

Screening, Diagnosis and Management of Diabetes in Pregnant Women: National Guideline, Sri Lanka

PURPOSE

The purpose of this guideline is to provide guidance for screening of pregnant women for diabetes and for the management of pregnancies complicated by pregestational and gestational diabetes mellitus (GDM) in the Sri Lankan setting.

SCREENING

Target Groups for Screening

Being South Asian and pregnant places Sri Lankan woman at higher risk for diabetes during pregnancy. Therefore, universal screening is recommended.

1. All pregnant women should be screened for diabetes mellitus (DM) at the first visit unless they are already known to have diabetes*. This should be performed as early as possible, preferably before 12 weeks, in order to diagnose previously undetected diabetes mellitus.
2. Those who are negative at the first screening should be screened for GDM again at 24 to 28 weeks.
3. Women who are known diabetics should not undergo further screening or diagnostic tests. They should be commenced on glycemic control measures immediately under the supervision of obstetrician or physician.

*Diagnostic criteria for prepregnancy diabetes are any one of the following:

FBS	≥126 mg/dl
RBS	>200 mg/dl
HbA _{1c}	>6.1%

FBS: Fasting blood sugar; RBS: Random blood sugar

Screening Tests

1. One stage, nonfasting 75 gm oral glucose tolerance test (OGTT), described by the Diabetes in Pregnancy Study Group of India (DIPSI) is recommended to screen at first visit and, at 28 weeks, where 2-hour blood glucose more than 140 mg/dl confirms maternal diabetes. This is the recommended test for both field and institutional levels.

One stage non-fasting OGTT

- In this method, a 75 gm oral glucose load is given to the woman irrespective of the fasting status. Therefore, a woman could be subjected to a glucose tolerance test (GTT) at any time, without the woman having to fast.
- A load of 75 gm of glucose dissolved in 300 ml water is given over 10 minutes. The water may be flavored with lime juice.
- The plasma glucose level is measured after a period of 2 hours.
- The main advantage of the DIPSI GTT is that it would be the best way to ensure universal screening. These advantages include reduced cost, the ability to make a diagnosis in one test and that women will not require to come fasting for the test. The test has been validated against the World Health Organization (WHO) and hyperglycemia and adverse pregnancy outcome (HAPO) criteria and been found to correlate well with them.^{1,2} Data also shows that glucose levels are not significantly affected by the fasting status and that the nonfasting glucose level effectively predicts adverse effects for the mother and baby.³⁻⁵

2. In situations where this is not possible (inability to tolerate glucose or lack of facilities), 2-hour postprandial blood sugar (PPBS) is an alternative test and the cut-off blood glucose value to proceed to a OGTT for a definitive diagnosis is ≥120 mg/dl.

2-hour postprandial blood glucose testing (PPBS):

- Advise the woman to have a normal meal.
- At the time of starting, the meal needs to be noted. The meal should be completed within 15 minutes.
- The 2-hour is calculated from the time of starting the meal.
- At the end of 2 hours, blood is tested for glucose levels using a glucometer or other laboratory method.

3. Screening using fasting blood glucose, random blood glucose, 50 gm glucose challenge test, HbA_{1c} or urinalysis for reducing substances is not recommended.

DIAGNOSIS OF DIABETES IN PREGNANCY

A plasma glucose value of ≥140 mg/dl (7.8 mmol/l) in the one stage, nonfasting OGTT is diagnostic.

In the event of an equivocal screening result/well-equipped laboratories, where resources permits the three-point OGTT may be used.⁶

For those who undergo the three-point OGTT, the following cut-off should be used for diagnosis:

	Fasting	60 minutes	120 minutes
mg/dl	92	180	153
mmol/l	5.1	10	8.5

Oral glucose tolerance test

- This is probably the most accepted diagnostic test in the world today.
- The woman should attend for the test having fasted for 8 hours or more, having had a diet unrestricted in carbohydrates.
- Blood is first drawn for estimation of fasting plasma glucose.
- The woman is then given a solution of 75 gm glucose dissolved in 300 ml of water to be taken within 10 minutes. Squeezing a lime into this water will make the solution more palatable without interfering with the result.
- Blood is then drawn at 60 and 120 minutes for estimation of plasma glucose.

