Jan 14. doi:10.1186/s12884-022-04389-5

# What's Trending? What's Trending? Gender Differences in Complications of Type 2 Diabetes Mellitus

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There is an increasing evidence of type 2 diabetes mellitus (T2DM) and associated complications along with mounting evidence of clinically important gender differences. Although obesity is a common risk factor in women, men are more likely to have T2DM diagnosed at earlier ages and with lower body mass index.

There is data to show that gender differences affect the pathophysiology, treatment, and results of many disease conditions but they seem to be especially relevant to non-communicable diseases. The development, awareness, diagnosis, management, and prevention strategies of T2DM depend on some extent to gender differences.

## Cardiovascular Disease (CVD)

Among both genders, diabetes is one of the strongest CVD risk factors, however, women seem to have the worst outcomes. Diabetes mellitus raises the risk of cardiovascular disease by three to four times for women and two to three times for men.

Diabetes puts women at higher risk than men for nonfatal incidents of CVD. Numerous biological and environmental factors are involved, but the exact explanation of the increased risk of CVD in women with diabetes is still not known. Female sex hormones have advantageous physiological impacts on cardiovascular wall characteristics. However, diabetes more severely reduces endothelial responsiveness in females than in males, changing the advantageous hemodynamic effects of estrogen through intricate interactions between insulin and estrogen signaling. The equilibrium of estrogen receptor (ER) expression and activity is adversely altered by hyperglycemia. Additionally, an increase in endothelin-1 and oxidative stress worsens insulin signaling, which increases vasoconstriction and platelet aggregation while decreasing endothelium-dependent relaxation and NO generation.

The antiproliferative effects of estrogen on vascular smooth muscle cells are inhibited by hyperglycemia. These are carried out under normoglycemic conditions by selective ER activation. As a result, benefits are balanced out by simultaneous ER activation, which results in the loss of estrogen protective effects. This creates an environment that is proinflammatory, which speeds up atherosclerotic processes and CVD.

## Depression

Women suffer from depression about twice as often as men do, and in women, with diabetes, the risk is even more. Many hormonal factors may be responsible for this increased risk such as hormonal changes during the menstrual cycle, pregnancy changes, postpartum period, and menopausal changes. In general, women usually face additional stresses like dual responsibility of work and home, looking after children and/or aged parents or in-laws, discrimination at work, etc. Chronic stress is associated with depressive symptoms. In India, there may also be a gender bias where medical treatment is delayed or not given priority for females over males which could mean more health issues leading to depression. Further, obesity along with diabetes makes women more susceptible to depression and such high risk women should be carefully assessed and monitored as depression can have a significant negative impact on the self-management of diabetes.

## Urinary Tract Infections (UTIs)


Women experience UTIs more frequently than men because of the shorter distance between their urethras and the rectum. The urinary tract is the most common site for infections in people with T2DM. Increased urine glucose levels may encourage the growth of pathogenic bacteria. Numerous immune system impairments, including those affecting humoral, cellular, and innate immunity, may play a role in the pathogenesis of UTI in people with diabetes. Genitourinary autonomic neuropathy causes dysfunctional voiding and urine retention, which reduces physical bacterial elimination by micturition and promotes bacterial growth. According to age, the degree of neuropathy, and the length of diabetes, bladder dysfunction affects 26 to 85% of women living with diabetes. As a result, all women with diabetes who experience UTI should be examined for bladder dysfunction.

There is also some evidence on women having a higher risk of blindness and kidney disease due to diabetes. More research into the gender differences in the pathophysiology of T2DM and its complications can help in the development of individualized therapy keeping in mind strategies to overcome challenges with respect to a specific gender.

## Resources:


1. Nitzan O, Elias M, Chazan B, Saliba W. Urinary tract infections in patients with type 2 diabetes mellitus: review of prevalence, diagnosis, and management. Diabetes Metab Syndr Obes. 2015;8:129-136. Published 2015 Feb 26. doi:10.2147/DMSO.S51792
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7. Harrington RD, Hooton TM. Urinary tract infection risk factors and gender. *J Gend Specif Med.* 2000;3(8):27-34.


# Diabetes and Sexual Health in Women

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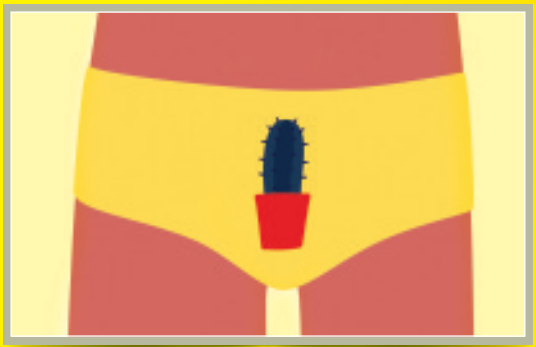
People living with diabetes have a higher risk for sexual problems and it occurs in both males and females. However, statistics show that lesser than 20% females talk about this to their healthcare team.

Sexual dysfunction is one of the lesser known complications of diabetes that might result from having high blood glucose levels for an extended length of time. Uncontrolled blood glucose levels harm the arteries and nerves, particularly those that supply the sexual organs. The sexual organs may receive less blood which may cause one to experience some loss of feeling. This makes it challenging to be physically and emotionally aroused. Here are some common sexual problems that women with diabetes face.

## Vaginal Dryness



Diabetes can frequently cause vaginal dryness. As a result, lubrication is lost. Sexual intercourse can therefore become painful and unpleasant. Vaginal dryness is twice as prevalent in women having diabetes than those without. Similarly, blood flow restrictions and nerve injury might mean a lesser sense of stimulation. Drugs like blood pressure pills and antidepressants can increase the likelihood of decreased libido further.

