Foeto-maternal outcome of diabetes in a tertiary health facility in Nigeria

C O John, J O Alegbeleye, and A O Otoide

Abstract

Diabetes complicating pregnancy is associated with adverse maternal, foetal and neonatal outcomes. We have determined the prevalence of both pre-gestational (PGDM) and gestational diabetes mellitus (GDM), and their associated maternal and perinatal morbidities and mortalities at the University of Port-Harcourt Teaching Hospital, Nigeria. A retrospective study was carried out of all cases of diabetes in pregnancy between 2008 and 2012. The case notes of the next two non-diabetic patients, whose gestational ages and parities matched, were examined as case controls. There were 122 cases of diabetes from a total of 14, 521 deliveries (8.4 per 1000 deliveries), 21 cases of PGDM, and 101 cases of GDM (1.45 per 1000 deliveries and 6.96 per 1000 deliveries respectively). There were 60 cases of foetal macrosomia (49%). The mean birth weight was 3.75±0.76 kg. There were 11 perinatal deaths (perinatal mortality rate 90 per 1000 deliveries). The caesarean delivery rate was 89%. Sixty (60) babies (49%) required neonatal intensive care admission. There were no maternal deaths or congenitally malformed babies. We conclude that diabetes in pregnancy is associated with adverse maternal and neonatal outcomes. Patients at risk should be encouraged to attend preconception clinics and register early in well-equipped hospitals for antenatal care. Universal screening of all pregnant women at booking and patients with clinical risks characteristics at 24 and 28 weeks of gestation may be effective for the early identification and management of GDM.

Introduction

Diabetes mellitus is the commonest endocrine disorder in pregnancy and complicates up to 10% of pregnancies overall, and up to 40% of pregnancies in communities with racial predilection for the disease.[1] The incidence has increased in recent years, probably due to increasing obesity and advanced maternal age.[1,2] Pre-gestational diabetes (PGDM) is the term used to refer to type 1 and type 2 diabetes occurring before pregnancy. Gestational diabetes (GDM) is diabetes that presents for the first time in pregnancy.[1–3] Diabetes in pregnancy may be associated with an increased risk of recurrent miscarriage, early onset of hypertensive disease in pregnancy, congenital anomalies, intra-uterine death, macrosomia, foetal growth restriction, difficult delivery, and increased operative delivery and birth injury.[1–4]

In the neonatal period, infants of mothers with diabetes are prone to birth asphyxia, hypoglycaemia, and respiratory distress syndrome. More than half of these mothers with GDM develop type 2 diabetes later in life.[1–5] The maternal and perinatal risk of adverse outcomes for both pre-gestational and gestational diabetes are similar from the second trimester of pregnancy. However, as a result of hyperglycaemia in the pre-conception and early conception periods, infants of mothers with PGDM experience double the risk of birth injury, triple the likelihood of caesarean delivery, and quadruple the incidence of newborn intensive care admissions.[3–5] In addition, relatively few women with PGDM receive preconception care, especially in developing countries, and foetal malformations as a result of poor glucose control before and during the early weeks of conception may be a major cause of perinatal mortality.[5–8]

Studies have shown that early identification and appropriate management of diabetes complicating pregnancy are associated with a decrease in morbidity and mortality in infants.[6–8] In view of this, the management of PGDM should begin in the preconception period as proper glycaemic control is essential for better outcomes. Opinions are divided over the use of appropriate screening for GDM, or screening of only patients with high clinical risk characteristics.[8–11]

The objective of this study was to determine the incidence of both PGDM and GDM, and their possible associated maternal and perinatal morbidity and mortality, at the University of Port-Harcourt Teaching Hospital, a tertiary institution in South Nigeria.

Patients and methods

A retrospective study was carried out on all cases of diabetes complicating pregnancies managed at the University of Port-Harcourt Teaching Hospital from 1 January 2008 to 31 December 2012. Patients were identified from delivery registers. The case notes of the next two non-diabetic patients, whose gestational ages and

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parities matched those of the patients with diabetes, were also retrieved to serve as case controls. A total of 122 patients with diabetes in pregnancy and 244 non-diabetic patients were studied. Data retrieved included maternal age, parity, gestational age at booking, high clinical risk characteristics, diagnosis or confirmation of PGDM or GDM, treatment received for diabetes in pregnancy, gestational age at delivery, mode of delivery, indications for delivery, and delivery outcome.

