

Diabetes in pregnancy: *Factsheet*

Tower Hamlets Joint Strategic Needs Assessment 2010-2011

Executive Summary

Diabetes in pregnancy is associated with risks to both the woman and the developing fetus including higher rates of miscarriage, pre-eclampsia, urinary tract disorder, preterm labour, fetal malformation, neural tube defect, macrosomia, stillbirth, birth injury, perinatal mortality and postnatal adaptation problems (such as hypoglycaemia).

Pre-existing diabetes in pregnancy refers to women who had a diagnosis of diabetes prior to becoming pregnant; either type 1 or type 2. For women with pre-existing diabetes advice on management of diabetes prior to conception is important and complications such as diabetic retinopathy can worsen rapidly during pregnancy.

Gestational diabetes mellitus (GDM) is a type of diabetes that arises during pregnancy. Risk factors for gestational diabetes are obesity, increased weight gain in early adulthood, advanced maternal age, family history of diabetes, non-white ethnic origin, and being a current smoker.

As with pre-existing diabetes, GDM is associated with a number of adverse fetal and maternal outcomes and therefore early detection and management is likely to offer benefits to mother and baby both during and after pregnancy. Diagnosis may also provide an opportunity to intervene through lifestyle modification to prevent or delay the onset of subsequent type 2 diabetes. The lifetime risk of developing type 2 diabetes after gestational diabetes is 30%.

Increased birth weight and neonatal fat mass may also have long-term health implications for the offspring of mothers with GDM, including an increased risk of impaired glucose tolerance and childhood obesity.

In 2010 10.9% of pregnancies in Tower Hamlets were complicated by diabetes, of which 9% were due to GDM, 1.8% to pre-existing type 2 diabetes and 0.1% to pre-existing type 1 diabetes. This is substantially higher than the available estimate for England and Wales where 2-5% of pregnancies were complicated by diabetes (2002/03).

Of all pregnancies in Tower Hamlets complicated by diabetes in 2010, 81.5% were due to GDM, 17.5% due to type 2 diabetes and 1.0% due to type 1 diabetes. The prevalence of type 2 diabetes in pregnant women in Tower Hamlets is substantially higher than the average for England and Wales, 5% (2007) which can be explained largely by our local demography.

There are local protocols and guidelines in place for the antenatal period however further work is required locally for both pre-conception care and post-GDM follow-up.

See diabetes factsheet for more information on the wider impact of diabetes in the population.

Recommendations

- Amendment to obstetric discharge summary to highlight GDM.
- Universal system for follow-up of women with GDM in primary with implementation of a call / recall system; development of a post-GDM care pathway in primary care

- Implementation of a postnatal screening guideline and annual GTTs or HbA1c for all women who have had a previous diagnosis of GDM in primary care.
- Commencement of a multidisciplinary pre-conception counseling service in the community for high risk groups e.g. Type 2 diabetes / history GDM / obesity – to include a basket of factors e.g. improving glycaemic control, commencement of folic acid etc.
- Add preconception care to enhanced service DM template
- Improved links with family planning services
- Implementation of mandatory competency based training and QA process for advocates
- Link with key strategies – obesity, maternity health improvement
- Continuation of the comprehensive breastfeeding services and senior level support to enable the RLH to achieve stage 3 BFI accreditation.

1. What is diabetes in pregnancy?

Diabetes

Diabetes is a long term condition that affects around 2.8 million people in the UK, plus a predicted additional 850,000 people who have not yet been diagnosed. There is a high level of morbidity and mortality associated with diabetes including increased risk of heart disease, stroke, eye problems and limb problems.

There are two main types of diabetes: type 1 diabetes and type 2 diabetes. Type 1 diabetes develops when the body's immune system attacks and destroys the cells that produce insulin. As a result the body is unable to produce insulin and this leads to increased blood glucose levels. Type 2 diabetes develops when the body does not produce enough insulin to maintain a normal blood glucose level, or when the body is unable to effectively use the insulin that is being produced. Type 2 diabetes has been increasing, particularly in younger ages, as a consequence of decreasing levels of physical activity and increasing levels of obesity, therefore increasingly impacting on women of reproductive age.

