Obstetric Performance of Pregnant Diabetics in a Nigerian Tertiary Hospital

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ABSTRACT

Background: Diabetes mellitus is one of the common medical complications of pregnancy and it seems to be on the increase. The study was undertaken to assess the obstetric performance of pregnant diabetic patients in a Nigerian tertiary hospital, with a view to identifying relevant interventions that will lead to better outcome.

Methodology: A retrospective review of the service delivery records of all cases of pregnant diabetics seen over a 5-year period in the maternity unit of the University of Benin Teaching Hospital, Benin City, Nigeria.

Result: Thirty four cases of diabetics were managed within the period and the incidence was 0.7% of the total deliveries. The cases were predominantly (75%) gestational diabetes mellitus and 80% (27) of the patients were booked. They were mainly (85.3%) multiparous and about two-thirds of the parturients had combined dietary and insulin regime for treatment during the antenatal period. The leading morbidities were candidiasis (63.6%), malaria (47.0%), urinary tract infection (41.2%), placenta previa (26.5%), preterm delivery (20.6%) and pre-eclampsia (18.2%). The caesarean section rate was high (53.0%). The maternal mortality rate was 5882/100,000 and the perinatal mortality rate was 147.1/1000 with a high perinatal morbidity rate.

Conclusion: A low incidence of diabetes is recorded, with high maternal infectious morbidity rates and a high caesarean section rate. The perinatal mortality were high and perinatal morbidity rate. Public health education, prompt booking and utilization of hospital facilities for antenatal care and supervised delivery by pregnant diabetics are recommended.

Keywords: Obstetric performance, pregnant diabetics, Nigerian Tertiary Hospital

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INTRODUCTION

Diabetes mellitus is one of the common medical complications of pregnancy.[1,2] Pregestational and gestational entities are encountered in pregnancy, with gestational diabetics accounting for 90% of all diabetes occurring in pregnancy.[3] However, both entities seem to be on the increase.[1-4]

Reports prior to the seminal discovery of insulin in 1921 by "Banting and Best"[1,2] indicates that the outlook for diabetics was

poor, with a good number succumbing to the acute or chronic complications. While a significant number of survivors present with infertility due to poor control. As such they were then uncommonly encountered in obstetric practice.

However, it is now well documented that cases of diabetes are more commonly seen in contemporary obstetric practice.[1,2] As with improvement in Medicare and better control, fertility profile is improved, and a good number survive to be able to take up reproductive responsibility as high risk cases.

Available data[5,6] indicate that if periconceptional and pregnancy blood glucose concentrations are maintained as near normal as possible, and available techniques for the assessment of fetal growth and wellbeing are used appropriately, then a pregnancy outcome approaching that of the non-diabetic mother can be achieved. This underscores the need for a team care approach for diabetes in pregnancy. On the other hand, the outcome is poor and often catastrophic for mother and fetus if there is no control or control is inadequate.[5,6]

Regrettably, the usage of our inadequate maternity services for antenatal care (ANC) is very low. It is worse with the utilization of labour and delivery components of the maternity services. This largely accounts for the sad state of our maternal and perinatal morbidity and mortality figures even with low risk pregnancies.

The aim of this study therefore was to retrospectively analyze the obstetric performance of diabetic patients seen at the University of Benin Teaching Hospital over a period of 5 years (from January 1st 2000 to December 31st 2004). The outcome of this study has the potential of engendering recommendations that will contribute to the millennium development goals of reducing maternal and perinatal mortality.

METHODS AND MATERIALS

This was a retrospective review of all cases of pregnant diabetic patients seen and managed from January 1, 2000 - December 31, 2004 at the maternity unit of the University of Benin Teaching Hospital. UBTH is located in Benin City, one of the states of the Niger-Delta region of Nigeria. It provides tertiary services to Benin City and its environs.