The criteria for screening in our department were a booking weight over 90 kg (or evident obesity), a family history of diabetes, previous GDM, glycosuria, previous macrosomia, congenital abnormalities or intrauterine foetal deaths, recurrent miscarriages, or unexplained stillbirths. Patients with such risk factors are screened at booking and a repeat test is done at 28 weeks. The screening test employed was the 2-hour 75 g oral glucose tolerance test.[11] A plasma glucose value ≥7.0 mmol/l for fasting or a plasma glucose value ≥7.8 mmol/l at 2 hours is diagnostic. Patients with PGDM are assessed with fasting plasma glucose, 2-hour post-prandial glucose, and glycated haemoglobin (HbA1c) tests. The management of such patients involves a multi-disciplinary approach by physicians, dieticians, obstetricians, and neonatologists. The choice of planned delivery versus spontaneous labour depends on the degree of glycaemic control achieved, with other obstetric indications associated on an individual basis.

This data were entered and analysed using SPSS version 17.0. The results obtained were expressed as percentages for frequencies, means and standard deviations (SD) for continuous variables, and presented in bar charts, pie charts, line pictograms or frequency tables as appropriate.

Results

There were a total of 122 cases of diabetes identified amongst booked patients from a total of 14521 booked deliveries within the study period, giving a prevalence of 0.8%. There were 21 cases of pre-gestational diabetes and 101 of gestational diabetes, giving an incidence of 1.45 per 1000 deliveries and 6.96 per 1000 respectively.

The numbers of cases of diabetes progressively increased over the 5-year study period as shown in Figure 1. This increase was accounted for mainly by GDM. The mean age of the patients was 32±4 (SD) years and ranged between 23 and 42 years. Their parity ranged from 0 to 7. Twenty (20) were nulliparous (16%), 92 were multiparous (75%) and 10 grandmultiparous (9%). None of the patients had any form of preconception care. Patients with PGDM presented earlier, and accounted for 34% of first trimester registrations. Twenty per cent (20%) of GDM cases were diagnosed before 24 weeks, and the rest afterwards.

Glycosuria was seen in 66% of cases, family history of diabetes in 40%, previous foetal macrosomia in 33%, booking weight greater than 90 kg in 28%, and bad poor obstetric history (defined as previous intrauterine foetal death, unexplained stillbirths, early neonatal deaths, recurrent miscarriages, or infertility) in 20% of cases. A previous history of GDM was identified in only 6% of cases. Dietary management alone was instituted for 41% of patients while dietary management with insulin therapy was instituted for 59%.

There were sixty (60) cases of foetal macrosomia (49%). The mean birth weight was 3.75kg±0.76 kg, and there were 11 perinatal deaths, giving a perinatal mortality rate of 90 per 1000 deliveries. This is shown in Figure 2, which compares rates with infants of non-diabetic mothers between 2008 and 2012. The overall caesarean delivery rate was 89%, shown in Figure 3, which gives rates from 2008 to 2012, and compares rates with non-diabetic mothers. Problems in the puerperium were identified in 21% of patients. Sixty (60) babies (49%) required neonatal intensive care admissions. There were no maternal deaths or congenitally malformed babies amongst among the patients studied.