See diabetes factsheet for further details.

Diabetes in pregnancy

Each year approximately 650,000 women give birth in England and Wales, and 2–5% of pregnancies involve women with diabetes. 87.5% of pregnancies complicated by diabetes are estimated to be due to gestational diabetes (GDM), with 7.5% being due to type 1 diabetes and the remaining 5% being due to type 2 diabetes¹. Diabetes in pregnancy is associated with higher rates of miscarriage, pre-eclampsia, urinary tract disorder preterm labour and higher rates of fetal malformation; neural tube defect, macrosomia, birth injury, and perinatal mortality .

Pre-existing diabetes in pregnancy

This refers to women who had a diagnosis of diabetes prior to becoming pregnant; either type 1 or type 2. The diabetes and pregnancy CEMACH report reported that women with type 2 diabetes were more likely to come from minority ethnic backgrounds, have a deprived social background and to be older².

¹ Confidential Enquiry into Maternal and Child Health (CEMACH), 2007

² Casson I F. Diabetes in pregnancy CEMACH report. Diabetes medicine, 2006. Second of three studies; a descriptive study of all women in the UK with Type 1 or Type 2 diabetes who were pregnant for the 1 year period from 2nd March 2002. 3808 women.

Gestational diabetes (GDM)

Gestational diabetes mellitus (GDM) is a type of diabetes that arises during pregnancy (usually during the second or third trimester). In some women, GDM occurs because the body cannot produce enough insulin to meet the extra needs of pregnancy. In other women, GDM may be found during the first trimester of pregnancy. In these women, the condition most likely existed before the pregnancy³.

Risk factors for gestational diabetes include obesity, increased weight gain in early adulthood, advanced maternal age, family history of diabetes, non-white ethnic origin, and being a current smoker. The lifetime risk of developing type 2 diabetes after GDM is 30 per cent. Using risk factors alone as a screening test however produces low sensitivities (50–69%) (8 studies) and one study has found that four risk factors (age, BMI, ethnic group and family history) gave most of the information and that adding other items added little. The principal risk factors for gestational diabetes are overweight, age and ethnicity⁴.

GDM is associated with a number of adverse foetal and maternal outcomes and therefore early detection and management is likely to offer benefits to mother and baby both during and after pregnancy. Diagnosis may also provide an opportunity to intervene through lifestyle modification to prevent or delay the onset of subsequent type 2 diabetes. In some populations up to 20% of women diagnosed with GDM actually have previously undiagnosed type 2 diabetes. This brings them into a high risk group for future pregnancies and these women would also benefit from properly structured management strategies including pre-pregnancy care⁵

Increased birth weight and neonatal fat mass may also have long-term health implications for the offspring of mothers with GDM, including an increased risk of impaired glucose tolerance and childhood obesity. Long-term follow-up studies are needed to determine whether treatment of gestational diabetes mellitus can reduce the risk of these complications⁶.

³ Diabetes UK

⁴ Scott D, Loveman E, McIntyre L and Waugh N (2001) Systematic review – meta-analysis.

⁵ Confidential Enquiry into Maternal and Child Health. Diabetes in Pregnancy: Are we providing the best care? Findings of a National Enquiry: England, Wales and Northern Ireland. CEMACH: London; 2007.

⁶ Landon M et al (2009) A Multicenter, Randomized Trial of Treatment for Mild Gestational Diabetes. *N Engl J Med* 2009;361:1339-48.

2. What is the local picture?

This section looks at the prevalence of pre-existing and gestational diabetes in pregnancy in Tower Hamlets with comparisons to national rates.