MANAGEMENT—WOMEN WITH PRE-EXISTING DIABETES

Prepregnancy Care

Emphasizing the importance of avoiding an unplanned pregnancy is an essential component of education for women with diabetes.

Women with diabetes who are planning to become pregnant and their families should be offered information on how diabetes affects pregnancy and *vice versa*.

Discuss their plans for pregnancy and reinforce an appropriate contraceptive method. Any type of contraception can be used except for women body mass index (BMI) > 25 kg/m² where depot medroxyprogesterone acetate (DMPA) would be best avoided. Pregnancy is contraindicated in women with proliferative retinopathy, stage 2 or above chronic renal disease or major cardiac disease.

All women with diabetes wishing to conceive must be encouraged to seek specialist advice to ensure satisfactory glycemic control (HbA_{1C} < 6.1) before conception.

Ideally, the decision to embark on pregnancy in known diabetics should be decided based on HbA_{1C} levels. A level of 6.1 or below would be ideal if safely achievable. Women whose levels are above 10% should be strongly advised against pregnancy in view of higher risk of congenital anomalies until good glycemic control is achieved.

Stress that good planning and control will help to achieve pregnancy outcome to be equivalent to that of a nondiabetic women. They should be informed that establishing good glycemic control before conception and continuing it throughout pregnancy will reduce the risk of miscarriage, congenital malformation, still births and neonatal deaths.

Women who are using either metformin or insulin for glycemic control should be advised that these are safe for use during the periconception period and into the pregnancy.

Self-testing of blood sugar should be encouraged where ever economically feasible.

Women must be encouraged to achieve a normal weight before becoming pregnant, especially those with a BMI above 25 kg/m². They must receive advice about reducing weight using lifestyle modifications.

Known diabetics should be assessed for diabetic nephropathy and retinopathy before and during pregnancy.

Start folic acid 5 mg daily when trying to conceive.

Antenatal Care

At the First Visit

- Should be referred for specialist care immediately once identified.
- Start/continue folic acid 5 mg daily upto 12 weeks of gestation. Change to 1 mg daily from 12 weeks onward.
- Check HbA_{1C} (target is 6.1% or less).
- Dating ultrasound (US), scan using crown rump length or head circumference is recommended.
- The woman may be referred to a physician for a combined antenatal care plan.
- Women with pre-existing diabetes mellitus must be screened for diabetic end-organ damage (retinopathy, nephropathy and cardiovascular disease).
- Retinopathy screening is recommended at least twice during pregnancy (first contact and at 28 weeks).
- For nephropathy, screening women with serum creatinine >120 µmol/l or 24-hour urinary protein excretion exceeding 300 mg must be referred for renal specialist's advice.
- Women with complicated diabetes should be managed at a tertiary care institution by a multidisciplinary team.

Antenatal Appointments

- These women must be identified as high-risk and managed almost entirely by a specialist obstetrician-led team.
- Public health midwife should visit such women once every 2 weeks (refer guideline on domiciliary care for high-risk pregnancies).
- Review by the obstetric/diabetic team once every 2 weeks throughout the pregnancy.
- Anomaly scans at 18 to 20 weeks and obstetric reviews at 22 to 24, 28, 32 and 36 to 37 weeks for ultrasound growth assessments.
- If required, antenatal steroids for fetal lung maturity may be used. Women should be admitted to hospital for glycemic control during therapy since glucose levels rise in response to steroids.

- More attention should be given to preparation for breastfeeding in women with diabetes during antenatal preparation. They need to start and establish breastfeeding early to prevent hypoglycemia in newborn.
- Refer to dental surgeon for screening and management of dental conditions.

Medical Nutrition Therapy

Medical nutrition therapy (MNT) is the cornerstone of management of diabetes in pregnancy. Women must be referred to a dietitian/diabetic educator nurse where one is available.

Need to emphasize the importance of small frequent meals, food with low glycemic index and dietary advice should be culture sensitive.

Exercise

Exercise has an insulin-like action and tends to reduce blood glucose levels in women with GDM and pre-existing diabetes complicating pregnancy. Therefore, they must be encouraged to engage in regular exercise.

Their intensity of exercise must depend on the woman's level of fitness, presence of complications and familiarity with exercise.

Ideally, this should comprise at least 30 minutes per day of an activity that leaves her slightly breathless.