## Thrush

A fungal infection called thrush is most prevalent in women with diabetes. It can be transferred during intercourse even though it isn't a sexually transmitted infection (STI). Anyone can contract it, although the risk increases if they have diabetes and high blood glucose levels. Hyperglycemia also increases the chances of STI.

## Urinary tract infections (UTI)

UTIs are more common in women with diabetes because high sugar in the urine helps pathogenic bacteria to grow. Further neuropathy may cause urine retention and therefore poor clearance of bacteria. Sexual intercourse while having UTI can be very painful and put pressure on the bladder.

These sexual issues can increase mental distress and further lead to a vicious cycle of low mood. By communicating with a healthcare professional half the battle is won. Depending on the severity of the sexual problems, improvements can be seen by bringing the blood glucose into the target range and altering the lifestyle. Maintaining normal blood glucose levels can help stop future harm. The entire body benefits from good diabetes management, which includes eating wholesome meals, working out frequently, and lowering stress.

**Resources:**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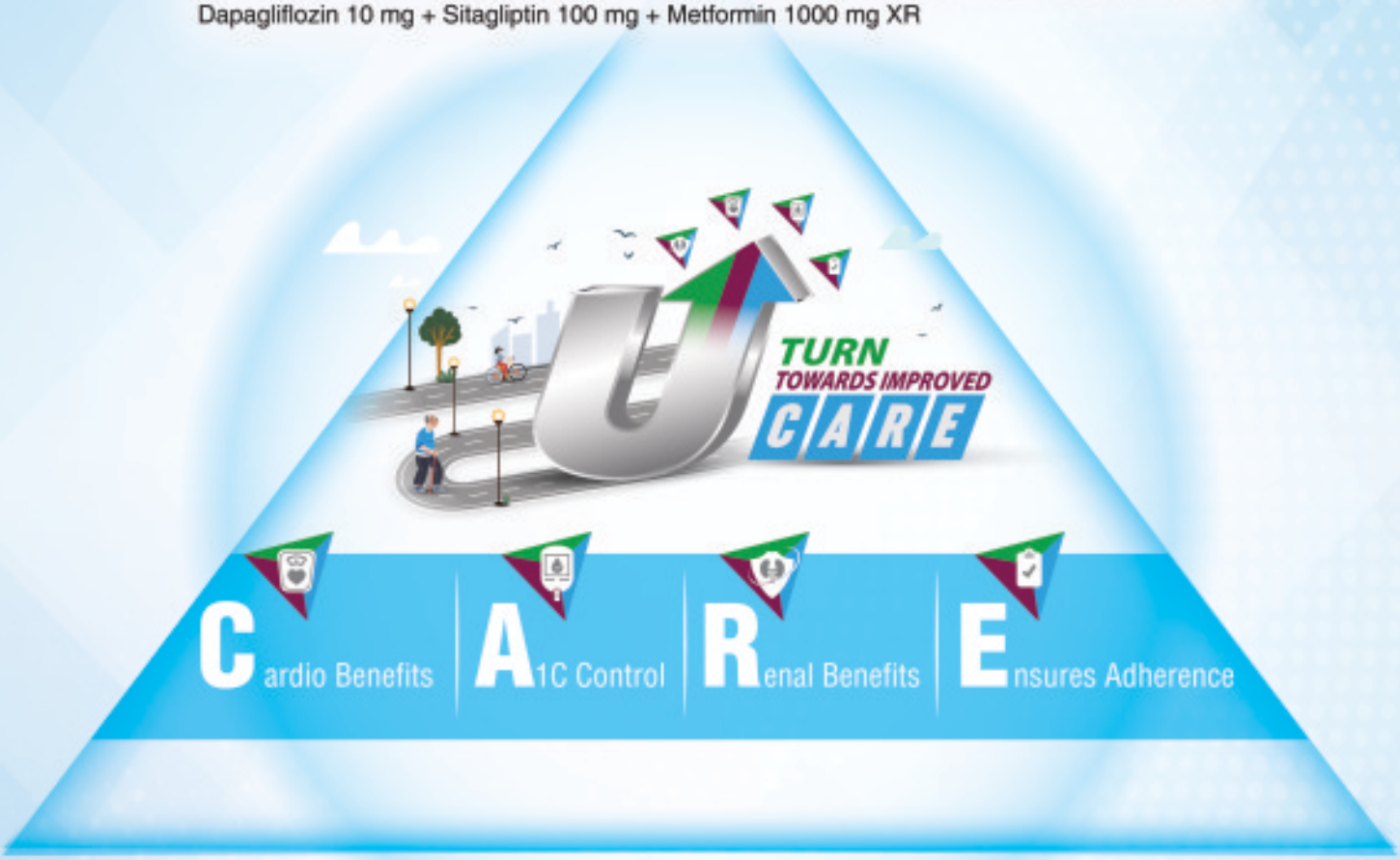
Dapagliflozin 10 mg + Sitagliptin 100 mg + Metformin 500 mg XR

# UDAPA-Trio Forte

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




**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 anaphylaxis, angioedema, and exfoliative skin conditions- Stevens-Johnson syndrome; Bullous pemphigoid. Metformin Hydrochloride: Lactic acidosis; In case of dehydration (severe diarrhoea or vomiting, fever or reduced fluid intake), metformin should be temporarily discontinued and contact with a healthcare professional is recommended.
**Contraindications:** Hypersensitivity to the active substance of Dapagliflozin, Sitagliptin & Metformin or to any of the excipients listed. Any type of acute metabolic acidosis (such as lactic acidosis, diabetic ketoacidosis). Diabetic pre-coma; Severe renal failure (eGFR < 30mL/min); Acute conditions with the potential to alter renal function such as: Dehydration, Severe Infection, Shock; Acute or chronic disease which may cause tissue hypoxia such as: Cardiac or respiratory failure, Recent myocardial Infarction, Shock, Hepatic Impairment, Acute Alcohol intoxication, alcoholism
**Use in a special population:** Pregnant Women: Due to lack of human data, drug should not be used during pregnancy. Lactating Women: It should not be used during breastfeeding. Paediatric Patients: The safety and efficacy of drug has not yet been established. No data are available. Geriatric Patients: In Patients > 65 years, it should be used with caution as age increases.