All patients who presented with diabetes in pregnancy within the study period had their ANC records, labor ward records, theater records, obstetric data sheets and the obstetric electronic data base of the department retrieved and evaluated. Using a study data sheet designed for this purpose, the following information were obtained – sociodemographic characteristics (age, parity, educational level, occupation), type of diabetes mellitus, booking status, maternal morbidities in pregnancy, the need for admission, management modalities in pregnancy, labour and delivery (type of labour – spontaneous, induced or elective CS, mode of delivery – SVD, vacuum, forceps or EMCS), fetal outcome (abortions, IUFD, Macrosomia with dystocia , APGAR score) and Neonatal outcome. Babies weighing less 2.5kg are low birth weight and babies of 4kg and above are macrosomic. All booked patients were jointly managed by the Obstetricians and Physicians.

The information obtained and recorded on the data collection sheet designed for the study was then coded. The coded data were fed into the computer using the SPSS PC+ statistical software and analysis conducted with same. This consisted of univariate analysis and comparisons of identified relationships.

RESULTS

Within the study period 4,868 deliveries were taken at the UBTH, and of these, 34 were diabetic parturients giving an in incidence of 0.7% of the total deliveries. Twenty three (75%) of the diabetic parturients had gestational diabetes while 11 (25%) had pre-existing diabetes. Twenty seven (80%) were booked and the other 7 (20%) came in unbooked. The average gestational age at booking ± SD was 25.8 ± 8.13 weeks. The mean gestational age at delivery ± SD was 37.51 ± 1.15 weeks. Overall, 26 (87.5%) patients had obstetric ultrasound scan done and the mean blood sugar at booking was 143.8mg%, at 32 weeks gestation it was 118mg% and at term 127mg%.

The sociodemographic variables of the patients are presented in table 1. The mean age ± SD of the patients in this review was 33.88 ± 4.64 years with the modal age range being 33-39 years. The mean parity ± SD was 2.29 ± 1.46 with majority (85.3%) being multiparous (para 1-4). The mode of delivery is presented in table 2. Over half (53%) were delivered by caesarean section (CS) while the others (47%) had spontaneous vaginal delivery (SVD).

The mode of antenatal treatment the patients had is analyzed in table 3. Majority (63.6%) had

Table 1: Sociodemographic variables

Variable	Number	%
Age range		
(Years)		
<20	-	-
20 –29	4	11.8%
30-39	26	76.4%
≥ 40	4	11.8%
Mean ± SD	*33.88 ± 4.64*	
Total	**34**	**100**
Parity		
Nullipara (0)	2	5.9
Multipara (1-4)	29	85.3
Grand multiparous (≥5)	3	8.8
Mean + SD	*2.29 ± 1.46*	
Total	**34**	**100**
Education status		
None	-	-
Primary	2	5.9
Secondary	5	14.7
Tertiary	27	79.4
Total	**34**	**100**

Table 2: Mode of Delivery

Mode	Number	%
Elective CS	9	26.5
Emergency CS	9	26.5
Vacuum	-	-
Forceps	-	-
Assisted breech delivery	-	-
Spontaneous vaginal delivery	16	47.0
Total	**34**	**100**

combined dietary management and insulin therapy, 6 (18.2%) had dietary management alone, 3 (9.1%) had insulin therapy alone and another 3 (9.1%) had dietary and oral hypoglycemic therapy. In table 4, the antenatal and postnatal complications are presented. 4 (11.8%) of the unbooked patients came in as emergency with diabetic ketoacidosis, the leading infectious morbidity in the antenatal period were Candidiasis (63.6%), malaria (47.0%), urinary tract infection (42.2%) and pneumonia (18.2%). 6 (18.2%) patients had pre-eclampsia, 9 (26.5%) patients had placenta previa and 7 had preterm delivery. 5 (14.7%) patients who had emergency CS came down with wound sepsis and 2 (5.9%) of the unbooked patients who came in with ketoacidosis at term suffered mortality in the immediate post-partum period giving a maternal mortality rate of 5882 per 100,000. Postnatally 11 (32.3%) patients had Candidiasis, 6 (18.2%) patients had pre-eclampsia and 5 (14.7%) patients had post-caesarean wound sepsis.

