Questions and Answers

Gestational Diabetes Mellitus

What is hyperglycemia in pregnancy?

Hyperglycemia in pregnancy (HIP) is one of the most common medical conditions associated with pregnancy and affects almost one out every seven live births. Hyperglycemia in pregnancy is a condition where the blood sugar (glucose) level of the mother rises above the normal level seen during pregnancy. Raised blood sugar is associated with adverse consequences for both the mother and the baby.

Hyperglycemia in pregnancy is of two types – Diabetes in Pregnancy and Gestational Diabetes.

Diabetes in pregnancy, maybe because a woman previously known to be diabetes becomes pregnant; or because, diabetes is first time detected during pregnancy on testing. Gestational diabetes is a condition in which women are unable to keep their blood sugar level within the normal range and develop hyperglycemia, usually in the second half of pregnancy, but the level is not high enough to diagnose overt diabetes. Eighty six percent of all cases of HIP are due to GDM.

What is GDM and who is at risk?

Gestational diabetes is a condition in which some women are unable to keep their blood sugar level within the normal range and develop hyperglycemia, usually in the second half of pregnancy, but the level is not high enough to diagnose overt diabetes. In most cases the condition reverts back to normal after delivery. This form of temporary diabetes affects about 1 in 8 to 10 women. It causes almost no symptoms but can be harmful for both the mother and her unborn child and is diagnosed only by testing blood. It is therefore important that all women are tested for the condition during pregnancy at the appropriate time.

The risk for GDM is higher in women belonging to ethnic groups with high rate of diabetes such as Asians, Pacific Islander, Latino etc.; women who are older (above 30 years of age); obese or overweight; have history of diabetes in the family (first degree relatives) or history of GDM in a previous pregnancy or have had problems in previous pregnancies such as a large baby, stillbirth (baby born dead) or repeated abortions. Over half of the women who develop GDM may have no known risk factors. Therefore all pregnant women should undergo testing for GDM.

When should the test be carried out?
Ideally, all women not previously known to have diabetes should be checked for diabetes at the time of booking i.e., when pregnancy is first confirmed. If no abnormality is found the test must be repeated between 24 and 28 weeks of pregnancy. Women at high risk may be tested in each trimester of pregnancy.

**How is GDM diagnosed?**

In different parts of the world different standards are used to screen and diagnose GDM. The criteria and blood glucose values to rule out GDM differ slightly based on risk assessment, local circumstances and established practice.

The World Health Organization (WHO) has recently introduced a criterion based on a 75 g oral glucose tolerance test (OGTT). After overnight fast, pregnant women are made to drink 75 g glucose dissolved in 300 ml of water. Blood samples are collected for glucose measurement just before and at 1 and 2 hours after the glucose drink. Diagnosis of GDM is made when test results indicate any one or more of the following values.

- Fasting value between 5.1 and 6.9 mmol/l (92 mg/dl and 125 mg/dl)
- 1 hr. value above 10.0 mmol/l (180 mg/dl)
- 2 hr. value between 8.5 and 11.0 mmol/l (153 mg/dl and 199 mg/dl)

If fasting plasma glucose value is 7.0 mmol/l (126 mg/dl) or more, and/or the 2 hr. value is 11.1 mmol/l (200 mg/dl) or more (the same as used to diagnose diabetes in non-pregnant women), then diagnosis of diabetes in pregnancy is made.

Ideally, all women not previously known to have diabetes should be checked for diabetes at the time of booking i.e., when pregnancy is first confirmed. This is done using any one of the standard recommended tests to diagnose diabetes. These include measurement of either fasting plasma glucose, or, 2hr plasma glucose after 75 g oral glucose, or, random plasma glucose, or, glycosylated hemoglobin (HbA1c). If no abnormality is found the oral glucose tolerance test (OGTT) must be repeated between 24 and 28 weeks of pregnancy. Women at high risk may be tested in each trimester of pregnancy.

Keeping in mind constraints in many low-resource countries, alternate strategies considered feasible, and already in practice, and accepted by the national governments are also considered equally acceptable by FIGO. These have been described in FIGO GDM Initiative document.

**What causes GDM?**

To sustain pregnancy and ensure that the developing baby in the womb gets adequate nutrition from the mother, the placenta - the organ that anchors the baby to the womb, produces hormones which oppose the effects of insulin (required to utilize and store energy) in the mother. The purpose of these counter
Insulin hormones is to increase the concentration of mother’s blood sugar protein and fat for transfer to the baby. To balance this, the mother’s pancreas produces more insulin to keep the blood sugar from rising as well as to not only prevent depletion but also help store energy for requirements later during pregnancy and breast feeding resulting in weight gain seen during pregnancy.