Additional information is available on request.
Last updated: January 03, 2023

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**BMI Reduced by 1.01 units**

**5% Weight loss vs Baseline body weight**


**High Dose Metformin improves Insulin sensitivity Vs Other OADs**


**Source:** 1. JAPI 2020 68,51.-55 2. Data on File, 3. Cureus 2020; 12(9): e10.7759/cureus.1070 4. Diabetes Technology & Therapeutics 2019..2,79-84 5. Kalra, et al.: Sulfonylurea and combinations: International Task Force Indian J Endocr Metab 2018;22:132-57.

## 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 mg. **Indications:** Glycomet GP is indicated for the management of patients with type 2 diabetes mellitus (T2DM) when diet, exercise and single agent (metformin hydrochloride or glimepiride alone) do not result in adequate glycemic control. **Dosage and Administration:** Dosage of Glycomet GP should be individualized on the basis of effectiveness and tolerability while not exceeding the maximum recommended daily dose of glimepiride 8mg and metformin 2000 mg. **Initial dose:** 1 tablet of Glycomet GP should be administered once daily during breakfast or with the first main meal. Do not crush or chew the tablet. In several cases the tablet may remain intact during transit through the gastrointestinal (GI) tract and will be eliminated in feces as hydrated mass (ghost matrix). Patients should be advised that this is normal as all drug components have already been released during GI transit. **Contraindications:** In patients hypersensitive to glimepiride, other sulfonylureas, other sulfonamides, metformin or any of the excipients of Glycomet GP; pregnancy and lactation; diabetic ketoacidosis, diabetic pre-coma, in patients with eGFR<30 ml/min/ 1.73 m2, 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 (myocardial infarction, shock, cardiac/respiratory failure) hepatic insufficiency, acute alcohol intoxication, alcoholism. **Warnings:** Keep out of reach of children. 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. In case of lactic acidosis, patient should be hospitalized immediately. **Precautions:** In the initial weeks of treatment, the risk of hypoglycemia may be increased and necessitates especially careful monitoring. Serum creatinine levels should be determined before initiating treatment and regularly thereafter: at least annually in patients with normal renal function. Intravascular contrast studies with iodinated materials can lead to acute alteration of renal function. In patients in whom such study is planned, Glycomet GP should be temporarily discontinued at the time of or prior to the procedure, and withheld for 48 hours subsequent to the procedure and reinstituted only after renal function has been re-evaluated and found to be normal. Use of Glycomet GP should be discontinued 48 hours before any surgical procedure. **Adverse reactions:** For glimepiride - hypoglycaemia; temporary visual impairment; GI symptoms like nausea, vomiting, abdominal pain, diarrhoea may occur; increased liver enzymes, cholestasis and jaundice may occur; allergic reactions may occur occasionally. For metformin – GI symptoms like nausea, vomiting, abdominal pain or discomfort may occur.

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

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# Breast Cancer and Diabetes

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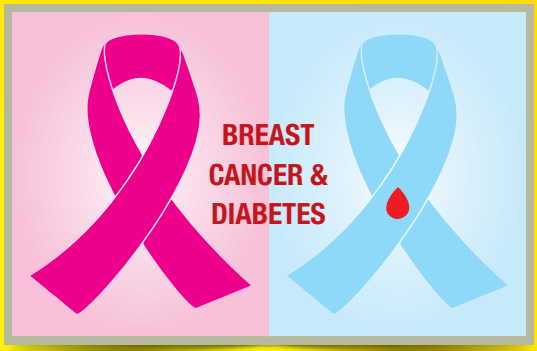
Lucknow

According to WHO, **Cancer** is one of the main causes of mortality worldwide, accounting for approximately one in every six deaths or 10 million deaths in 2020. **Breast Cancer** (BC) is caused by malignant cells (cancerous cells) that grow abnormally in the breast, invade surrounding tissue or cells, and spread to other parts of the body (metastasis). This type of cancer primarily affects women and can affect any part of the breast.




By the end of 2020, 7.8 million women were diagnosed with breast cancer in the previous five years, making it the world's most prevalent cancer. In India, from being fourth in the list of most common cancers during the 1990s, it has now become the first. According to Globocan data 2020, BC accounted for 13.5% of all cancer cases and 10.6% of all mortality in India.

**Diabetes** is one of the most common chronic conditions over the globe with 90 million adults living with it worldwide, according to International Diabetes Federation (IDF), 2021. Although BC and type 2 diabetes appear to be distinctly different diseases, several studies have been undertaken to determine the relationship between diabetes and the increased risk of breast cancer.

