Confidential Enquiry into Maternal and Child Health

Improving the health of mothers, babies and children

PREGNANCY IN WOMEN WITH TYPE 1 AND TYPE 2 DIABETES

2002–2003

England, Wales and Northern Ireland

Executive Summary
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Women with diabetes are at an increased risk of losing a baby during pregnancy and of having a baby with a congenital anomaly. Good periconceptional glycaemic control reduces the risk of these adverse perinatal outcomes. The St. Vincent Declaration (1989) set a clear target of achieving pregnancy outcomes in women with diabetes equivalent to those of the general maternity population within five years.

The CEMACH diabetes programme

The Confidential Enquiry into Maternal and Child Health (CEMACH) diabetes programme was set up to evaluate pregnancy outcomes and the quality of maternity care for women with diabetes in England, Wales and Northern Ireland. It is the largest study of diabetes in pregnancy ever conducted and includes information on 3808 pregnancies of women with diabetes who delivered or booked in 231 hospitals in England, Wales and Northern Ireland between 1 March 2002 and 28 February 2003. Data were collected on standards of care for these women and their babies from preconception to the postnatal period. This forms the basis of the report *Pregnancy in Women with Type 1 and Type 2 Diabetes in 2002–2003, England, Wales and Northern Ireland.*

Key finding 1: Perinatal outcomes remain poor

The babies of women with diabetes continue to have an increased risk of perinatal mortality (3.8-fold) compared with the babies of mothers in England, Wales and Northern Ireland (Table 1).

<table>
<thead>
<tr>
<th>Table 1: Maternal age-adjusted stillbirth, perinatal and neonatal mortality in babies born to women with type 1 and type 2 diabetes in England, Wales and Northern Ireland, 01/03/02–28/02/03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women with diabetes (type 1 and 2)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Stillbirth**</td>
</tr>
<tr>
<td>Perinatal death*</td>
</tr>
<tr>
<td>Neonatal death*</td>
</tr>
</tbody>
</table>

** Rate per 1000 live births + stillbirths.
* Rate per 1000 live births.
+ Source for national data: CEMACH 2005.

The prevalence of confirmed major anomalies was 41.8 per 1000 births compared with 21 per 1000 births for babies of mothers in general, as reported to the European Surveillance of Congenital Anomalies (EUROCAT). This increase is primarily due to a higher number of neural tube defects (3.4-fold) and congenital heart disease (3.3-fold).
Key finding 2: Type 2 diabetes – different needs, equivalent risks

There are an increasing number of women of childbearing age in the UK being diagnosed with type 2 diabetes. They have different needs to women with type 1 diabetes and the majority will need to commence insulin during or before pregnancy. This study describes outcomes for 1401 women with pre-gestational type 2 diabetes. It found that the perinatal mortality rate for babies of women with type 2 diabetes, born between 1 March 2002 and 28 February 2003, was as high as that for babies of women with type 1 diabetes (Table 2).

Table 2: Stillbirth, perinatal and neonatal mortality in babies born to women with type 1 and type 2 diabetes in England, Wales and Northern Ireland, 01/03/02-28/02/03

<table>
<thead>
<tr>
<th></th>
<th>Type 1</th>
<th></th>
<th>Type 2</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Rate [95% CI]</td>
<td>Frequency</td>
<td>Rate [95% CI]</td>
</tr>
<tr>
<td>Stillbirth*</td>
<td>44</td>
<td>25.8 [18.3–33.3]</td>
<td>19</td>
<td>29.2 [16.3–42.2]</td>
</tr>
<tr>
<td>Perinatal death*</td>
<td>54</td>
<td>31.7 [23.3–40.0]</td>
<td>21</td>
<td>32.3 [18.7–45.9]</td>
</tr>
<tr>
<td>Neonatal death*</td>
<td>16</td>
<td>9.6 [4.9–14.3]</td>
<td>6</td>
<td>9.5 [1.0–17.1]</td>
</tr>
</tbody>
</table>

- *Rate per 1000 live births + stillbirths.
- **Rate per 1000 live births.
- **Source for national data: CEMACH 2005.

