

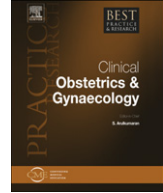


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Best Practice & Research Clinical Obstetrics and Gynaecology

journal homepage: www.elsevier.com/locate/bpobgyn



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Preconception care for women with diabetes: is it effective and who should provide it?

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Keywords:

preconception care
prepregnancy care
congenital malformations
type 1 diabetes
type 2 diabetes
perinatal morbidity

The association between hyperglycaemia and congenital malformations was first recognised over 40 years ago and was followed by the development of preconception clinics for women with diabetes. A fresh look at preconception care is needed as many studies were conducted during the late 1970s and early 1980s, before the introduction of regular home blood glucose monitoring and glycosylated haemoglobin assays, and when many patients with diabetes had microvascular complications. Recent observational studies and a meta-analysis suggest preconception care is effective with an approximately threefold reduction in the risk of malformations. There is now a worldwide epidemic of type 2 diabetes, but only few studies of preconception care have included women with type 2 diabetes. Furthermore, few studies have addressed the relationship between preconception care and perinatal morbidity. This article will review the evidence for preconception care in women with diabetes, evaluate different models of preconception care and discuss future strategies.

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Over the last 35 years, it has been recommended that all women with diabetes should plan their pregnancies and access preconception care (PCC) before embarking on a pregnancy. However, pregnancy outcomes remain very poor for women with type 1 and type 2 diabetes with a two- to threefold increase in risk of malformations and a fourfold increase in perinatal death compared with women without diabetes.^{1,2} Most studies report that only a third of women receive PCC.^{2,4,5} Worldwide, type 2 diabetes is now the most common type of diabetes to complicate pregnancy and women with type 2 diabetes are more likely to enter pregnancy with obesity and taking potentially teratogenic medications.^{3–5}

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National guidelines are consistent in recommending PCC (prepregnancy care) as the cornerstone for optimising pregnancy outcome in women with diabetes. However, many studies of PCC were performed in the 1970s and 1980s, before the advent of regular home blood glucose monitoring or measurement of glycosylated haemoglobin (HbA1c). At this time, patients with diabetes frequently had significant microvascular complications. The studies usually include few women with type 2 diabetes. Furthermore, these studies usually only addressed the relationship between PCC and risk of malformations with few studies examining the relationship between PCC and perinatal morbidity. It is therefore timely to review the evidence behind the recommendations for PCC.

Development of PCC

Relationship between hyperglycaemia and poor pregnancy outcome

Molsted-Pedersen first described the high incidence of congenital malformations in women in 1964 with 6.4% of infants of their diabetic mothers showing a malformation compared with 2.1% of women without diabetes.⁶ More recent studies, in women with type 1 and type 2 diabetes, have confirmed that there is a two-to threefold increase in risk of malformations in women with diabetes compared with women without diabetes.^{1,2} Hyperglycaemia has been proposed as a possible mechanism with both animal and human studies supporting this hypothesis.^{7–10}

More recent studies have confirmed the relationship between hyperglycaemia and poor pregnancy outcome. A study from the United Kingdom of 158 pregnancies in women with type 1 diabetes showed a significant increase in both congenital malformations and spontaneous abortion in women with a booking HbA1c above 7.5% compared with women with a booking HbA1c below 7.5%.¹¹ Pregnancies in women with an HbA1c at booking visit above 7.5% had a fourfold increase in spontaneous abortion rate (relative risk 4.0, 1.2–13.1) and a ninefold increase in the congenital malformation rate (relative risk 9.2, 1.1–79.9). A recent meta-analysis by Inkster and colleagues of seven observational studies in type 1 diabetes and six studies in type 1 and type 2 diabetes confirmed the relationship between poor pregnancy outcome and glycaemic control. They reported approximately threefold increases in spontaneous abortions, malformations and perinatal deaths in pregnancies with poorer glycaemic control.¹² Results of this meta-analysis showed a 0.4–0.6 relative risk reduction of congenital malformation for each 1% fall in HbA1c.

A second meta-analysis of studies of HbA1c and congenital malformation also showed a stepwise fall in the risk of malformation with lowered HbA1c with a 3% risk of malformation for an HbA1c of 6%, a 6% risk for an HbA1c of 9% and a 12% risk for an HbA1c of 12%.¹³

Development of PCC

The concept of PCC for women with diabetes was developed after Pedersen observed the relationship between glucose control and malformations and described how “the occurrence of hypoglycaemic reactions and insulin coma during the first trimester was low in mothers with malformed infants, indicating a poor compensation of the diabetes at that time.”¹⁴ It was recognised that malformations occurred in the first few weeks of pregnancy, and that improvement in glucose control was needed before conception to impact on the risk of malformation. This led to the development of preconception clinics and regional diabetes and pregnancy programmes being established. A personal view of the development of PCC in Scotland in the late 1970s has been well described by Judith Steel.¹⁵

Aims of preconception clinics – then and now

Diabetes and antenatal care in the late 1970s

It is important to look back at routine diabetes and antenatal care in the 1970s to fully understand both the aims of PCC in the earlier studies, why the development of this care was so important at that time and to interpret results of the studies.

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