Table 1. Prevalence of pre-existing and gestational diabetes in pregnancy in Tower Hamlets 2007/08⁷ and 2010⁸

	Number of pregnancies 2007/08	Diabetes type as percentage of total births 2007/08	Number of pregnancies 2010	Diabetes type as percentage of total births 2010
Total births	4200		4652	
Type 1 diabetes	4	0.9%	5	0.1%
Type 2 diabetes	78	1.8%	88	1.8%
Gestational	416	10%	409	9%
Total diabetes in pregnancy	498	12.7%	502	10.9%

In 2002/03 2–5% of pregnancies in England and Wales involved women with diabetes, pre-existing type 1 diabetes and pre-existing type 2 diabetes accounting for 0.27% and 0.10% of births, respectively⁹. This means that about twice as many pregnancies in Tower Hamlets are complicated by diabetes

Table 2. Percentage of all pregnancies complicated by diabetes by type

Diabetes Type	CEMACH 2007 ¹⁰	RLH 2007/08	RLH 2010
Type 1	7.5%	0.8%	1%
Type 2	5%	15.6%	17.5%
GDM	87.5%	83.5%	81.5%

Table 2 shows that, of the pregnancies complicated by diabetes, when compared CEMACH 2007 estimates for England and Wales, the proportion due to type diabetes in Tower Hamlets is over 3 times higher. The lower prevalence of type 1 diabetes and higher prevalence of type 2 diabetes is reflective of population demography. 89.3% of diagnosed cases of diabetes in Tower Hamlets are attributable to type 2 diabetes¹¹. 52.9% of total diagnosed cases are Bangladeshi and 50.8% female¹².

A 2005/6 retrospective GDM audit at RLH found that 81.7% were Bangladeshi and 7.9% African compared to 4.1% Caucasian. This is reflective of high proportion of births to Bangladeshi women, 44.8% in 2008/09 (see maternal health JSNA factsheet for further information).

⁷ Audit of Postnatal Diabetes, Royal London hospital, Sooi-Mai Jones, 2008

⁸ Diabetes & Pregnancy, Pre-existing Diabetes at The Royal London Hospital (Pregnancy Outcomes for 2010). Nickey Tomkins. 2011

⁹ CEMACH. Confidential Enquiry into Maternal and Child Health: Pregnancy in Women with Type 1 and Type 2 Diabetes in 2002–03, England, Wales and Northern Ireland. London: CEMACH; 2005;

¹⁰ Diabetes in pregnancy management of diabetes and its complications from preconception to the postnatal period. National Collaborating Centre for Women's and Children's Health Commissioned by the National Institute for Health and Clinical Excellence. March 2008 (revised reprint July 2008)

¹¹ QOF, 2009/10 (Diabetes JSNA factsheet)

¹² CEG 2010 (Diabetes JSNA factsheet)

3. What are the effective interventions?

The NICE clinical guideline, Diabetes in pregnancy¹³, makes recommendations for the management of diabetes and its complications in women who wish to conceive and those who are already pregnant.

Pre-conception

Care pathways for women with pre-existing diabetes should flag up pre-pregnancy assessment as routine at the annual review, and highlight the need to anticipate that women may become pregnant. This should prompt discussion for contraception or pregnancy planning¹⁴.

- Diabetes control should be optimised prior to conception to improve maternal and fetal outcomes. Counselling about the risk of miscarriage, congenital malformation, stillbirth and neonatal death poor glycaemic control should be undertaken^{15, 16}. Counseling should however be wider than glycaemic control, and include use of 5mg folic acid, stopping potentially teratogenic drugs, ensuring laser treatment for retinopathy is complete and eyes are stable and ensuring patients know how to contact the antenatal diabetes service as soon as they are pregnant.¹⁷
- The importance of avoiding unplanned pregnancy should be an essential component of diabetes education from adolescence for women with diabetes.
- Women with diabetes who are planning to become pregnant should be offered pre-conception care and advice before discontinuing contraception¹⁸.

Antenatal¹⁹

Screening for GDM should be built into the antenatal care for all pregnant women.