Women with type 2 diabetes compared with women with type 1 diabetes were less likely to have had a glycaemic control test prior to pregnancy (29% compared with 40%), prepregnancy counselling (25% compared with 38%) or uptake of folic acid supplementation (29% compared with 43%). Given the high risks of adverse perinatal outcome, type 2 diabetes should not be viewed as a less serious condition in pregnancy than type 1 diabetes. Health professionals and women with type 2 diabetes need to be aware of this and to be just as vigilant with prepregnancy planning and care as is the case for type 1 diabetes.

Half of the women with type 2 diabetes come from a Black, Asian or Other ethnic minority and just under half (45%) live in a deprived area. Factors relating to the availability and accessibility of health services for people from ethnic minorities or disadvantaged social groups may be contributing to these observed suboptimal outcomes. These issues need to be addressed.

Key finding 3: Prevalence of type 2 diabetes in pregnancy

Pre-gestational type 2 diabetes in pregnancy occurred in one in every 955 births and accounted for 27.6% of diabetes in pregnancy. The reported proportion of type 2 diabetes ranged from 13.3% in Wales to 44.5% in London (Figure 1).

The regions with high prevalence of type 2 in pregnancy did not necessarily coincide with regions where the overall prevalence of diabetes in the general population is high. Health commissioners need to be aware of the variation in prevalence of type 2 diabetes in pregnancy when planning provision of services.

Key finding 4: Poor preparation for pregnancy

Women with diabetes, irrespective of type of diabetes, are poorly prepared for pregnancy. There was documented evidence of:

- 35% receiving preconception counselling
- 37% having a preconception glycaemic control measurement
- 39% taking folic acid supplements before conception.
The low level of documented uptake of folic acid supplements parallels the position for pregnancy in general in the UK rather than being specific to women with diabetes. However, an additional concern for the babies of mothers with diabetes is the increased risk (3.4-fold) of neural tube defect compared with that of babies of mothers in general. Women with diabetes should take the higher dose of folic acid (5 mg) from before conception up to the 12th week of pregnancy, as recommended by the National Service Framework (NSF) for Diabetes.

**Key finding 5: Glycaemic control – poor prepregnancy levels**

Other studies have shown that good glycaemic control reduces the risk of adverse perinatal outcomes. Mothers who had a poor pregnancy outcome (stillbirth, congenital anomaly, neonatal death) had higher HbA\(_1c\) levels before pregnancy and at all stages throughout pregnancy than mothers who had a healthy baby (Figure 2).

HbA\(_1c\) should be used to monitor long-term glycaemic control and the NSF for Diabetes recommends that glycaemic levels of HbA\(_1c\) should be less than 7% at the time of conception. Only 38% of women with an HbA\(_1c\) test by 13 weeks of gestation managed to achieve...
glycaemic levels within the recommended range (less than 7%). Efforts need to be made to ensure that all groups of mothers, regardless of type of diabetes or ethnic group, enter pregnancy with substantially better glycaemic control, while taking hypoglycaemic risk into account.

Key finding 6: High preterm delivery rate and caesarean section rate

The experience of pregnancy and childbirth for a woman with diabetes is very different to that for a woman in general. A woman with diabetes is much more likely to be delivered early, require an induction of labour or to be delivered by caesarean section (Table 3).

<table>
<thead>
<tr>
<th>Table 3: Preterm deliveries, induction and caesarean section in 2002–03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women with diabetes (%)</td>
</tr>
<tr>
<td>Deliveries before 37 weeks</td>
</tr>
<tr>
<td>Induction of labour</td>
</tr>
<tr>
<td>Caesarean section</td>
</tr>
<tr>
<td>Emergency caesarean section</td>
</tr>
<tr>
<td>Note: HES data</td>
</tr>
</tbody>
</table>

Behind these high intervention rates is the tension between continuing the pregnancy in order to achieve a normal delivery versus expediting delivery to avoid an unexpected stillbirth. The decision for optimum timing for delivery should be based on the most accurate evidence of risks to the mother and her baby.