## Mechanism that Relates Diabetes with Breast Cancer

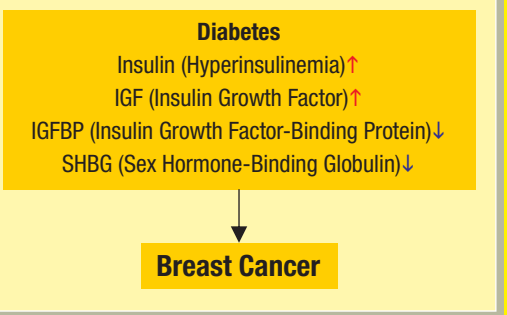



**Figure 1: Link between diabetes and breast cancer is characterized by upregulation of insulin and IGF-1 and downregulation of SHBG and IGFBP.**

T2DM affects more than 7% of adults in developed countries, while 10 to 20% of individuals with breast cancer have diabetes. T2DM and BC share the same risk factors: old age and obesity. According to Wolf *et al.*, three pathways have been proposed to correlate diabetes with breast cancer:

(1) Activation of the insulin system

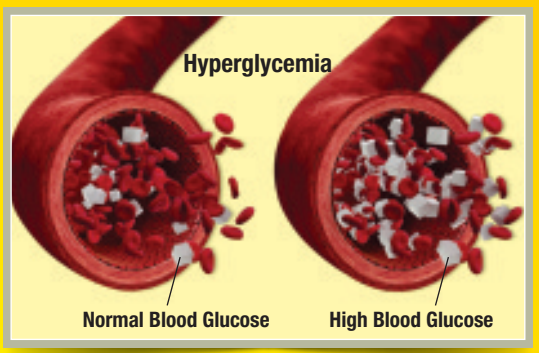
(2) Activation of the insulin-like growth factor pathway

(3) Regulation of endogenous sex hormones

(4) Another proposed mechanism is chronic hyperglycemia, which may raise the risk of breast cancer known as the **Warburg effect.**

## Hyperglycemia

**Hyperglycemia** is associated with higher levels of insulin-like growth factor 1 (IGF-1) and inflammatory cytokines, which influence cancer cell proliferation, apoptosis (cell death), and metastasis (spread), both directly and indirectly. IGF-1 is a mitogenic agent to breast cells that binds with IGF-binding protein 3 in the blood (IGFBP-3). This IGF-1/IGFBP-3 ratio along with other factors such as age, hormone use, and family history is critical in determining breast cancer risk.




## Insulin

**Insulin - a key hormone in breast cancer**. Insulin, like IGF-1, is a mitogen and plays a major role in breast cancer, which may be related to underlying insulin resistance. Insulin stimulates insulin receptor expression in breast cancer cell lines, and overexpression can result in malignant transformation of breast epithelial cells and activation of oncogene. Increased insulin resistance can result in **reflex hyperinsulinemia**, which causes an increase in androgen synthesis and a decrease in estrogen production. Postmenopausal women are at risk of breast cancer due to estrogen deficiency.

One study concluded that individuals with type 2 diabetes who are on insulin are more likely to develop cancer, including breast cancer. In the Women's Health Initiative Observational Study, hyperinsulinemia was shown to be an independent risk factor for postmenopausal breast cancer.

## Association Between Diabetes and Breast Cancer

An analysis of 38,000 women reported that 15% of women had diabetes and were at higher risk to develop an advanced stage of breast cancer compared to women without diabetes. Other studies show that the risk of breast cancer in patients with diabetes is 20% higher than in those without diabetes.

A meta-analysis undertaken using a random-effects model to investigate the association between diabetes and breast cancer risk demonstrated the risk of BC in women with T2DM was as high as 27%, although the risk was decreased by 16% after adjustment for body mass index (BMI). In a 2010 consensus study, the American Diabetes Association and the American Cancer Society stated that type 2 diabetes was linked to malignancies, including breast cancer. Additionally, another study analyzing the relationship between diabetes and BC in Asian-American women, concluded that even after correcting BMI and waist-to-hip ratio (WHR), the incidence of breast cancer increased. This demonstrates that a history of diabetes has a strong relation with breast cancer.

While diabetes and breast cancer are distinct diseases, insulin stimulates key cancer processes while insulin signaling plays a central role in both conditions.

Women with type 2 diabetes have a slightly increased chance of acquiring breast cancer. A low estrogen level as a result of insulin resistance increases the chance of developing cancer in any organ including the breast with high estrogen receptor levels. Awareness of these relationships enables medical professionals to find ways to encourage increased screening and lifestyle changes to reduce the mitogenic effects of insulin-like growth factors.

## Resources: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8. Dong S, Wang Z, Shen K, Chen X. Metabolic Syndrome and Breast Cancer: Prevalence, Treatment Response, and Prognosis. *Front Oncol.* 2021;11:629666. Published 2021 Mar 25. doi:10.3389/fonc.2021.629666

# Preexisting Diabetes and Pregnancy Care

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Women with diabetes and of reproductive potential need extra care while planning a family. This includes preconception care, as well as care during pregnancy and postpartum. Preconception care is an opportunity to educate regarding the risks of unplanned pregnancies and improved maternal and fetal outcomes with pregnancy planning. It is important to emphasize the risks of malformations associated with unplanned pregnancies and even mild hyperglycemia.

## Preconception Counseling

Preconception counseling should begin at puberty as a part of routine diabetes care and continue in all women with diabetes and reproductive potential. Women with preexisting diabetes planning to conceive should ideally receive preconception care at a multidisciplinary clinic including an endocrinologist, maternal-fetal medicine specialist, registered dietitian, and diabetes educator, when available. Effective contraception should be advised and used until the glycemic profile is optimized for pregnancy. The most important diabetes-specific component of preconception care is the attainment of glycemic goals prior to conception. These women should be informed about the importance of achieving and maintaining as near euglycemia as safely possible prior to conception. Ideally, A1C <6.5% should be maintained to reduce the risk of preeclampsia, congenital anomalies, macrosomia, and preterm birth. Systematic review and meta-analysis of observational studies of preconception care in pregnant women with preexisting diabetes have shown a relationship between low A1C levels and reduced risk of birth defects, preterm delivery, perinatal mortality, small-for-gestational-age births, and neonatal intensive care unit.

