
MATERNITY UNIT

GUIDELINE: Antenatal blood glucose monitoring

AUTHOR: Diabetes in pregnancy working group

SCOPE: Obstetricians, midwives and nurses working in antenatal clinic, community and maternity unit.

PURPOSE: To provide guidance on blood glucose monitoring in the antenatal period to reduce the risk of complications due to diabetes in pregnancy and childbirth for the woman and her baby.

DEFINITIONS:

GESTATIONAL DIABETES MELLITUS (GDM)

GDM is defined as “any degree of glucose intolerance with onset or first recognition during pregnancy”. The definition applies whether or not insulin is used for treatment or hyperglycaemia persists after pregnancy. It does not exclude the possibility that unrecognised glucose intolerance may have predated the pregnancy.

GDM occurs in 1 to 14 percent of all pregnancies, depending on the population and diagnostic criteria used. It is associated with significant risk of maternal and perinatal complications.

GDM is more likely to be present if there is a history of:

- Obesity
- Previous large babies
- Previous GDM
- Previous unexplained perinatal loss, miscarriage and premature deliveries.

Glucose tolerance often returns to normal after birth, but there is a high risk of subsequently developing type 2 diabetes (up to at least 50 percent).

TYPE 1 DIABETES

Type 1 diabetes is of auto-immune or viral aetiology with other environmental and genetic factors involved. Incidence of type 1 diabetes peaks in childhood and in the elderly. It usually presents acutely. Islet cell antibodies, islet tyrosine phosphatase 2 (IA2) antibodies and/or glutamic acid decarboxylase (GAD) antibodies are often present. Individuals with type 1 diabetes cannot produce adequate insulin levels and consequently are dependent upon insulin injections to control their blood sugar. If their blood sugars are not controlled they are at risk for coma and death.

TYPE 2 DIABETES

The cause of type 2 diabetes remains unknown although an inherited predisposition and lifestyle factors such as obesity contribute. It is more common for members of families with a history of diabetes. However, it is less likely among those of European descent. There is a general increase in the prevalence of **Type 2 diabetes worldwide. Type 2 diabetes is associated with significant morbidity and mortality.** The goal of treatment is to prevent long term complications and symptoms of diabetes.

Women with type 2 diabetes are frequently first diagnosed with this condition during pregnancy. It can be difficult to differentiate between gestational diabetes and previously undiagnosed type 2 diabetes. A definitive diagnosis can only be made after delivery.

Women with type 2 diabetes may be able to control their blood sugars with diet alone but most will also need oral medications and/or insulin. The pancreas produces insulin however the cells are resistant to the action of insulin. Consequently they often need oral medications to sensitize them to insulin, such as Metformin or Glibenclamide, or insulin itself. They rarely suffer from DKA though it is not impossible.

GUIDELINE:

All women should have their body mass index (BMI) recorded as close to booking as possible. The BMI is the persons weight (kg) divided by their height (m)².

Example: Weight = 68 kg, Height = 165 cm (1.65 m).

Calculation: $68 \div (1.65)^2 = 24.98$

SCREENING:

1. Routine screening for all women

The recommendation is to offer all pregnant women HbA1C testing as part of their booking antenatal bloods to detect undiagnosed diabetes.

Women with HbA1c >40 mmol/mol should be under the care of Secondary Antenatal Diabetes clinic.

It is recommended that all women are offered a polyose test at 24 – 28 weeks, this is performed by T-lab. An information leaflet regarding the reasons this test is recommended, where available, should be given to the woman. A national leaflet has been recommended by the Gestational Diabetes Mellitus Technical Working Party.

2. Women with pre-existing Type 1 and Type 2 Diabetes

These women will be referred in the first trimester to the Secondary Care Antenatal Diabetes clinic, usually by GP to enable early blood glucose control, early treatment with Metformin and insulin as necessary, and timely screening as per Antenatal care.

3. Oral Glucose Tolerance Test (OGTT)

Women with a normal HbA1c <41 mmol/mol and no risk factors for diabetes (as above) should be offered a screening test, the non-fasting 50g **Glucose Challenge Test (GCT)** or Polyose test.

If the GCT result >7.8mmol/l a fasting OGTT is required.

Women with a normal HbA1c <41 mmol/mol but with one or more risk factors for diabetes should be offered a **Glucose Tolerance Test (GTT)** rather than GCT.

GDM is diagnosed with one or both of the following:

- Fasting glucose > 5.5mmol/l
- Two hour glucose >9.0mmol/l

If the two hour test result is >8.0mmol/l in a woman with a macrosomic baby or polyhydramnios, it would be appropriate to discuss with Obstetrician in the Antenatal diabetic

clinic regarding her management as she may need to be treated as having GDM and need dietary input and blood glucose monitoring.