Key finding 7: Large babies and difficult deliveries

The babies of women with diabetes are bigger and are at increased risk of a difficult delivery. For singleton babies of mothers with diabetes, 21% weighed above 4 kg, 6% weighed above 4.5 kg. The corresponding figures for singleton babies of mothers in England and Wales are 11% above 4 kg and 2% above 4.5 kg. There was a higher risk of shoulder dystocia (79/1000 vaginal births) and Erb’s palsy (4.5/1000 births) in these babies compared with that for babies of mothers in general.

Key finding 8: High separation rates from mother at birth, failures to use reliable glucose test in baby and low breastfeeding rates

Ideally, the baby should remain with the mother and should only be admitted to a neonatal unit for a specific medical indication. One-third of term babies (33%) were admitted to a neonatal unit. Two-thirds of these admissions were potentially avoidable. From examination of the reasons given, 26% were described as ‘routine’ and 42% were for minor clinical conditions. Units need to consider transitional care arrangements or ways to improve safe monitoring on the normal postnatal wards for these babies.

Babies should have a test of blood glucose concentration by 4–6 hours of age before a feed. Although most (83%) babies had a glucose measurement within 6 hours, the method used was not always reliable. Despite glucose reagent strips being contraindicated for use in neonates, they were used in 35% of cases.

Breast milk is the food of choice for babies of mothers with diabetes. Fifty-three percent of women with diabetes intended to breastfeed. This compares with an initial breastfeeding rate of 69% in the general population. Local services should support practices and education that encourage women to consider breastfeeding.
Conclusion: What do these findings mean for the future?

Both women with type 1 and those with type 2 diabetes represent high-risk groups during pregnancy. As the incidence of diagnosed diabetes continues to increase, especially at young ages, the number of women with diabetes in pregnancy will also continue to increase. This study finds a nearly four-fold increase in perinatal mortality rate and two-fold increase in congenital anomaly rate in women with diabetes compared with that seen in the general maternity population. Despite evidence since the late 1980s that good glycaemic control around the time of conception and in early pregnancy can reduce these adverse outcomes, there appears to have been minimal improvement. The issues identified in 2002/03 are likely to become more problematic in the next two decades unless concerted action is taken now.

This study is substantially larger than any other in describing pregnancy outcomes for women with pre-gestational type 2 diabetes. It finds that the perinatal mortality rate for the babies of mothers with type 2 diabetes is as high as that for the babies of mothers with type 1 diabetes. It also finds that preparation for pregnancy in this group appears to be particularly poor. Health professionals and women of childbearing age with type 2 diabetes need to be aware of this and be just as vigilant with preconception planning and care as for women with type 1 diabetes.

More work is required to elucidate how women with diabetes regardless of type can be best enabled to improve the outcomes of their pregnancy. This applies in particular to preconception preparation. The best outcomes will be achieved if there is an effective partnership between the woman and the health professionals responsible for her. The challenge for health professionals is how to best empower women with diabetes to fully participate in this partnership.

This study has demonstrated a clear need to develop and implement effective strategies for the education, wellbeing and health care of women with diabetes of childbearing age. Enhanced preconception services and future research on understanding the reasons for these women having adverse pregnancy outcomes are a priority.

Acknowledgements

CEMACH thanks the many clinicians and staff in the 231 hospitals throughout England, Wales and Northern Ireland who provided data for this study. Without their continued support and commitment we would not have been able to produce this report.

A more detailed explanation of the study findings and supporting evidence can be found in the full report, which can be obtained from:

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Tel: 0207 486 1191
Fax: 0207 486 6543
Price £10
Please make cheques payable to CEMACH

The report can also be found on the CEMACH website: www.cemach.org.uk