Women on insulin must be aware of the tendency to hypoglycemia during exercise.

GLYCEMIC CONTROL AND MONITORING

Glycemic Control

The aim of control is to achieve optimum glycemic control throughout the day for the whole duration of the pregnancy (avoiding hypoglycemia).

The target values for glycemic control are given below:

	Target values in glycemic control	
	<i>Fasting and pre-meal</i>	<i>2-hour post-meal</i>
Venous plasma	70-90 (3.9-5.0 mmol/l)	Below 120 mg/dl (6.7 mmol/l)
Capillary blood	80-103 (4.4-5.7 mmol/l)	118 mg/dl (6.5 mmol/l)

The equivalent capillary blood values were converted using a conversion formula⁷

Refer to diabetic educator nursing officer (DENO) where one is available.

At diagnosis, offer diet/lifestyle advice with a recorded glycemic assessment within 1 to 2 weeks.

Majority of these women can achieve optimal glycemia with modest changes in diet and exercise.

Consider insulin and/or metformin treatment, if sub-optimal glycemia persists despite diet and exercise modi-

fications. The choice of these treatments will depend on physician and patient preferences.

Ideally, insulin regimen should be adjusted to achieve targets: in most cases with moderate to severe hyperglycemia, three doses of short acting preprandial insulin combined with a single dose of basal insulin at bed time is required. However, twice-daily dose of premixed 30:70 insulin has high patient compliance with adequate control of blood sugar in most cases. If blood sugar is not controlled by this twice-daily regimen, adding metformin or soluble insulin to cover lunch is an alternative.

Angiotensin converting enzyme (ACE) inhibitors, statins and angiotensin receptor blockers (ARBs) are contraindicated during pregnancy.

Low dose aspirin should be commenced, if there is no other contraindication.

Monitoring of Glycemic Control

Self-monitoring of blood glucose (SMBG) with close liaison with the diabetic team is recommended for those who are able to afford glucometers and test strips. However, in view of variable quality of glucometers, women must be advised to crosscheck the values occasionally with estimations made by a reliable laboratory.

For women who cannot afford self monitoring of blood glucose (SMBG), monitoring with regular six-point blood glucose monitoring should be offered.

The frequency of such monitoring should be decided by the overall glycemic control, presence or absence of fetal macrosomia, the period of gestation, and at least four weekly early in pregnancy and two weekly in late pregnancy.

Schedule US measurement of abdominal circumference (AC) at 28, 32 and 36 weeks. If AC is above the 90th centile at any stage, consider insulin therapy to target 2-hour PPBS to be less than 100 mg/dl but avoiding hypoglycemia.

If crossing centiles or AC <10 centile, do amniotic fluid index (AFI) and request to review by an obstetrician.

Insulin requirements change throughout the pregnancy. If requirements are falling (or maternal hypoglycemia), request early obstetrician review for fetal assessment.

HbA_{1c} is not a reliable indicator of glycemic control in the second and third trimesters.

DELIVERY AND INTRANATAL CARE

Timing of Delivery

For women with prepregnancy diabetes or on insulin therapy, schedule review by an obstetrician at 36 to 37 weeks for delivery at 38 to 39 weeks.

For women on diet control and/or women having optimal glycemic control, carrying a normally grown baby, there is insufficient evidence to suggest the best time for delivery.

Diabetes alone is not an indication for cesarean section.

The obstetrician should make the decision after discussing with the woman.

Delivery should be arranged in the daytime.

Labor Care

Second tier obstetric on-call (SHO/Registrar) should be informed of any woman with diabetes at onset of labor. And, he/she should be present for the delivery. It is recommended to involve medical team in the management of difficult cases.

Inform on-call neonatal team of any planned/imminent delivery of a diabetic mother.

During labor and birth, capillary blood glucose should be monitored 1 to 2 hourly in women with diabetes and maintained at between 4 and 7 mmol/l (72-126 mg/dl). These CBG records should be entered to the partogram.

Hartmann's/normal saline or insulin-dextrose potassium (GIK) infusion should be started, if the values are lower or higher than the recommended range.

POSTNATAL CARE

Neonatal Care

Handover care of the newborn to the neonatal team.

Ensure delivery to abdomen and initiate breastfeeding as early as possible (within first half to 1 hour) unless specific concerns prevent such action.