[See Appendix 1 – screening for Diabetes in Pregnancy flowchart](#)

BLOOD GLUCOSE MONITORING

Any woman with diabetes in pregnancy will need an individualised care plan made and documented. This must be communicated clearly to the woman and her LMC, including tests and antenatal appointments required and with whom.

The use of MCIS system data entry will allow for this communication to be documented.

If a woman is diagnosed with diabetes in pregnancy, then blood glucose levels will be advised to be monitored on a daily (or alternate day) basis, and a record kept in a log book, to give an indication of glycaemic control throughout the day. The woman can access a glucose meter and appropriate test strips from the Diabetes team who will make contact with the woman to educate her on treatment target goals and education on GDM, diet and lifestyle interventions with appropriate current resources. Alternatively, the woman can access a glucose meter and testing strips from her LMC or from GP clinic.

During pregnancy the aim is for a level of 4.0 – 5.0 mmol/l before breakfast, and 4.0 - 6.5 mmol/l post-prandial. Action will occur (e.g. commencement or increase in insulin therapy) if a fasting glucose of >5.5 mmol/l or a postprandial glucose of >6.5 mmol/l consistently occurs and appears to reflect worsening glycaemic control.

1. Diabetes controlled by diet only

It is recommended that these women be taught to do blood glucose monitoring at the following times: -

- ON WAKING
- TWO HOURS AFTER BREAKFAST
- TWO HOURS AFTER LUNCH
- TWO HOURS AFTER DINNER (or before bed)

The times at which monitoring is carried out may vary each day or at weekends, therefore the time of the test needs to be recorded in the log book. Additional tests may be required before bed and during the night.

2. Diabetes requiring insulin in pregnancy

To be useful in assessing dietary compliance or the need for insulin adjustment, monitoring needs to be carried out in relation to mealtimes.

It is recommended that women be taught to do blood glucose monitoring at the following times: -

- ON WAKING.
- TWO HOURS AFTER BREAKFAST.
- BEFORE LUNCH (this may be omitted if very close to post breakfast test).
- TWO HOURS AFTER LUNCH.
- BEFORE DINNER
- TWO HOURS AFTER DINNER (or before bed).

The times at which monitoring is carried out may vary each day or at weekends, therefore the time of the test needs to be recorded in the log book. Additional tests may be required before bed and during the night.

Women with type 1 will test before every meal as well as 2 hours after, plus during the night and before exercise as instructed by Diabetes CNS/team.

3. Laboratory blood glucose estimations

An HbA1c may be requested by the obstetrician as required. This test gives a mean average of blood glucose levels over the previous 120 days.

Individual care plan for glucose monitoring - intrapartum and postnatal care

This must be clearly documented in the antenatal records/MCIS by the obstetrician/diabetes in pregnancy team to ensure good communication to the midwife and obstetrician caring for the woman in labour and postnatally.

DIET

The dietician will see the newly diagnosed woman to assess diet and provide education and follow up as needed.

Following dietary guidelines – (taken from the Diabetes in Pregnancy – Quick reference guide for health professionals on the screening, diagnosis and treatment of GDM in New Zealand, 2014) should be discussed with the woman by her midwife or obstetrician/diabetes team particularly before she has seen the dietician.

Advise pregnant women with gestational diabetes that their dietary recommendations could include the following:

- Consuming a minimum of 175g carbohydrate/day
- Spreading carbohydrates evenly throughout the day between meals and snacks
- Reducing intake of saturated fats
- Consuming lean protein
- Keeping weight gain in pregnancy in line with Ministry of Health recommendations.

The recommendation is independent of individual requirements of the pregnant woman.

EXERCISE

Exercise for example walking, yoga, swimming is ideal, allowing the workload to be increased safely without distress to the foetus. They should aim for 30 minutes daily. This is particularly effective after main meals.

A Green prescription may be offered to assist the woman with her daily activity.