During the second half of pregnancy when the placenta is fully developed and the baby starts to grow and requires more nutrition, the level and effect of these counter insulin hormones becomes substantial. To counter this mother’s pancreas has to produce more and more insulin. Some women (see risk factors listed above) are unable to raise their insulin production to overcome these effects of counter insulin hormones. In this case the blood sugar level starts rising, resulting in gestational diabetes.

When the baby is born the placenta gets detached and is pushed out from the womb. Now there is nothing to oppose the effect of maternal insulin, so insulin requirement goes down, insulin produced by the mother is adequate to keep her blood sugar in check and the hyperglycemia goes away.

Unfortunately women who develop GDM continue to be at increased risk of developing GDM during subsequent pregnancies. Also, if no preventive action is taken after delivery to reduce weight and change to healthier lifestyle, 50% or more women with GDM develop full-fledged diabetes within ten years of GDM pregnancy. This is because they have limited ability to secrete increasing amounts of insulin as demonstrated during pregnancy. Shedding the weight acquired during pregnancy and a healthy active life post pregnancy is critical for these women to prevent future diabetes.

**What are the complications of GDM?**

If GDM is diagnosed in time and well managed the chances that it will cause major problems is low. However, if the diagnosis is delayed or the blood sugar levels are not kept in check with proper treatment, the chances of complications affecting both the mother and the baby in the womb increase.

Pregnant women with diabetes have greater chance of developing high blood pressure, puffiness and swelling of the body during pregnancy - a condition called as ‘pre-eclampsia”; in extreme cases this may result in convulsions and kidney damage - a life threatening condition called ‘toxemia’.

Pregnant women with diabetes have greater risk of infections particularly of the urinary bladder and the genital area. Maintenance of proper hygiene, drinking plenty of fluids, emptying the bladder more frequently to avoid urine stagnation and good diabetes control will prevent these complications.
During delivery, the large baby (see below) increases the risk of obstructed labor, birth canal injuries, and the need for assisted or caesarean delivery. Soon after delivery there is an increased risk of excessive bleeding (post-partum hemorrhage) and womb infections. In the long term women with history of GDM have higher risk of diabetes and heart disease.

Higher glucose levels transferred from the mother with uncontrolled diabetes to the baby, stimulates its pancreas to secrete more insulin, resulting in excess fat deposition, making the baby large and flabby. This may cause difficulty during birth resulting in incapacitating injuries.

Babies of mothers with GDM may develop respiratory problems due to poor lung maturation or suffer from low blood sugar (hypoglycemia) at birth or soon after. This is because the baby continues to have high insulin for sometime after birth but is now not receiving high glucose from the mother's circulation, resulting sometimes in life threatening or brain damaging low glucose levels.

In the long term these babies are at increased risk of being fat in childhood, adolescence and adult life and at higher risk of developing diabetes and heart disease when they grow up.

Uncontrolled diabetes in the mother can also cause spontaneous abortions and increase the risk of death of the baby in the womb or the baby being born early (premature delivery).

In addition, babies of mothers’ with uncontrolled diabetes in pregnancy are at higher risk of congenital malformations.

Can GDM be prevented?

GDM may occur in women who apparently do not seem to be at risk, it is therefore difficult to identify women at risk and take preventive actions. However, it is known that there are certain modifiable risk factors for GDM – being older, overweight, gaining excessive weight during pregnancy, unhealthy lifestyles and lack of physical activity. If these factors are addressed before and early during pregnancy, particularly, amongst women with family history and those with ethnic background of high risk of diabetes; than the chances of GDM can be reduced.

Eating a healthy and balanced diet which is low in fat and sugar and high in fiber; regular physical exercise; adequate sleep, avoidance of excessive weight gain, smoking, alcohol and aggravating factor such as stressful lifestyle help lower the risk of GDM.

What is the treatment for GDM?
Most women with GDM can be managed by simple modification of their diet and physical activity.

Diet for pregnant women with diabetes should be healthy and well balanced. It is advisable to reduce refined carbohydrate rich foods and foods high in saturated fats. Taking foods that are rich in fiber such as fruits, vegetables and whole grains is beneficial. It is preferable to have frequent small meals (five to six) rather than two or three large meals. Supplementation with folic acid is recommended and other vitamins in particular, Vitamin B12 and Vitamin D may be required. Women with GDM should seek their doctors’ or dieticians’ advice for more information related to their specific needs.

