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Fetomaternal outcomes among pregnant women with diabetes mellitus in Aminu Kano Teaching Hospital: A five-year review

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Abstract

Background: Diabetes mellitus is one of the oldest diseases known and is among the largest global health emergencies of 21st century. It is associated with adverse obstetric outcome.
Method: The study was a retrospective review of patients with diabetes mellitus in pregnancy at the obstetrics and gynecology department of AKTH from January 2016 to December 2020. Case folders were retrieved and information on bio-data, obstetric history, treatment received, maternal and fetal complications were collected on a proforma. Data was analyzed using SPSS version 23, presented on tables and charts, and summarized using standard deviation as well as rate and proportions. Chi – square test was used to test for significance.
Result: The prevalence of diabetes in pregnancy was 1.26%; 78.4% were GDM and 21.6% were pre-gestational diabetes. The mean age was 32.6±4.6 years, with 36.4% were in age group 30-34years. About 95% were multiparous while only 4.5% were primiparous. About a quarter (15.9%) had normal BMI, 34.1% overweight and 31.8% obesity. Fetal macrosomia accounted for 10.2%, respiratory distress syndrome 4.5%, neonatal jaundice 3.4%, hypoglycemia 6.8% and congenital anomaly 2.3%. Pregnancy induced hypertension was noted in 12.5%, 5.7% had preterm labor, and 12.5% had miscarriage. Polyhydramnios was present in 2.3%, 11.4% had infection and 55.7% normal outcome.
Conclusion: Prevalence of DM in pregnancy was 1.26%. DIP is an increasing health problem with fetomaternal complications. Maternal complications include preeclampsia, miscarriage, infection, preterm labor and polyhydramnious, while fetal complications include fetal macrosomia, hypoglycemia, IUGR and congenital anomaly.

Keywords: Diabetes mellitus, fetomaternal outcome, pregnant women, gestational diabetes mellitus, pregestational diabetes mellitus

Introduction

Diabetes mellitus is one of the oldest diseases known to mankind and it is counted among the largest global health emergencies of 21st century.[1] Diabetes mellitus (DM) is defined as increased blood glucose level due to defect in insulin secretion, insulin action or both.[2] Diabetes is a serious global epidemic affecting more people worldwide and is particularly devastating when triggered during pregnancy.[3] Diabetes in pregnancy is classified as preexistting diabetes (type 1 and type 2) and gestational diabetes mellitus (GDM).[4]

Gestational diabetes mellitus (GDM) is defined by the American Diabetes Association (ADA) and the World Health Organization (WHO) as any degree of glucose intolerance with onset or first recognition during pregnancy that is not clearly overt diabetes.[5] Approximately 84% of hyperglycemia cases during

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pregnancy are due to GDM, while the remaining 26% are due to pre-existing type 1 or 2 diabetes.[6]

The prevalence of GDM worldwide ranges from 4% to 14%[7] in the United State prevalence of pre-existing and gestational diabetes were 0.9% and 6.0% respectively.[8] In India the prevalence is reported at 4.65%,9 20.5% in Cameroon,[10] 10.5% in PortHarcourt[11] and 8.3% in Jos.[12]

Risk factors for diabetes in pregnancy are previous history of GDM, family history of diabetes, obesity, macrosomic babies, unexplained neonatal death, advance maternal age, persistent glycosuria, recurrent urinary tract infection and polycystic ovarian syndrome.[13,14] About 40 – 60% of women with GDM exhibit no symptoms for this reason many advocate to screen all women, but some women may have increased thirst, increased urination, fatique, nausea and vomiting, bladder infection, yeast infections and blurred vision.[15]

A diagnosis of diabetes in pregnancy as defined by the WHO criteria (2013) should be made at any time during pregnancy when the fasting plasma glucose level is ≥ 7.0 mmol/L and or the 2 hours plasma glucose is ≥11.1mmol/L following a 75g OGTT or the random plasma glucose level is ≥ 11 mmol/L with symptoms of diabetes. HbAIC ≥ 48 mmol/mol (6.5%).[16] The diagnosis of GDM is made using the WHO criteria (2013) when one or more of the following results are obtained during the course of pregnancy, especially between 24 and 28 weeks. Fasting plasma glucose of 5.1 - 6.9 mnol/L, 1hour post 75g OGTT ≥ 10 mmol/L, 2hour post 75g OGTT of 8.5 – 11.0 mmol/L.[17]

