A new study of 15-year trends in diabetes pregnancy preparation suggests there is room for improvement. Overall, just 40 per cent attended preconception care, 37 per cent took folic acid and 28 per cent had good glycaemic control.

**PREPARING FOR PREGNANCY**

_– a continuing challenge_

Women with Type 1 or Type 2 diabetes are at risk of adverse pregnancy outcomes that include stillbirth, neonatal mortality, major congenital abnormality and macrosomia. There is a strong link between glycaemic control before and during the pregnancy and its outcome, which indicates a need for careful preparation and planning preconception. Research has shown, for instance, that attending preconception care is associated with a reduction in the risk of congenital abnormalities and preterm delivery. However, there is also evidence that uptake of preconception care remains low, despite its proven benefits. A new study, from Ruth Bell of the Institute of Health & Society, Newcastle University, and colleagues, looks at trends in preparation for pregnancy in diabetes, and associated factors, over a 15-year period.

**The Northern Diabetes in Pregnancy Survey**
The North of England is a geographically distinct area that has a population of around three million and 31,000 deliveries a year. Data for this study came from the Northern Diabetes in Pregnancy Survey (NorDIP), which records details of all pregnancies occurring in the region among women diagnosed with diabetes at least six months before the pregnancy (cases of gestational diabetes were not included). All maternity units in the region contribute to NorDIP and supply demographic and clinical variables, including HbA1c data.

The current study included all pregnancies in women with Type 1 or Type 2 diabetes resident in the region who delivered between 1 January 1996 and 31 December 2010. Pregnancies ending in miscarriage, termination, stillbirth and live birth were included. The NorDIP records are linked to the Perinatal Morbidity and Mortality Survey and to the Northern Congenital Abnormality Survey to identify outcomes of pregnancy.

**Study analysis**
Three indicators of preparation for pregnancy were defined: supplementation with folic acid, documented attendance for preconceptual care and adequate glycaemic control (periconception HbA1c < 53mmol/mol [ < 7 per cent]). ‘Good’ pregnancy preparation was defined, for the purposes of this study, as a...
Combination of folate supplementation and adequate glycaemic control.

A number of possibly significant factors were examined: diabetes type, maternal smoking, maternal ethnicity, parity and socio-economic status. The study did not cover information on contraception or pregnancy planning, but did look at duration of diabetes, maternal age (at delivery), maternal body mass index (BMI), gestational age at first antenatal visit and year of delivery.

**Study findings**

There were 2,298 diabetes pregnancies delivered between 1996 and 2010 in the North of England, with a median maternal age of 30. Of these women, just over three-quarters had Type 2 diabetes and the rest had Type 1. The women with Type 2 were more likely to be multiparous, of non-White ethnicity and from deprived areas, while those with Type 1 were younger, had a lower BMI and a longer history of diabetes.

The proportion of women attending preconception care was significantly higher among women with diabetes, increasing to 558 between 2008–2010. The proportion of pregnancies involving women with Type 2 diabetes increased fivefold during this time, from 7.0 per cent to 36.0 per cent. The proportion of those attending preconception care went down from 47.0 per cent to 34.5 per cent for those with Type 1, and from 38.5 per cent to 31.5 per cent for those with Type 2. However, the absolute numbers of those attending did increase for Type 2. There was a significant improvement in those taking folic acid, to 55 per cent and 45.4 per cent for those with Type 1 and Type 2, respectively. However, periconception glucose control did not improve over the study period.

**Trends over time**

In 1996–1998, there were 381 pregnancies among women with diabetes, increasing to 558 between 2008–2010. The proportion of pregnancies involving women with Type 2 diabetes increased fivefold during this time, from 7.0 per cent to 36.0 per cent. The proportion of those attending preconception care went down from 47.0 per cent to 34.5 per cent for those with Type 1, and from 38.5 per cent to 31.5 per cent for those with Type 2. However, the absolute numbers of those attending did increase for Type 2. There was a significant improvement in those taking folic acid, to 55 per cent and 45.4 per cent for those with Type 1 and Type 2, respectively. However, periconception glucose control did not improve over the study period.

**Why preparation matters**

There were 2,264 singleton pregnancies in this study, with 484 adverse outcomes: 254 miscarriages, 48 terminations (31 for a congenital abnormality), 47 antepartum and three intrapartum stillbirths, 14 neonatal deaths, nine post-neonatal deaths and 109 infants who were born with a major congenital abnormality.

The proportion of singleton pregnancies with one of these adverse outcomes was significantly higher for women who had had inadequate preparation for their pregnancy, as measured by any of the study’s three indicators. In women who did not attend for preconception care, adverse outcomes were 23.5 per cent, compared with 18.2 per cent among those who did. The risk of an adverse outcome was also higher at 18.1 per cent among those who did not take folic acid, compared to those who did, at 11.8 per cent.