For women with pre-existing diabetes or previously diagnosed GDM, NICE recommends the following:

- Multidisciplinary diabetes clinics with diabetologist, diabetes nurse, dietitian, obstetrician and midwife with special interest in diabetes.
- If it is safely achievable, women with diabetes should aim to keep fasting blood glucose between 3.5 and 5.9 mmol/litre and 1-hour postprandial blood glucose below 7.8 mmol/litre during pregnancy.
- Women with insulin-treated diabetes should be advised of the risks of hypoglycaemia and hypoglycaemia unawareness in pregnancy, particularly in the first trimester.
- During pregnancy, women who are suspected of having diabetic ketoacidosis should be admitted immediately for level 2 critical care, where they can receive both medical and obstetric care.
- Women with diabetes should be offered antenatal examination of the four-chamber view of the fetal heart and outflow tracts at 18–20 weeks.

Neonatal care

Babies of women with diabetes should be kept with their mothers unless there is a clinical complication or there are abnormal clinical signs that warrant admission for intensive or special care.

¹³ NICE (2008). CG63. Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period

¹⁴ I F Casson. Diabetes and pregnancy CEMACH report . (2006). Diabetic medicine.

¹⁵ NICE (2008). CG63. Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period

¹⁶ M Mahmud & D Mazza (2010) . Preconception care of women with diabetes: a review of current guideline recommendations

¹⁷ I F Casson. Diabetes and pregnancy CEMACH report . (2006). Diabetic medicine.

¹⁸ NICE (2008). CG63. Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period

¹⁹ NICE (2008). CG63. Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period

Postnatal

Women who were diagnosed with gestational diabetes should be offered lifestyle advice (including weight control, diet and exercise)²⁰

Previous diagnosis of GDM should prompt regular screening for Type 2 diabetes to identify it at an early stage before it becomes symptomatic or is associated with the development of diabetic complications. For those women with previous GDM who miss (or are missed) either at the postnatal or annual check, there is an increased risk associated with undiagnosed type 2 diabetes and development of associated morbidities which will result in significant personal and economic costs.

For women who have had GDM, a GTT test should be arranged 6-7 weeks postnatally and then annually. However, new diagnostic criteria for diabetes has been accepted by the WHO (2011)²¹. HbA1c can be used as a diagnostic test for diabetes providing that stringent quality assurance tests are in place and assays are standardised to criteria aligned to the international reference values, and there are no conditions present which preclude its accurate measurement.

An HbA1c of 48 mmol/mol (6.5%) is recommended as the cut point for diagnosing diabetes. A value of less than 48 mmol/mol (6.5%) does not exclude diabetes diagnosed using glucose tests.

Breastfeeding

Diabetes should not prevent women breastfeeding. Breastfeeding may be difficult to establish e.g. if the baby has had to be given a 'top-up feed' by syringe to treat hypoglycaemia, if the women was initially separated from her baby due to Caesarean section or due to the baby's treatment in the neonatal unit. In these cases the mother should be encouraged to express her milk.

Babies of diabetic mothers are at greater risk of hypoglycaemia and so an early feed is recommended. A study has found that Infants who are breastfed in the delivery room have a significantly lower rate of borderline hypoglycaemia than those who were not breastfed in the early postpartum period (10% versus 28%, P = 0.05) and had significantly higher mean blood glucose level compared to infants who were not breastfed in the delivery room (3.17 versus 2.86 mmol/l, P = 0.03). Breastfed infants had a significantly higher mean blood glucose level compared to those who received infant formula for their first feed (3.20 versus 2.68 mmol/l, P = 0.002). The researchers concluded that an early breastfeed may facilitate stable blood glucose levels in the infants of mothers with gestational diabetes .