*Table 3:*Mode of antenatal management

Mode	Number	%
(a) Diet only	6	18.2
(b) Insulin only	3	9.1
(c) Oral hypoglycemic only	-	-
(d) a & b	22	63.6
(e) a & c	3	9.1
Total	**34**	**100**

The fetal and neonatal outcome is presented in table 5. There were 29 (85.5%) live births and 5 (14.7%) stillbirths giving a perinatal mortality rate of 147.1/1000 live births. The average birth weight + SD was 3.33kg + 1.04 kg with 20.6% being low birth weight babies and 32.3% being macrosomic babies. One (2.9%) of the babies delivered to an unbooked patient had caudal regression syndrome which is a typical congenital anomaly associated with diabetes mellitus. The admission rate to SCBU was 44.1% and the leading neonatal morbidity were Macrosomia (32.4%), Prematurity (20.6%), jaundice (5.9%) and respiratory distress syndrome (RDS) in 1 (2.9%) baby.

Table 4: Antenatal and postnatal complications

Complications	Antenatal No.	%	Postnata l No	%
1. **Ketoacidosis**	4	11.8	-	-
2. **Infection:**				
Malaria	16	47.0	-	-
Pneumonia	6	18.2	-	-
Urinary tract	14	41.2	-	-
Candidiasis	22	63.6	11	32.3
3. **Polyhydramnios**	-	-	-	-
4. **Raised blood pressure:**				
Pre -eclampsia	6	18.2	6	18.2
5. **Placenta previa**	9	26.5	-	-
6. **Preterm delivery**	7	20.6	-	-
7. **Others :**				
Retinopathy	-	-	-	-
Nephropathy	-	-	-	-
Wound sepsis	-	-	5	14.7
Maternal death	-	-	2	5.9

Table 5:Fetal and Neonatal outcome

Variable	Number	%
Viability @ birth		
Live birth	29	85.3
FSB	1	2.9
MSB	4	11.8
Birth weight (kg)		
<2.5	7	20.6
2.5 –2.99	2	5.9
3.0 –3.99	14	41.2
≥4	11	32.3
Mean + SD	*3.33 + 1.04*	
Congenital Anomaly		
Yes	1	2.9
No	33	97.1
Admission to SCBU		
Yes	15	44.1
No	19	55.9
Neonatal morbidity		
Jaundice	2	5.9
RDS	1	2.9
Macrosomia	11	32.4
Prematurity	7	20.6
Nil	12	38.2

DISCUSSION

This study was conceptualized to evaluate the obstetric performance of pregnant diabetic patients with a view to using the findings to design useful interventions that will help reduce the burden of diabetes in pregnancy in Nigeria. The recorded incidence of diabetes in pregnancy in this study was 0.7% of total deliveries, this compares favorably with the figure from Ibadan in south western Nigeria reported by Otolorin *et al* over two decades ago and lower than the figures reported from South Eastern Nigeria by Ozumba et al less than a decade ago. This figure is also much lower than values from Caucasian studies.[3,4] The is not surprising as the frequency of diabetic patients presenting to obstetric units in Nigeria remains low possibly because a good proportion of our diabetic population still succumb to the acute or chronic complications of diabetes due to poor access to health facilities coupled with ravaging effect of poverty that prevents the diabetic patients from sustaining the long term treatment needed to keep them in good health just akin to what the situation was before the seminal discovery of insulin by "Banting and Best".[1,2] Over two thirds of patients in this study had tertiary level of education and this probably explains the relative excellent state of health, prompt use of health facilities and good obstetric outcomes in this series. As with good level of education the patients are better informed of the health implications of not taking appropriate treatment and care.[7] Additionally, they are also better endowed economically to be able to afford the cost of treatment and hence better compliance.