Women with GDM without any complication should undertake physical activity suitable for other pregnant women and in line with the activity level they were used to before pregnancy, but should avoid very strenuous activities. For women not previously physically active, the safest exercise is walking; 15 minutes’ walk after each major meal is recommended. Women with GDM should seek their doctors’ advice about more information related to their specific needs.

When diet and physical activity are not adequate to control blood sugar medications maybe required. FIGO recommendation suggests that if lifestyle modification alone fails to achieve glucose control, metformin, glyburide, or insulin are considered as safe and effective treatment options for GDM.

The choice of medication is made by the treating physician keeping in mind various factors including patient's preference and convenience. It is natural for women to worry about the consequences of different medications on themselves and their baby. Women with GDM must seek their doctors’ advice about suitability of different treatments and their risks and advantages.

**Can women with diabetes exercise during pregnancy?**

Generally women with diabetes with no major existing complications can do the same exercises as other pregnant women without diabetes. The exception is women with existing diabetic retinopathy (eye problems) or high blood pressure, and women with certain obstetric problems where certain forms of exercise are not permitted. The safest exercise is walking and 15 minutes walk after each major meal is recommended. Women with GDM should seek their doctors’ advice about more specific information related to your needs.

**How is the progress of GDM pregnancy evaluated?**

Measuring and monitoring blood sugar levels regularly is very important in the overall management of GDM. This is best done by self-monitoring of blood sugar at home using a glucometer, supplemented by testing in the laboratory. How
often this should be done is based on several factors including the level of control and is best decided in consultation with the team of health care professionals.

In addition, measurement of weight, blood pressure and tests such as ultrasound and blood tests to assess other health parameters for the mother and to ensure that the child is growing properly are recommended.

**What special care is required for pregnant women with diabetes?**

Pregnancy is a delicate state and in women with diabetes it is all the more delicate, because improperly controlled diabetes can harm both the mother and the child. Therefore it is essential that women with diabetes who wish to become pregnant must get medical advice to plan their pregnancy to ensure good health and blood glucose control before conceiving and during pregnancy.

Permanently high blood glucose levels during early pregnancy (first 3 months) can cause irreversible harm to the unborn child. Therefore women with poorly controlled diabetes who become pregnant must consult their doctor immediately and seek opinion on the next course of action.

During pregnancy women who cannot control their diabetes with diet and exercise should receive insulin, to ensure good control.

Insulin requirements fluctuate as pregnancy advances therefore it is best that pregnant women with diabetes perform home blood glucose monitoring so that insulin doses can be adjusted as required. Their health care providers must educate them on how this should be done. If this is not possible, weekly blood glucose tests at a good laboratory is advised. Regular follow up with care provider at least every 15 days maybe needed.

The doctor may recommend tests, such as ultrasound and blood tests for assessing other health parameters and to ensure that the child is growing properly.

With the above precautions, pregnant women with diabetes can carry out normal routine just like other women without diabetes.

**Can mothers with GDM breast-feed?**

Mothers with diabetes can breast feed, as it helps loose pregnancy induced weight gain, lowers the risk of obesity in both the mother and the baby and significantly reduces the risk of future diabetes and heart disease in both. Breast fed infants have better immunity and lower risk of diarrhea; and breast feeding mothers have lower risk of breast cancer. Women with GDM must consult their health care providers for more information.
How can women with GDM reduce their risk for getting future diabetes?

Women with GDM are at high risk of future diabetes and cardiovascular disease. All women diagnosed with hyperglycemia for the first time during pregnancy (GDM and diabetes in pregnancy), should be re-evaluated for their glycemic status with a 75-g oral OGTT at 6–12 weeks after delivery.

Diagnosis at that time should be based on the currently recommended WHO criteria for diabetes, impaired fasting glucose (IFG), and impaired glucose tolerance (IGT) in the nonpregnant state.

Women who do not have diabetes or pre-diabetes, according to these definitions, are still at risk of progression to diabetes and other cardiovascular problems and require ongoing surveillance every few years according to local protocol.

Irrespective of the glycemic status on early postpartum testing, it should be assumed that women with GDM have the same or a higher level of future risk of diabetes and cardiovascular disease as people with pre-diabetes and they should be advised to maintain a healthy lifestyle with appropriate diet, regular exercise, and normal body weight and should be encouraged to follow up with their health care providers.

In the busy public health setting follow up of the GDM mother can be linked to the child’s vaccination and growth and development monitoring visit to ensure continued engagement of the high-risk mother–child pair.