Maternal outcomes of GDM will include; polyhydramnios, preeclampsia, prolonged labour, obstructed labour, caesarean section, uterine atomy, postpartum haemorrhage, increased incidence of asymptomatic bacteriuria, urinary tract infection, recurrent GDM and increased risk for type 2 diabetes in the future.[1,4,11,12]

Fetal complications include: unexplained intra uterine death, macrosomia, shoulder dystocia respiratory distress syndrome, hypoglycemia, hypocalcemia, congenital malformations, polycythemia, hyperbilirubineamia, prematurity, still birth, birth injuries, cardiomyopathy, spontaneous abortion, obesity development of type 2 diabetes mellitus during childhood.[9,19,20]

Diabetes in pregnancy is associated with long term consequences to both the mother and the baby. Therefore, screening all pregnant women at booking helps in detecting patients with diabetes in pregnancy thereby preventing complications associated with it. The aim of this study is to assess the fetal and maternal outcomes in patients with diabetes mellitus in pregnancy who delivered in AKTH over a five-year period.

The Objectives were to determine the prevalence of diabetes mellitus in pregnancy, the maternal outcome of patients with diabetes mellitus in pregnancy, the fetal outcome of patients with diabetes in pregnancy, and the factors associated with maternal and fetal adverse outcome among the patients with diabetes in pregnancy in AKTH.

Methodology

This study is a retrospective review of patients who presented with diabetes mellitus in pregnancy to obstetrics and gynecology department of AKTH from January 2016 to December 2020. Case folders was retrieved from the records department and data was extracted and entered into proforma designed on an excel spread sheet. Data on the total number of deliveries over the time period was extracted from the labour ward register.

Information on bio-data, obstetric history, treatment modalities, maternal and fetal complications was collected. The data was anlysed using SPSS. Data obtained was summarized using standard deviation as well as frequencies and percentages. Chi – square test was done to test for statistical significance.

Results

A total of 124 patients were diagnosed as having diabetes in pregnancy within the study period. However, only 88 folders were retrieved and analyzed giving a retrieval rate of 70.96%. The mean age was 32.6±4.6 years, 36.4% were in the age group 30-34years while only 6.8% were above 40 years. About 95% were multiparous while only 4.5% were primiparous. About 16% had normal BMI, where as 34.1% were overweight and 31.8% were obese. About 78% were GDM and 21.6% were pregestational. Three categories of treatment were observed; 65.9% were on insulin, 33% on both insulin and diet and only 1.1% on diet. About 49% had C/S while 51.1% delivered through vaginal route.

About 73% of the babies weighed 2.5-3.9kg, 14.8% weighed more than 4kg and only 12.5% weighed less than 2.5kg. About 27% developed mild asphyxia while 64.8% had normal APGAR with only 27.3% required admission into neonatal intensive care unit.

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency	(%)
Age (years)		
≤25	3	3.4
25 – 29	24	27.3
30 – 34	32	36.4
35 – 39	23	26.1
≥40	6	6.8
Mean ± SD = 32.6 ± 4.6		100%
Parity		
Primigravida	4	4.5
Multipara	65	73.9
Grand multipara	19	21.6
Body Mass Index (BMI)		
Underweight	1	1.1
Normal	14	15.9
Overweight	30	34.1
Obesity	28	31.8
Morbid obesity	15	17.0
Level of Education		
Primary	22	25.0
Secondary	36	40.9
Tertiary	28	31.8
Uneducated	2	2.3
Ethnic Groups		
Hausa	58	65.9
Igbo	8	9.1
Yoruba	12	13.6
Others	10	11.4
		100%

Table 2. Type of diabetes mellitus and treatment received

Variables	Frequency (n=88)	(%)
Type of diabetes		
Pregestational diabetes	19	21.6
Gestational diabetes	69	78.4
Treatment received		
Diet	1	1.1
Insulin	58	65.9
Diet and insulin	29	33.0
Oral hypoglycemic agents	0	0.0