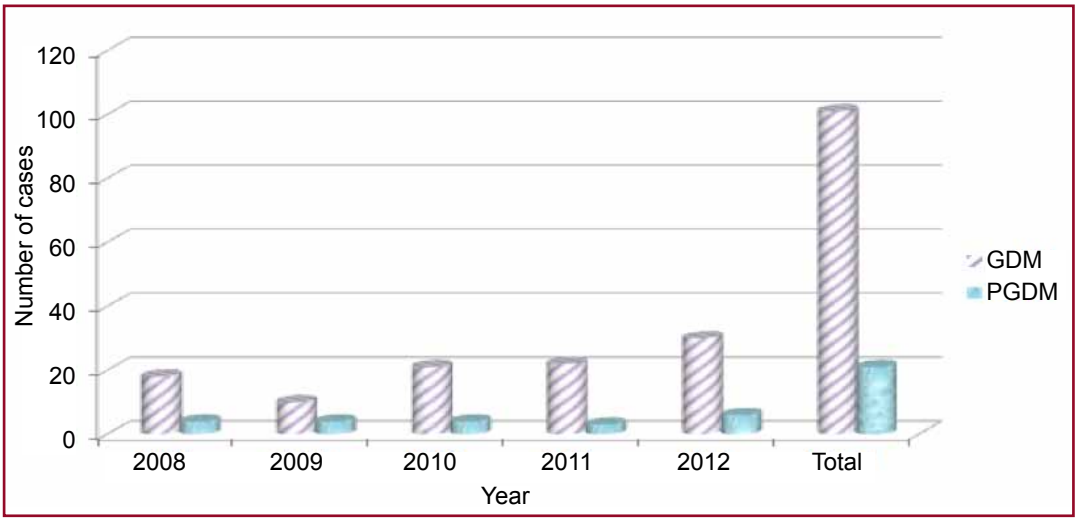

Figure 1. Pregestational (PGDM) and gestational (GDM) diabetes numbers from 2008 to 2012

Discussion

The prevalence of diabetes in pregnancy in this study is relatively high compared with other reports from Nigeria.[2,7,8] A previous study from Port Harcourt, Nigeria in 2001 reported a GDM rate of 3 per 1000 pregnancies.[2] This is significantly lower than the incidence of 7 per 1000 deliveries reported in this study. The difference may be accounted for by increasing levels of obesity due to changes in dietary practices and physical activity. A study in Enugu, Nigeria reported a prevalence of diabetes in

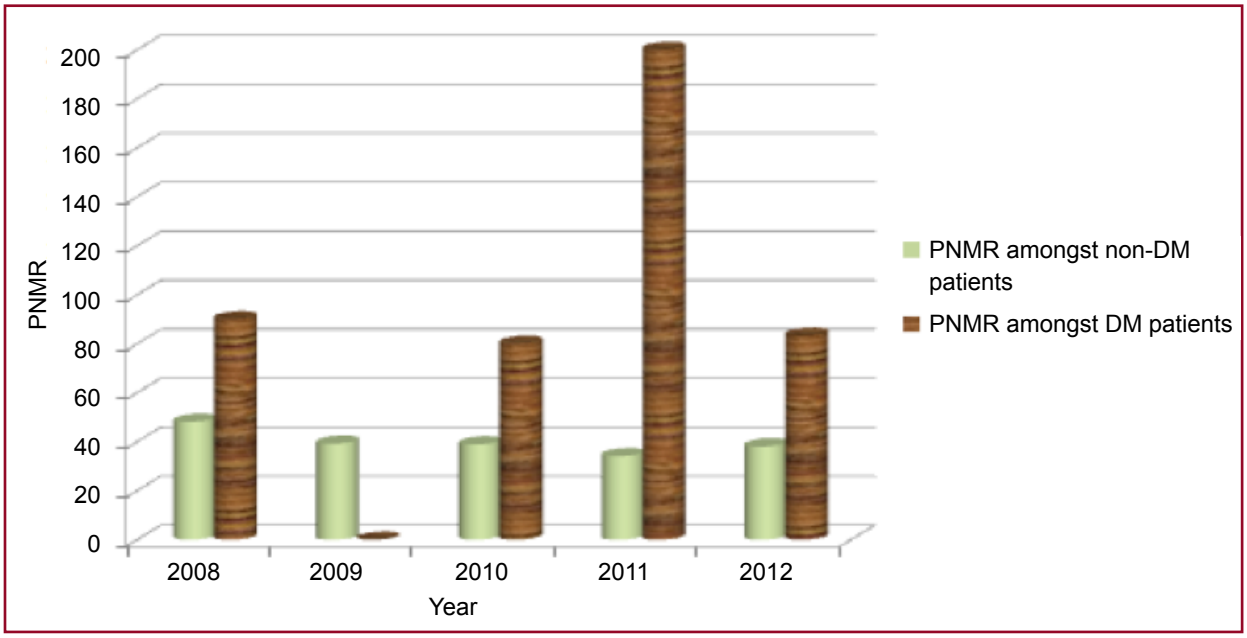

Figure 2. Perinatal mortality rate (PNMR) among infants of diabetic mothers, compared with non-diabetic mothers (2008–2012)