A systematic review of published evidence of the relationship between infant feeding and type 2 diabetes in later life or risk factors for diabetes found that breastfeeding is associated with a reduced risk of type 2 diabetes, with lower blood glucose and serum insulin concentrations in infancy and marginally lower insulin concentrations in later life²². A more recent cohort study of 52,731 women found that compared to nulliparous women, childbearing women who do not breastfeed have about a 50% increased risk of type 2 diabetes in later life. Breastfeeding substantially reduces this excess risk.²³

²⁰ NICE (2008). CG63. Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period

²¹ WHO. Use of glycosylated haemoglobin (HbA1c) in the diagnosis of diabetes mellitus (Abbreviated Report of a WHO Consultation), 2011. WHO/NMH/CHP/CPM/11.1

²² Owen CG, Martin RM, Whincup PH, Davey Smith G, Cook DG. Does breastfeeding influence risk of type 2 diabetes in later life? A quantitative analysis of published evidence. *American Journal of Clinical Nutrition*. 2006; 84: 1043-1054.

²³ Liu B, Jorm L, Banks E (2010) Parity, Breastfeeding and the Subsequent Risk of maternal Type 2 diabetes. *Diabetes Care*.

4. What is being done locally to address this issue?

Preconception care

The lack of preconception care is a major gap in the service for women previously diagnosed with GDM. There is also currently no routine dietetic / diabetes specialist nurse service in place for pre-conception advice to women of reproductive age with pre-existing type 2 diabetes. There is no template on EMIS for pre-conception care and it is not part of current diabetes care pathway. There is also a lack of sexual health management for patients with type 2 diabetes which includes inadequate contraceptive service. The awareness of importance is variable across GP practice.

Diabetes and pregnancy guideline

The Diabetes and Pregnancy guidelines were revised in March 2010 to incorporate NICE (2008) recommendations and care pathways have been developed. The purpose of the guideline is to provide guidance on screening for gestational diabetes and its management as well as the management of pre-existing diabetes in pregnancy and the postnatal period.

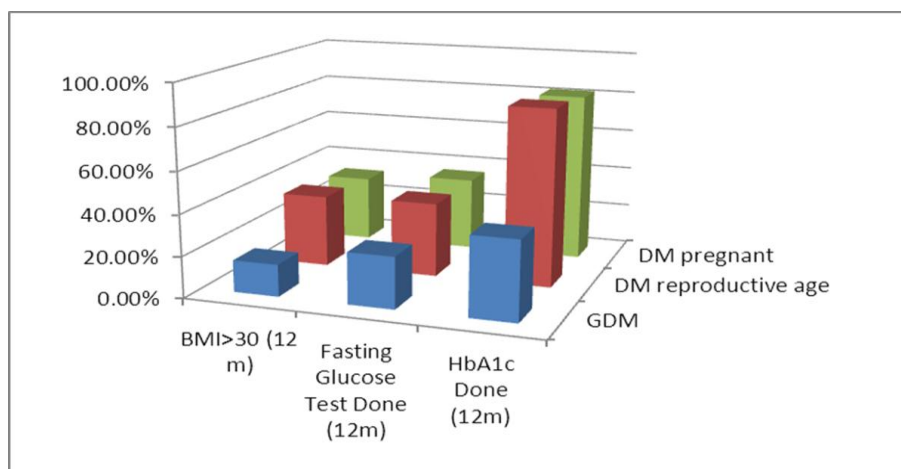
Diabetic Retinal Screening in Pregnancy

Since early 2007 women with diabetes have been referred to the THPCT retinal screening programme for screening during pregnancy. Women are screened, where possible, during each trimester and have their follow up appointment before the ninth month post-natally. Following the publication in September 2007 of the 'Position Statement on Screening in Pregnancy' by the National Screening Programme for Diabetic Retinopathy the local protocol in place for Diabetic Retinal Screening in Pregnancy was reviewed and amended.