Table 3: Fetal outcomes of patients with diabetes mellitus in pregnancy

Variables	Frequency	Percentage (%)
Delivery outcome		
Alive	82	93.2
Still birth	6	6.8
Birth weight		
<2.5	11	12.5
2.6 – 3.9	64	72.7
≥4kg	13	14.8
Apgar score		
Normal	57	64.8
Mild asphyxia	24	27.3
Moderate asphyxia	1	1.1
Severe asphyxia	6	6.8
SCBU admission		
Yes	24	27.3
No	64	72.7
Fetal complications		
Prematurity	2	2.3
Neonatal Jaundice	3	3.4
Congenital Malformation (spina bipida and gastroschisis)	2	2.3
Hypoglycemia	6	6.8
ARDS	4	4.5
No complication	52	59.1
Total	**88**	**100.0**

Table 4: Maternal outcome

Variables	Frequency, n=88	Percentage (%)
Mode of delivery		
Vaginal	45	51.1
C/S for DM	43	48.9
Assisted vaginal delivery	0	0.0
Complications		
Miscarriage	11	12.5
Preterm labour	5	5.7
Pre-eclampsia	11	12.5
Polyhydramnious	2	2.3
Infection	10	11.4
No complication	49	55.7

About 5% developed respiratory distress, 3.4% develop neonatal jaundice and 2.3% had congenital anomaly and premature birth respectively. About 15% had macrosomic babies, 6.8% had hypoglycemia and still birth while IUGR was seen in 4.5% and 59.1% had normal outcome. Pregnancy induced hypertension was noted in 12.5%, 5.7% had preterm labor, and 12.5% had miscarriage. Polyhydramnios was seen in 2.3%, 11.4% had infection and 55.7% had normal outcome.

Discussion

This is a retrospective study done in Aminu Kano Teaching Hospital to determine maternal and fetal outcomes among pregnant women with diabetes mellitus from 2017-202[21]. The prevalence of diabetes in pregnancy was 1.26% which is similar to 1.39% reported by Gedam S. et al in India[1] and 0.9% reported by Nicholas P. et al in US.[8] Higher prevalence of 4.65% was reported by Sobia Akram.[9] 8.3% reported by Ajen Stephen in Jos,[12] 4.8% reported by Ewenghe Chinwe, et al in Abakaliki.[15] The lower prevalence obtained is because screening for Diabetes in our environment is based on risk factors and is not community base study may not give true reflection of the population.

Most common fetal complication was fetal macrosomia (14.8%), hypoglycemia (6.8%), IUGR (4.5%) and congenital anomaly (2.3%). Similarly macrosomia noted in 16.2% and 10.3% by observation of Wahi P, et al and Bener AB et al respectively.[2] Dahiya K, et al cited in their study hypoglycemia was seen in 5.7%, hyperbialirubinaemia in 11.4%, respiratory distress syndrome in 5.7%, babies and congenital anomaly in 1.8%.[21] Maternal hyperglycemia causes fetal hyperinsulinaemia and insulin is an anabolic hormone leading to fetal macrosomia.

Maternal complications noted include preeclampsia and miscarriage (12.5%), infection (11.4%) preterm labor (5.7%) and polyhydramnious (2.3%). According for Gedam S et al mothers with GDM were at increased risk of presenting with pre eclampsia.[1] Preeclampsia can complicate the course of pregnancy and has an adverse effect on the fetomaternal outcome. This is because of wide spread endothelial damage leading to vasculopathy.

Majority of patients (36.4%) were found in the age group of 30-34years and 3.4% of patients were below 25years. A study in India also stated that women with DIP were older.[19] DIP affects older women more than

the younger ones. Moreover, cardiovascular risk factors may be present in older women. About 5% of the women were primigravida while 95.5% were multigravida. A study by Rajput, et al showed that higher parity would have a higher rate of GDM.[22] This is because the risk of medical conditions is higher in older women with high parity than in the younger ones.

Conclusion

The prevalence of diabetes mellitus in pregnancy was 1.26%. DIP is an increasing health problem and has been associated with fetomaternal complications. Maternal complications include preeclampsia, miscarriage, infection, preterm labor and polyhydramnious. The most common fetal complications include fetal macrosomia, hypoglycemia, IUGR and congenital anomaly.

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