Standard preconception care should also provide a significant focus on nutrition and screening for diabetes comorbidities and complications. A referral for a comprehensive eye exam is recommended. Education on the risk of development and/or progression of diabetic retinopathy is important. It is advised to do dilated eye examinations ideally before pregnancy or in the first trimester and monitored every trimester until 1-year postpartum as indicated by the degree of retinopathy or as recommended by the eye health care professional. Potentially harmful medications in pregnancy (ACE inhibitors, angiotensin receptor blockers, statins) must be discontinued prior to conception and avoided in sexually active individuals of childbearing potential not using reliable contraception Checklist for preconception in women with diabetes is outlined in the table below:

**Table 1: Preconception education should include:**

- *Comprehensive nutrition assessment and recommendations for:*
  - Overweight/obese or underweight
  - Meal planning, correction of dietary nutritional deficiencies, caffeine intake
- *Lifestyle recommendations for:*
  - Regular moderate exercise
  - Avoidance of hyperthermia (hot tubs)
  - Adequate sleep
- *Comprehensive diabetes self-management education*
- *Counselling on diabetes in pregnancy* including natural history of insulin resistance in pregnancy and postpartum; preconception glycemic targets; avoidance of DKA; avoidance of severe hypoglycemia; progression of retinopathy; risks to pregnancy including congenital malformations, macrosomia, preterm labor, etc.
- *Supplementation*
  - Folic acid supplement (400 mg routine), appropriate use of over-the-counter medications and supplements

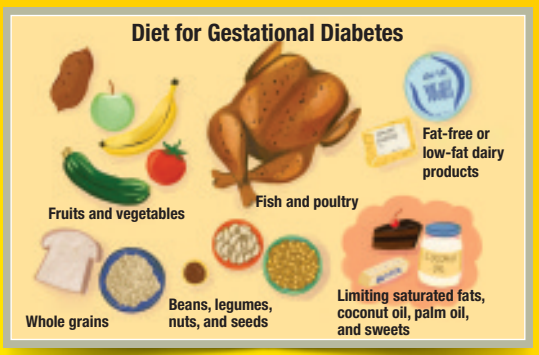
## Care During Pregnancy

Health care does not stop once a woman has conceived. It is crucial to continue adequate health care throughout the period of pregnancy. Pregnant women with type 1 diabetes pose an increased risk of hypoglycemia during the first trimester and similar to other non-diabetes pregnant women, have altered counter-regulatory responses which may decrease hypoglycemia awareness. Therefore, education about the prevention, recognition, and treatment of hypoglycemia is important. Diabetic ketoacidosis (DKA) carries a high risk of stillbirth. Pregnancy is a ketogenic state hence people with type 1 diabetes are comparatively at a higher risk than type 2 diabetes at lower blood glucose levels than in the non-pregnant state. Hence, pregnant women with type 1 diabetes should be prescribed ketone strips and receive education on DKA prevention and detection. The preferred treatment for women with type 2 diabetes during pregnancy is insulin. The risk for associated hypertension and other comorbidities may be as high or higher with type 2 diabetes as with type 1 diabetes, even if diabetes is better managed and of shorter apparent duration.

Both fasting and postprandial blood glucose monitoring are recommended. Glucose targets for fasting plasma glucose levels are 70-95 mg/dL and either 1 hr postprandial glucose ≤140 mg/dL or 2 hr postprandial glucose ≤120 mg/dL. Some women with preexisting diabetes may also be required to check preprandial blood glucose levels. This is especially useful when using insulin pumps or basal-bolus therapy to determine premeal rapid-acting insulin dosage administration. Continuous glucose monitoring (CGM) system can be used in addition to help achieve A1C levels in the target range for pregnancy.

Due to augmented red blood cell turnover, A1C is slightly lower during pregnancy in people with and without diabetes. The ideal A1C target in pregnancy is <6% if this can be achieved without significant hypoglycemia, but the target can be relaxed to <7% if necessary to prevent hypoglycemia. Also, A1C represents an integrated measure of glucose, it may not completely capture postprandial hyperglycemia, that drives macrosomia. Hence, although A1C can be useful, it must be used as a secondary measure of glycemic outcomes, after regular blood glucose monitoring during pregnancy.

Glycemic targets are usually achieved by a combination of insulin administration and medical nutrition therapy in women with preexisting diabetes. Nutrition counseling should ensure a balance of macronutrients including fruits, legumes, vegetables, whole grains, and healthy fats especially ω-3 fatty acids from nuts, seeds, and fish. High fiber and low glycemic index carbohydrates should be preferred over simple carbohydrates. Any diet which severely restricts a macronutrient class must be avoided, like a ketogenic diet which lacks carbohydrates, etc.




These women are advised to eat consistent amounts of carbohydrates in order to match with insulin dosage and thus, preventing hyperglycemia or hypoglycemia. Referral to a qualified nutritional professional is important to establish a meal plan and insulin-to-carbohydrate ratio and also, determine weight gain goals. Pregnant women with type 1 or type 2 diabetes should be prescribed low-dose aspirin 100–150 mg/day starting at 12 to 16 weeks of gestation to lower the risk of preeclampsia. In pregnant women with diabetes and chronic hypertension, a blood pressure threshold of 140/90 mmHg for initiation and titration of therapy is associated with better pregnancy outcomes.

## Care During the Postpartum Period

Immediately postpartum, insulin resistance decreases significantly with the delivery of the placenta. Insulin requirements should be evaluated and adjusted because requirements are often nearly half the prepregnancy values for the initial few days of postpartum. In a study, insulin requirements in the immediate postpartum period were found to be roughly 34% lower than prepregnancy insulin requirements. Insulin sensitivity returns to prepregnancy levels over the following 1-2 weeks. For women on insulin, special attention should be directed to hypoglycemia prevention in the setting of breastfeeding, erratic sleep, and eating schedules.