Meanwhile, for those women whose periconception HbA1c was ≥ 53 mmol/mol (≥ 7 per cent) 19.2 per cent of pregnancies had an adverse outcome, compared with 10.4 per cent for those who had a lower HbA1c. In short, those with a ‘poor’ preparation for their pregnancy had a significantly higher risk of an adverse outcome compared with those whose preparation was ‘good’ (15.5 per cent vs 9.1 per cent).

**Associated factors**

Younger maternal age (< 35 years), living in a more deprived area and maternal smoking were linked with all three indicators of poor preparation for a diabetes pregnancy. Not attending preconception care was associated with Type 2, multiparity, older maternal age and with a longer duration of diabetes. Meanwhile, lack of folic acid consumption was linked to Type 2, multiparity, non-White ethnicity and older maternal age. Finally, the study notes that suboptimal blood glucose control during periconception was associated with Type 1, higher BMI, non-White ethnicity as well as a longer duration of diabetes.
Study context
The sharp increase in both the prevalence of pregnancies complicated by diabetes and the proportion involving women with Type 2 diabetes found in this study reflects findings in the rest of the UK. Here, this is mainly attributable to increasing obesity rates. The study found that women with Type 2 diabetes were less likely to attend preconception care, suggesting that specialist preconception clinics, which are delivered mainly in a hospital setting, are less accessible to this group.

Indeed, uptake of preconception pregnancy care in diabetes is universally low. According to data from the Confidential Enquiry into Maternal and Child Health, only 39 per cent of women with diabetes took folic acid prior to conception, 35 per cent attended for pre-pregnancy counselling and 37 per cent had some documentation of glycaemic control before pregnancy.

In this new study, just one-third had documented pre-pregnancy advice, which is especially disappointing given that this is a decline from 47 per cent in 1996–1998. However, over the study period, the absolute numbers of women receiving pre-pregnancy advice have remained more or less the same, suggesting that capacity has not expanded in response to increasing numbers of pregnancies in women with diabetes.

The new study also found some socio-demographic inequalities in pregnancy preparation. Smokers, younger women and those in deprived areas were less likely to attend for care or take folic acid and they also had higher levels of HbA1c during periconception.

Reasons for missing out
Research has reported that women with diabetes may not realise the importance of preconception care for their pregnancy outcome. However, one study found that the majority of women do know the risks but still do not attend, even if they have had previous experience of adverse pregnancy outcomes. It is possible that negative messages from healthcare professionals about the risks of pregnancy may discourage women from attending, but having a good relationship with a healthcare professional, who is aware of and sensitive to a woman’s personal circumstances and goals, can make all the difference.

Since more than half of women with diabetes have a pregnancy that is unplanned, information and advice about pregnancy needs to be integrated into a woman’s routine diabetes care. This will allow a woman to have the knowledge and understanding she needs about preparation well before embarking on the pregnancy.

Outcomes
This study shows that those women who do attend preconception care are more likely to experience a good pregnancy outcome. However, there is still a lack of evidence from randomised trials and a causal link, and extrapolation of benefit from preconception care, should only be made with caution. There is clearly room for improvement when it comes to helping women with diabetes prepare for pregnancy and minimising the risks associated with outcomes.

Looking ahead
Pregnancy complicated by diabetes is on the increase, not least because of an increase in the proportion of women with Type 2 and with co-morbidities, such as obesity. The challenge for healthcare professionals is to ensure that women are adequately prepared, so that they have the best possible chance of a good outcome to their pregnancy.

To meet these challenges, new service models for preconception care in diabetes may be needed. These should be integrated into routine care in the primary or community setting, rather than being located in hospital. It may be that Incorporating preparation for pregnancy for women with diabetes within chronic
Disease management frameworks, such as the Quality Outcome Framework in England, may also be helpful.

In an accompanying editorial, Diabetic Medicine Editor-in-Chief Professor Graham Hitman notes that National Institute for Health and Care Excellence (NICE) guideline 63 (www.nice.org.uk/guidance/cg63) states that:

1 Women with diabetes who are planning to become pregnant should be informed that good glycaemic control before conception and throughout pregnancy will reduce the risk of miscarriage, congenital malformation, stillbirth and neonatal death. It is important to explain that risks associated with pregnancy complicated by diabetes can be reduced but not eliminated.

2 The importance of avoiding unplanned pregnancy should be an essential component of diabetes education from adolescence for women with diabetes.

3 Women with diabetes who are planning to become pregnant should be offered preconception care and advice before discontinuing contraception.

Against this background, the findings of the NorDIP-based study are deeply concerning. How can the situation be improved? Barriers to accessing pregnancy preparation services need to be identified and removed. In particular, these services should be adapted to match the needs of the local community more closely, Prof Hitman concludes.