GDM follow-up in primary care

The obstetric discharge summary is currently inadequate for highlighting the need for postnatal follow-up for women and there is inconsistent 6 week follow-up check between GP practices. There is limited follow-up of patients with previous GDM at 12 months in primary care, see graph 1. Below, and currently no guidelines in place for the annual check. There is variable coding for GDM in GP practices

Graph 1. Primary care population 2009/10: monitoring DM vs. GDM at 12 months²⁴



DM reproductive age N= 1021,
DM pregnant N = 56,
GDM N = 181

²⁴ CEG

Advocacy

There is a training issue for the advocacy service within the acute setting with not all receiving competency based training and a lack of annual evaluation of advocates following training

5. What evidence is there that we are making a difference?

Outcomes during pregnancy

The 2010 outcome audit for women with pre-existing diabetes audited against the following outcomes:

- Pre-term birth < 37 weeks
- Induction of labour
- Type of birth
- Macrosomia

The findings were that the outcomes were better than CEMACH and there were also improvements in outcomes since the previous audit of 2007-2008, possibly as a consequence of the implementation of new guidance

Future audits are planned to assess:

- Guideline compliance - audit tool for CNST (not yet completed)
- Outcomes of women diagnosed with GDM

6. What is the perspective of the public on support available to them?

We do not have any local data, but qualitative research to inform the development of a service to prevent type 2 diabetes after gestational diabetes highlights the following issues.²⁵

Intervention development, issues raised:

- If messages about the personal implications of not following a healthy lifestyle are clear, women will make more of an effort
- Whether the intervention was one-to-one or a group depended on the personal preferences and circumstances of women
- Some women feel vouchers for access to leisure services can be abused or may stigmatise women
- Depending on the age and personal preferences of women, the internet or phone as means of communicating advice are real possibilities

Intervention development, timing:

- The majority of women prefer an intervention 6 months after having the baby because:
 - Baby is more settled and can be left, more normality
 - Baby is being introduced to solids -incentive
- A small minority of women feel that the six-week check and annual follow up are sufficient because:
 - One year is just about the right time to be needing a reminder of the risk of T2DM
 - They prefer to self-monitor and get in touch if there are any concerns
 - They prefer to manage their healthy lifestyles on their own and have the resources to do so
- Other options: 6 month followed by annual checks; advice helpline (community health trainer)

²⁵ Barned et al. (2010). Preventing type 2 diabetes after gestational diabetes (Qualitative studies to inform intervention development).

7. What more do we need to know?

Perspective of the local community re: current diabetes in pregnancy care; pre-conception care; postnatal follow-up.

8. What are the priorities for improvement over the next 5 years?

What are the Key Insights?

- Diabetes in pregnancy is associated with risks to the woman and the developing fetus.
- The lifetime risk of developing Type 2 diabetes after gestational diabetes is 30%.
- Lack of pre-conception care and planning in primary care
- An early breastfeed may facilitate stable blood glucose levels in the infants of mothers with gestational diabetes
- Breastfeeding can reduce the woman's subsequent risk of developing type 2 diabetes
- Inadequate follow-up postnatally for women diagnosed with GDM for prevention of progression to Type 2 diabetes
- Inadequate communication to GPs following discharge
- Poor coding for GDM on EMIS
- Need for improved partnership work across agencies

Key recommendations

- Amendment to obstetric discharge summary to highlight GDM.
- Universal system for follow-up of women with GDM in primary with implementation of a call / recall system; development of a post-GDM care pathway in primary care
- Implementation of a postnatal screening guideline and annual GTTs or HbA1c for all women who have had a previous diagnosis of GDM in primary care.
- Commencement of a multidisciplinary pre-conception counseling service in the community for high risk groups e.g. Type 2 diabetes / history GDM / obesity – to include a basket of factors e.g. improving glycaemic control, commencement of folic acid etc.
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- Link with key strategies – obesity, maternity health improvement
- Continuation of the comprehensive breastfeeding services and senior level support to enable the RLH to achieve stage 3 BFI accreditation.

9. Key Contacts

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		Signed off by (LBTH Lead):	<i>e.g. Director of Adults/CFS</i>				