Considering the immediate nutritional and immunological benefits of breastfeeding for the baby, all mothers, including those with diabetes, should be supported in attempts to breastfeed. Breastfeeding also confers longer-term metabolic benefits to both mother and offspring. It is important to note that lactation can increase the risk of overnight hypoglycemia, and insulin dosing may need to be adjusted accordingly. A contraceptive plan should be discussed and implemented. Postpartum care should also include psychosocial assessment and support for self-care. Hence, planning a pregnancy is critical in women with preexisting diabetes to ensure the optimum health of both the expecting mother and the offspring.

### Resources:


1. ElSayed NA, Aleppo G, Aroda VR, *et. al*., American Diabetes Association. Summary of revisions: Standards of Care in Diabetes–2023. Diabetes Care 2023;46(Suppl. 1):S5–S9.
2. Charron-Prochownik D, Sereika SM, Becker D, *et. al.* Long-term effects of the booster-enhanced READY-Girls preconception counseling program on intentions and behaviors for family planning in teens with diabetes. *Diabetes Care* 2013;36: 3870–3874.
3. Achong N, Duncan EL, McIntyre HD, Callaway L. Peripartum management of glycemia in women with type 1 diabetes. *Diabetes Care* 2014;37: 364–371.

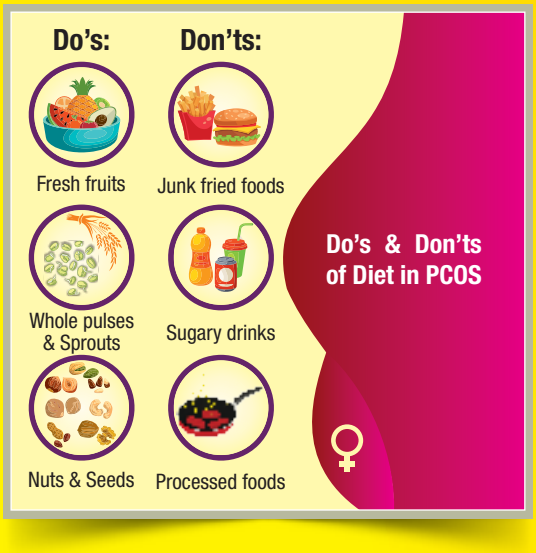
# Diabetes Educator Tip of the Month

**Contributed by**
**Name: Ms. Prapti Shah**

**Post Graduate Diploma in Clinical Nutrition & Dietetics, Renal Nutrition Specialist.**

## Diet Tips for PCOS

The first line of care for PCOS in women is lifestyle modification. Aiming for a wholesome healthy diet is important to manage the symptoms of PCOS. Here are a few diet tips to manage PCOS




1. **Include adequate fiber:** Always start the main meal with a salad or soup. Include whole grain cereals, pulses, fruits, vegetables, green leafy vegetables, and nuts in the diet.
2. **Minimize the use of refined sugar and processed food:** Restrict the usage of sugar, jaggery, honey, butter, and table salt. Salty foods like pickles, papad, and bakery products like biscuits, cookies, bread, cakes, donuts, waffles, khari, and toast should be avoided. Restrict fruit juices, aerated drinks, ketchup, ice cream, and chocolates. The use of processed meat like sausages, bacon, etc. should be restricted.
3. **Pump up the protein intake:** Protein-rich foods like eggs, chicken, fish, curd, buttermilk, paneer, soya, dals, and sprouts should be included in every meal.
4. **Mind the type of fat:** Include healthy fats such as nuts, seeds, avocados, and fish instead of butter, margarine, mayonnaise, creamy sauces, dressings, and red meat. Restrict oil consumption to 3-4 tsp/day.
5. **Diet diversity:** Include a variety of whole grains, millets, legumes, vegetables, and fruit in the diet to fulfill all the micronutrient requirements.

## Resources:

1. Szczuko M, Kikut J, Szczuko U, *et al.* Nutrition Strategy and Life Style in Polycystic Ovary Syndrome-Narrative Review. *Nutrients.* 2021;13(7):2452. Published 2021 Jul 18. doi:10.3390/nu13072452

# Superfood: Soyabean

Soya differs from other legumes in a way that it has a higher protein level while having a low carbohydrate content, which makes it more appealing to the vegetarian population with diabetes. Textured soya products are a typical meat alternative too.

## Nutritional Benefits

- Good source of vegetable protein
- Provides phytoestrogens
- Rich source of calcium and iron
- Source of heart-friendly omega-3 fats
- Lactose and gluten-free

## Health Benefits

**Anti-diabetes effect:**

- Soya has a beneficial effect in regulating blood glucose levels due to the presence of isoflavones. Isoflavones lead to increased insulin secretion, better glycemic control, and provide antioxidant protection.

**Cardiovascular effect:**

- Studies have shown that soya protein lowers LDL cholesterol by 4-6% and that consuming 25 g of soya protein per day significantly lowers cholesterol levels. Soya protein upregulates the LDL receptors in the liver.
- Additionally, soya protein boosts HDL levels by 1 to 3% and reduces triglycerides by 5%.

**Anti-cancer effect:**

- Isoflavones found in soya have mostly been linked to anti-cancer properties and have the ability to alter cell cycle, apoptosis, differentiation, proliferation, and cell signaling.

**Post-menopausal women health:**

- Isoflavones in soya are phytoestrogens which are basically plant-based foods that can have an estrogen-like effect on the body.
- During menopause, lowered estrogen levels cause discomfort in women.
- Phytoestrogens help in reducing menopausal symptoms like hot flashes and night sweats.