Contraindications to exercise in pregnancy include:

- Preterm rupture of membranes
- Threatened preterm labour
- Pregnancy induced hypertension or pre-eclampsia
- Persistent second/third trimester vaginal bleeding
- Intrauterine growth restriction

ASSOCIATED DOCUMENTS

[Diabetes in Pregnancy Intrapartum Care.pdf](#)

[Diabetes Insulin Therapy in Gestational Diabetes.pdf](#)

[Diabetes Maternal Postnatal Management.pdf](#)

[Diabetes Nutritional Management of Diabetes in Pregnancy.pdf](#)

APPENDIX

[Appendix 1: Screening for Diabetes in Pregnancy Flowchart](#)

REFERENCES:

The HDC Code of Health and Disability Service's Consumer's Rights Regulation 1996

NZCOM (2006) *NZCOM consensus statement – Gestational Diabetes*

ADHB. (2013,Dec). *Diabetes in pregnancy: guideline.*

http://nationalwomenshealth.adhb.govt.nz/Portals/0/Documents/Policies/Diabetes%20in%20Pregnancy_.pdf

MOH (2014) *Screening, Diagnosis and Management of Gestational Diabetes in New Zealand A clinical practice guideline*

<http://www.health.govt.nz/publication/screening-diagnosis-and-management-gestational-diabetes-new-zealand-clinical-practice-guideline>

<https://www.health.govt.nz/system/files/documents/publications/diabetes-in-pregnancy-quick-reference-guide-dec14-v4.pdf>

<http://www.health.govt.nz/publication/food-and-nutrition-guidelines-healthy-pregnant-and-breastfeeding-women-background-paper>

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EVALUATION: By audit for compliance.

Authorised By (HOD Obstetrics)

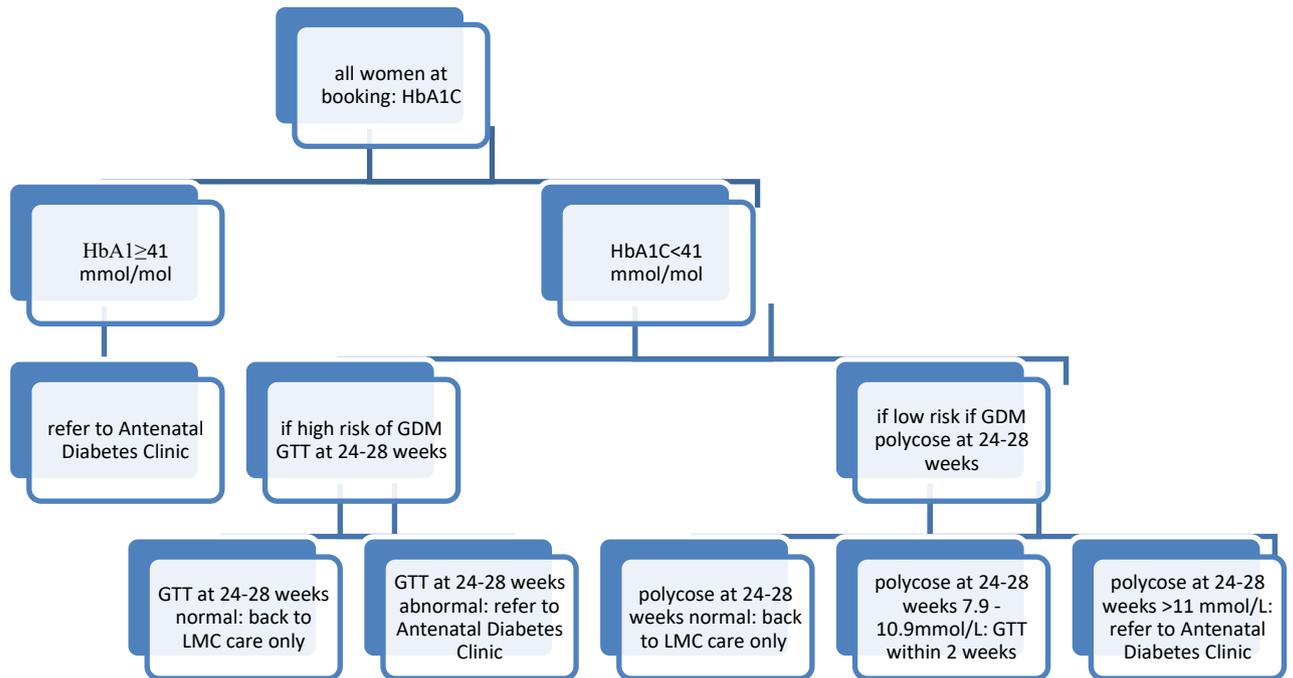
Authorised By (Clinical Care Manager Woman, Child & Youth)

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APPENDIX 1

SCREENING FOR DIABETES IN PREGNANCY



Risk Factors for Diabetes (adapted from ADHB flowchart):

- Previous GDM
- Previous macrosomia
- Age >40 years
- Morbid obesity (Indian/Asian BMI ≥ 32, Polynesian BMI ≥ 37, everyone else BMI ≥ 35)
- PCOS
- Glycosuria
- Two 1st degree relatives with diabetes
- On antipsychotic medication or prednisone

Ctrl & Click on link below for a larger flow chart view.

[Screening for diabetes in pregnancy flowchart](#)