Take all suitable essential newborn care measures to avoid hypothermia.

Blood glucose testing should be carried out routinely in babies of women with diabetes at 2 to 4 hours after birth.

Blood glucose values below 36 mg/dl (2 mmol/l) should trigger action.

Blood tests for polycythemia, hyperbilirubinemia, hypocalcemia and hypomagnesemia should be carried out for babies with clinical signs.

Immediate Postpartum Care

If mother is given insulin in the antenatal period, it is recommended that the dose needs adjustments to pre-pregnant doses or with diet alone in the first 48 hours after delivery. The decision should be based on her postpartum blood glucose value. If fasting blood glucose (FBG) exceeds 126 mg/dl or RBS exceeds 200 mg/dl, insulin or metformin may be required.

At Hospital Discharge

Inform medical officer of health (MOH) and area public health midwife (PHM) through woman's pregnancy record.

For women with pregestational diabetes, prescribe suitable hypoglycemic agent, restart statins, schedule follow-up clinic date at medical clinic.

For women with confirmed GDM, give a date or make arrangements to screen for DM at 6 weeks postpartum.

Discuss and help to decide on the suitable contraceptive method to use.

Late Postnatal Care and Follow-up

At 6 to 8 weeks postpartum, women with GDM who became normoglycemic postpartum should be referred for screening for DM. The test of screening is ideally GTT. Fluid blood sugar is an alternative, if resources are limited. Women whose fasting venous plasma glucose is above 100 mg/dl (5.5 mmol/l) must be referred for further evaluation.

Women who have been diagnosed with GDM and are screen-negative at the 6-week review should receive lifestyle advice and screening for noninsulin dependent diabetes mellitus (NIDDM) with annually, with FBS. The importance of maintaining a normal BMI must be emphasized to them.

FAMILY PLANNING

- All reliable methods of family planning can be used as appropriate for the needs of the individual woman with diabetes.
- For women with BMI >25 kg/m², DMPA is best avoided.
- Women with type 2 diabetes should be advised to complete their family within 5 to 10 years of diagnosis of diabetes in view of development of complications.

DISCLAIMER

This guidance is intended to provide general advice to streamline the management and maintain overall quality of patient care. It should never be relied on as a substitute for proper clinical assessment with respect to the particular circumstances and needs of each patient under your care. It is the responsibility of each practitioner to have regard to the particular circumstances of each individual patient, and the application of this guidance. This guidance has been prepared having regard to the information available at the time of its preparation. Medicine is a continually evolving science and the users must have regard to relevant information, research or material, which may have been published or become available subsequently.

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Appendix 1: Dietary recommendations for Sri Lankan pregnant women

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රාත්‍රී ආහාරය		කාබෝහයිඩ්‍රේට් ප්‍රමාණ 5	කාබෝහයිඩ්‍රේට් ප්‍රමාණ 6	කාබෝහයිඩ්‍රේට් ප්‍රමාණ 5	
බාහ්‍යමය ආහාර ඵලදායී පොල් ආහාර පළතුරු	බිත්	කෝප්ප 2	කෝප්ප 2½ ක්	කෝප්ප 1½ ක්	
	ඵලදායී	මේස හැඳි 6	මේස හැඳි 6	මේස හැඳි 6	
	මාංශ ආහාර	කැලි 1 ක්	කැලි 1 ක්	කැලි 1 ක්	
	පොල් ආහාර	හෙඳි	මේස හැඳි 3	මේස හැඳි 2	
පළතුරු	කස්ලබු වතුර	කැලි 1 කෝප්ප 1½ ක්	කැලි 1 කෝප්ප 1½ ක්	කැලි 1 කෝප්ප 1½ ක්	
අමතර ආහාර		කාබෝහයිඩ්‍රේට් ප්‍රමාණ 2	කාබෝහයිඩ්‍රේට් ප්‍රමාණ 3	කාබෝහයිඩ්‍රේට් ප්‍රමාණ 1	
ශීනි, ධාන්‍ය, පොල් ආහාර	ත්‍රිකෝණාකාර කිරි මේස හැඳි 2 සමඟ පිනි කැනුම්	2 කෝප්ප 1	4 කෝප්ප 1	- කෝප්ප 1	