## How to Consume?

The market offers a variety of soya products, including soya chunks, granules, tempeh, tofu, soya milk, miso, soya flour, soya nuts, etc. These soya products can be used in a variety of dishes. Regular soyabean can also be soaked and made into a curry. Remember soya needs to be either roasted or cooked to destroy the antinutritional properties. It should not be consumed raw.

### Resources:


1. Dukariya, Garima & Shah, Shreya & Singh, Gaurav & Kumar, Anil. (2020).Soybean and Its Products: *Nutritional and Health Benefits.* 1. 22-29
2. Rizzo G, Baroni L. Soy, Soy Foods and Their Role in Vegetarian Diets. Nutrients.2018;10(1):43. Published 2018 Jan 5. doi:10.3390/nu10010043
3. Messina M. Soy and Health Update: Evaluation of the Clinical and Epidemiologic Literature. Nutrients. 2016;8(12):754. Published 2016 Nov 24.


## SOYMILK & DIABETES

# Recipe: Soya Kebab

Serves: Makes 3 kebabs

| Ingredients | Amount |
|---|---|
| Soya granules | ¼ cup |
| Crumbled tofu (soya paneer) | ½ cup |
| Raw banana (boiled and mashed) | ½ cup |
| Sprouted moong (boiled and mashed) | ½ cup |
| Besan | ½ tbsp |
| Lemon juice | ½ tsp |
| Sesame seeds | ½ tsp |
| Chili powder | ½ tsp |
| Crushed dried kasuri methi (fenugreek leaves) | ½ tsp |
| Chopped mint leaves | 1 tsp |
| Ginger (grated) | ½ tsp |
| Garlic (grated) | 1 clove |
| Green chili (finely chopped) | 1 unit |
| Salt and pepper powder | To taste |
| 1 cup: 250 mL; 1 tablespoon: 15 mL; 1 teaspoon: 5 mL | |

## Method

1. Soak the soya granules in hot water for 10-15mins. Drain and squeeze out all the water.
2. To this add, mashed sprouts, besan, tofu, mashed raw banana, and other ingredients.
3. Add a little water to the mixture, and knead it into a soft dough.
4. Make round balls from the mixture, and flatten the balls on your palm.
5. Shallow fry them, till golden brown.
6. Serve with mint coriander chutney.

# Dia-Games

## True or False

1. Diabetes mellitus raises the risk of cardiovascular disease by three to four times for women and two to three times for men.
2. Men experience depression more frequently than women.
3. Diabetes can frequently cause vaginal dryness.
4. Insulin resistance is a common feature of PCOS and diabetes.
5. Women with type 1 diabetes are unable to conceive or give birth to normal babies.
6. Anorexia nervosa and Bulimia nervosa are common eating disorders among adolescent girls with diabetes.
7. Careful diabetes control in the three months before and throughout pregnancy can minimize the risk of congenital abnormalities in the progeny by 10-fold.
8. Smoking cigarettes, bidis, and hookahs may reduce insulin sensitivity and raise the chance of developing type 2 diabetes.
9. Women with GDM have an increased risk of developing diabetes in later life.
10. Insulin injections taken during pregnancy can cause hypoglycemia in the baby.

**Answer:** 1. True 2. False 3. True 4. True 5. False 6. True 7. True 8. True 9. True 10. False

# Patient Speaks

I am Ruchika, mother of a 2-year-old girl. I live in a joint family. When I was expecting my baby, the whole family was very excited and took good care of me. My mother-in-law did not let me do any housework and used to feed me my favorite foods. She believed that I need to eat for two so she would feed me more food than I wanted. She started applying ghee liberally to my rotis. I was given 3 fruits a day. I gained a lot of weight in my second trimester and by the time I reached the third trimester, I was diagnosed with gestational diabetes. We were all worried and did not know how to manage as no one in my house has diabetes. We stopped all sugar intake but other usual routines continued. My doctor gave me strict glucose targets but I realized my glucose readings were coming way above the targets. The doctor warned me about complications if my blood glucose was not in control and that he might need to start insulin. So I, along with my mother-in-law visited a diabetes educator (DE).

The DE was very empathetic and heard whatever we had to tell her about my condition and diet. She appreciated my mother-in-law being so supportive and taking good care of me. However, she pointed out and explained where we were going wrong. She said that there is no need to eat double. Calorie requirement does not double and so excess intake is causing more fat in the body which in turn is not allowing my sugar to come under control. My mother-in-law even told her that in spite of not eating sugar, my blood glucose was going high post meals. The DE immediately asked us if we replaced sugar with anything and my mother-in-law said yes organic jaggery. The DE informed us that sugar, jaggery, honey had the same effect on blood glucose levels and so replacing sugar with jaggery was not a good idea. She helped me portion out my meals and referred me to a qualified dietitian for a customized meal plan. She also educated me and my mother-in-law on the need for some exercise instead of just being sedentary and that it was essential for me and my baby's health. We got to learn so much from her and more so, a lot of our doubts and myths were cleared. We took the plan from the dietitian as well and followed the advice of the DE and dietitian. Sure enough, we saw a drastic change in my blood glucose levels and they started coming in the target range. My doctor was happy and informed me that he did not feel the need to start insulin as I was successfully able to manage with lifestyle changes alone. I am very thankful to my doctor, DE, and dietitian for the guidance and I gave birth to a healthy baby girl after my full term was done. I now do my annual blood checkup as advised by the DE.