Over half (53%) of the patients in this review were delivered by caesarean section. This is consistent with existing data[8-10] that shows that both pre-existing and gestational diabetes increase the risk for caesarean delivery. However, unlike the report by Remserg et al8 in which they demonstrated that the risk of caesarean delivery is independent of the birth weight, our findings show that 61.1% of the cases of caesarean delivery were on account of Macrosomia. Other contributing factors in this series were placenta previa, severe pre-eclampsia and prematurity. Some of the patients had more than one indication for the caesarean delivery. Remserg *et al* also noted other intermediating factors in diabetics such as practice pattern and physician referrals to high risk care as contributing to caesarean delivery.

Majority of the patients (63.6%) in this study had dietary management combined with insulin and this compares favorably with reports of previous study[11]. Evidence are abound[1,2,] that while some oral antidiabetic medications have been studied and found to be safe in pregnancy, insulin is still the best and safest method for controlling blood sugar throughout pregnancy. However, some emerging reports[11-13] are indicating that the use of oral antidiabetic medications (glyburide and metformin) in the management of diabetes in pregnancy have shown the equivalence to insulin in terms of pregnancy outcomes. Both agents are shown to cross the placenta to the fetus often resulting in unacceptable hypoglycemia in the new born, and thus they should be used with caution and patients counseled appropriately. The use of oral hypoglycemic agents in this series remains largely rudimentary as only few patients had these oral antidiabetic agents prescribed.

It has been documented that the increased glucose content of the vaginal epithelium and the presence of glycosuria make infection with Monilia commonplace in pregnant diabetics[2] and this has been clearly demonstrated in this series with about two thirds of the patients having Candidiasis antenatally. This dropped postnatally to about a third of the study population indicating a reduction in the glucose

content as the gluconeogenic effect of pregnancy had been cut off. Additionally, it is in evidence[2] that urinary tract infection is more common in pregnant diabetes than non-diabetics and therefore it is recommended that asymptomatic bacteriuria be sought at specific intervals in pregnancy and any sign of infection be treated vigorously. This becomes very instructive in view of the finding of this study where inspite of the fact that eighty percent of the patients reviewed were booked, over forty percent of them still had clinical urinary tract infection. Interestingly the post-caesarean wound infection rate in this study is consistent with that described previously for normal population[14,15] and we hypothesize that this is due to adequate prophylactic antibiotic use. Indeed, Beattie *et al*[16] in their prospective study of the Risk Factors for Wound Infection Following Caesarean Section, demonstrated that antibiotic prophylaxis was the most significant protective factor in the reduction of postoperative wound infection even in overweight patients.

Pregnant women with gestational diabetes have been shown in population studies to have increased risk of pregnancy-associated hypertension compared with nondiabetic women[17]. About a quarter of patients in this series had pre-eclampsia and it has been hypothesized that this association could be due, at least in part, to insulin resistance. Although insulin resistance is a physiologic phenomenon in normal pregnancy, in predisposed individuals this could lead to hyperinsulinemia with the development of gestational hypertension, gestational diabetes mellitus or both.

The fetal outcome in this series is in keeping with the findings of previous studies. [10,18-21] The perinatal mortality rate compares favorably with above earlier Nigerian reports but higher than values from Caucasian studies[10,18-21]. About a third of babies in the study were macrosomic which underscores the need for tight blood sugar control, as the blood sugar control in most instances in these patients was less than optimal. This call for prompt implementation of a team care approach which is the gold standard for the management of diabetes mellitus in pregnancy.[22] The only case of congenital malformation was that of caudal regression syndrome which is pathognomic of diabetes mellitus and this was in an unbooked patient with extreme poor control of the blood sugar at presentation. Admission rate to SCBU and the morbidity rate were quite high which is consistent with the findings of earlier authors[4,9,12,19,20].

In summary, the incidence of diabetes in pregnancy was low, the caesarean section rate was high and the use of insulin in conjunction with dietary regime was the major option of treatment of the pregnant diabetics in this study. The infectious morbidity rate was high and a significant proportion of the parturient had pre-eclampsia. The perinatal mortality and perinatal morbidity rates were high. We recommend that there is the need for public health education as to the need for prompt booking and utilization of hospital facilities for antenatal care and supervised delivery by pregnant diabetics, as this is the only way they can benefit from the team care approach of management which is the gold standard.

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