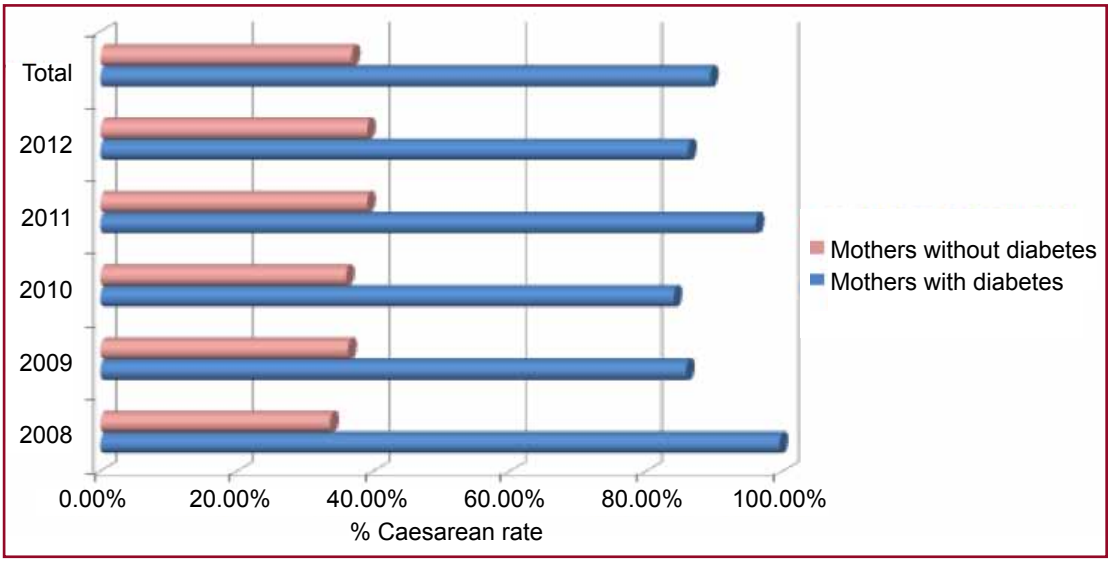

Figure 3. Caesarean section rates (2008–2012) among mothers with and without diabetes

pregnancy of 1.7%[8] which is similar to the prevalence reported in this study but significantly lower than the prevalence of 4.8% for gestational diabetes reported in Abakaliki, 6.8% reported from a multicenter study in Port Harcourt, and 8.3% reported from Jos, Nigeria.[12–14]

The majority of our patients were between the ages of 21 and 34 years and most were primiparous (31%). These findings are in keeping with previous studies from Port Harcourt and Lagos, Nigeria.[2,7,14] However, a study from Qatar found that the prevalence of GDM increased significantly with advancing maternal age and increased parity.[5] In our environment, most pregnant women present late in their pregnancies for antenatal care, especially those who have had a previous delivery.[1,2] This means that screening for GDM often occurs later than is ideal.

The uptake of preconception care in our study was low. Though patients with PGDM presented earlier than those with GDM, they should ideally have had planned pregnancies. Most studies from the developing world have identified foetal macrosomia as a risk factor for diabetes in pregnancy. Glycosuria was, however, the most indicative in our patients. Studies in African populations using universal screening policies suggest that a proportion of patients with diabetes in pregnancy may have no recognised risk factors.[9-12,15-17] This group of patients would be missed by present screening criteria, and universal screening is advocated.

The incidence of foetal macrosomia was 49%, the perinatal mortality rate was 90 per 1000 deliveries, the caesarean section rate was 89%, and neonatal intensive care admission rate was 49%. These are much higher rates than those reported by Ugboma et al in a similar study in the same region.[7] The adverse outcomes in spite of treatments received or type of diabetes in pregnancy, suggest that current treatment modalities may be inadequate and more sensitive methods of foetal surveillance and glycaemic assessment in patients diagnosed with

diabetes in pregnancy are required. Late booking, late diagnosis and the resultant poor diabetic control for most of the pregnancies may also be implicated. This may also account for the high incidence of operative deliveries and neonatal intensive care admissions.

This study has shown that diabetes complicating pregnancy in still associated with a high risk of adverse outcomes. Universal screening of all pregnant women at booking, and patients with clinical risks characteristics at 24 and 28 weeks of gestation, may be more effective for the early identification and management of the disease in pregnancy. Community education targeted at women of reproductive age may help to encourage uptake of reproductive services (such as pregnancy planning or family planning clinics) for high-risk patients and early registration for antenatal care, and will teach women to recognise the signs and symptoms of diabetes in pregnancy.

Author Declaration

Competing interests: none.

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