# NOTES

# Beat Diabetes
## Win Life

For screening people with High & Moderate Risk of Diabetes

## Indian Diabetes Risk Score


Share this simple test with your family & Friends

Users can share it with their family & friends


Video on Suggestive Lifestyle Interventions to minimise risks - for each category

12 Languages

An awareness initiative by USV

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## Indian Diabetes Risk Score

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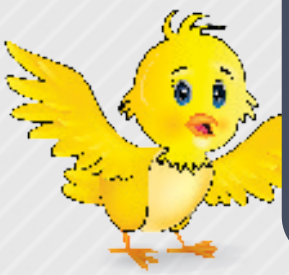

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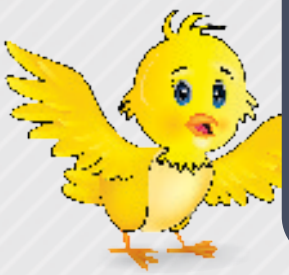

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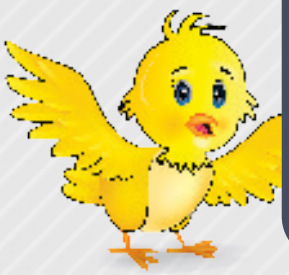

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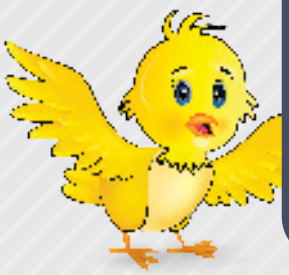

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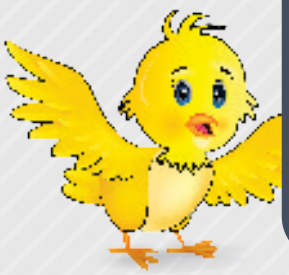

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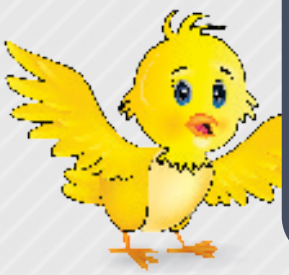

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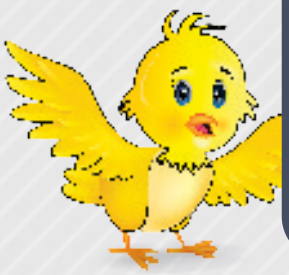

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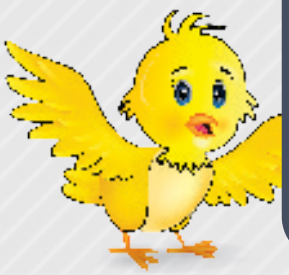

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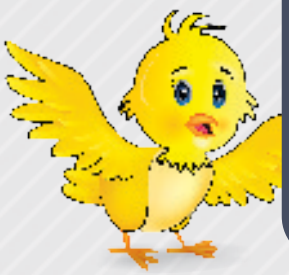

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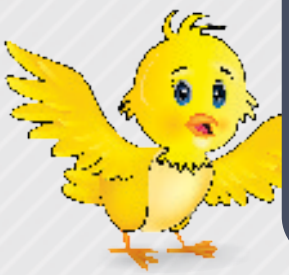

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*In T2DM Across Continuum,*

Start with

# Glycomet®-GP 1/2

Metformin Hydrochloride 500 mg SR + Glimepiride 1/2 mg


**Source:** 1. JAPI 2020 68,51.-55 2. Data on File, 3. Cureus 2020; 12(9): e10.7759/cureus.1070 4. Diabetes Technology & Therapeutics 2019,.2,79-84 5. Kalra, et al.: Sulfonylurea and combinations: International Task Force Indian J Endocr Metab 2018;22:132-57.

## 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 mg. **Indications:** Glycomet GP is indicated for the management of patients with type 2 diabetes mellitus (T2DM) when diet, exercise and single agent (metformin hydrochloride or glimepiride alone) do not result in adequate glycemic control. **Dosage and Administration:** Dosage of Glycomet GP should be individualized on the basis of effectiveness and tolerability while not exceeding the maximum recommended daily dose of glimepiride 8mg and metformin 2000 mg. **Initial dose:** 1 tablet of Glycomet GP should be administered once daily during breakfast or with the first main meal. Do not crush or chew the tablet. In several cases the tablet may remain intact during transit through the gastrointestinal (GI) tract and will be eliminated in feces as hydrated mass (ghost matrix). Patients should be advised that this is normal as all drug components have already been released during GI transit. **Contraindications:** In patients hypersensitive to glimepiride, other sulfonylureas, other sulfonamides, metformin or any of the excipients of Glycomet GP; pregnancy and lactation; diabetic ketoacidosis, diabetic pre-coma, in patients with eGFR<30 ml/min/ 1.73 m2, 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 (myocardial infarction, shock, cardiac/respiratory failure) hepatic insufficiency, acute alcohol intoxication, alcoholism. **Warnings:** Keep out of reach of children. 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. In case of lactic acidosis, patient should be hospitalized immediately. **Precautions:** In the initial weeks of treatment, the risk of hypoglycemia may be increased and necessitates especially careful monitoring. Serum creatinine levels should be determined before initiating treatment and regularly thereafter: at least annually in patients with normal renal function. Intravascular contrast studies with iodinated materials can lead to acute alteration of renal function. In patients in whom such study is planned, Glycomet GP should be temporarily discontinued at the time of or prior to the procedure, and withheld for 48 hours subsequent to the procedure and reinstituted only after renal function has been re-evaluated and found to be normal. Use of Glycomet GP should be discontinued 48 hours before any surgical procedure. **Adverse reactions:** For glimepiride - hypoglycaemia; temporary visual impairment; GI symptoms like nausea, vomiting, abdominal pain, diarrhoea may occur; increased liver enzymes, cholestasis and jaundice may occur; allergic reactions may occur occasionally. For metformin – GI symptoms like nausea, vomiting, abdominal pain or discomfort may occur.

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