A STUDY ON FOETOMATERNAL OUTCOMES AMONG GESTATIONAL DIABETES MELLITUS PATIENTS IN A TERTIARY CARE HOSPITAL, WESTERN ODISHA

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ABSTRACT

BACKGROUND

Gestational diabetes mellitus (GDM) is a common metabolic disorder in pregnancy. The incidence of GDM increases in older and more obese pregnant women. GDM increases the risk of certain pregnancy complications like pregnancy-induced hypertension and adverse perinatal outcome.

Aims and Objectives-

1. To assess the foetomaternal outcome in pregnant women with gestational diabetes mellitus.
2. To find out the relationship of BMI in pregnant women with GDM and its foetomaternal outcome.

MATERIALS AND METHODS

It was a prospective observational study conducted in the Department of Obstetrics and Gynaecology, VSSIMSAR, Burla, Sambalpur, Odisha with a total sample size of 100.

RESULTS

Maternal complications like UTI, polyhydramnios, IUGR and vaginal candidiasis were proportionately more in GDM group than in Non-GDM group. Out of all neonatal complications, only hyperbilirubinaemia cases were found to be statistically significantly associated with GDM with (p value < 0.05). The mean BMI of total patients found out to be (26.40 ± 4.94 kg/m^2). Mean BMI was higher in women with GDM (29.81 ± 3.76 kg/m^2) than Non-GDM (23.00 ± 3.39 kg/m^2). Only vaginal candidiasis is found to be statistically significantly associated with BMI (p value < 0.05).

CONCLUSION

Many maternal and foetal complications are significantly seen more among GDM population compared to Non-GDM group. Early universal screening is essential.

KEYWORDS

GDM, BMI, Maternal Conditions.

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BACKGROUND

Gestational diabetes mellitus (GDM) is a common metabolic disorder in pregnancy and is defined as "any degree of glucose intolerance with onset or first recognition during pregnancy with or without remission after the end of pregnancy."[1] It is estimated that 1 out of 200 pregnancies is complicated by diabetes mellitus and additionally 5 in every 200 pregnant women will develop gestational diabetes mellitus (GDM).[2] GDM is diagnosed in approximately 3-7% of pregnancies.[2,3,4] The incidence of GDM increases in older and more obese pregnant women. GDM increases the risk of certain pregnancy complications like pregnancy-induced hypertension and adverse perinatal outcome. It carries the risk of later development of type 2 diabetes mellitus (DM) in 75% of cases.[1,3,4,5,6,7]

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Offspring of women with GDM are at increased risk of obesity, glucose intolerance and diabetes in late adolescence and young adulthood.[8] Women diagnosed with GDM are at increased risk for a variety of pregnancy complications including gestational hypertensive disorders, foetal macrosomia, shoulder dystocia and caesarean delivery.[9] So this study was conducted with the objectives: 1) To assess the foetomaternal outcome in pregnant women with gestational diabetes mellitus; 2) To find out the relationship of BMI in pregnant women with GDM and its foetomaternal outcome.

MATERIALS AND METHODS

It was a prospective observational study conducted in the Department of Obstetrics and Gynaecology, VSSIMSAR, Burla, Sambalpur, Odisha.

100 cases were taken, out of which 50 were cases with GDM and same number of cases without GDM were taken as control. The cases were taken from those who attended the antenatal clinics or were admitted to the same department. All the cases had antenatal check-up in the antenatal period and were advised for delivery and postpartum check-up. A detailed clinical assessment of the patient was performed in the OPD. Routine investigations were done during antenatal visits after informing them about the present study and consent was also taken.

The pregnant women irrespective of trimesters, fasting status or timing of previous meal were given 75 g glucose load orally and the blood sugar levels were measured after 2 hours. The women underwent 2-hour PGBS test in the later weeks of pregnancy, if they had normal glucose tolerance in the first visit. Those women with 2-hour PGBS level ≥ 140 mg/dL were diagnosed as GDM and were taken as cases and those having 2 hrs. PGBS < 140 mg/dL were taken as controls and were followed up to compare the foetomaternal outcome.

Inclusion Criteria

1. Pregnant women attending antenatal clinic and having GDM and expected to deliver at VSSIMSAR, Burla, were taken as cases.
2. Pregnant women attending antenatal clinic and not having GDM were taken as controls.
3. Pregnant women of any parity.

Exclusion Criteria

1. Patients with known type 1 or type 2 Diabetes mellitus.
2. Pregnant women having chronic diseases/ cardiac/ hepatic/ respiratory diseases.
3. Taking drugs that alter glucose metabolism.

Statistical analysis was done in SPSS Version 16. Percentage and chi-square were used to find the relationship of the foetomaternal outcome. Ethical clearance was taken from the institutional authority.

RESULTS

Majority of GDM women were in the age group of ≥ 25 years (76%). 8% of GDM women belonged to urban areas, whereas 20% of GDM women belonged to rural areas. Most (76%) of Non-GDM women belonged to rural areas and (24%) belonged to urban areas. Majority of patients belonged to lower socioeconomic status. Among GDM group (60%) belonged to middle class, whereas in Non-GDM (70%) belonged to lower class.

(56%) GDM cases had family history of DM. 60% of the patients with GDM were G2-G4 parity. On the other hand, 68% of subjects in the Non-GDM group were primigravidae.

Maternal Complications	GDM		Non-GDM		Total		P-value
	Nos. (50)	%	Nos. (50)	%	Nos. (50)	%	
Polyhydramnios	6	12	2	4	8	8	0.140
UTI	11	22	5	10	16	16	0.102
Preterm Labour	6	12	4	8	10	10	0.505
IUGR	5	10	2	4	7	7	0.240
Vaginal Candidiasis	6	12	3	6	9	9	0.295
Nil	16	32	34	68	50	50	0.000

Table 1. Maternal Complications in GDM and Non-GDM Group

Table 1 shows that maternal complications like UTI, polyhydramnios, IUGR and vaginal candidiasis were proportionately more in GDM group than in Non-GDM group. Out of 50 GDM patients, 16 were having no complication. UTI occurred in 22% of GDM patients. In Non-GDM group 10% of patients had UTI, 68 had no complications in comparison to 32% of GDM patients which has got statistically high significance with 'p' value of 0.000. All other parameters were not statistically significant.

Neonatal Complications	GDM		Non-GDM		Total		P value
	Nos. (45)	%	Nos. (48)	%	Nos. (93)	%	
Birth asphyxia	3	6.66	2	4.16	5	5.37	0.593
Hypoglycaemia	7	15.5	2	4.16	9	9.6	0.063
Hyper bilirubinaemia	6	13.3	1	2.08	7	7.52	0.040
Polycythaemia	3	6.66	0	0	3	3.22	0.069
Hypocalcaemia	3	6.66	0	0	3	3.22	0.069
Respiratory Distress	8	17.7	5	10.4	13	13.9	0.306
Nil	15	33.3	38	79	53	56.9	0.000

Table 2. Neonatal Complications among GDM and Non-GDM Cases

Table 2 states that Neonatal complications like hyperbilirubinaemia, hypoglycaemia, respiratory distress, polycythaemia and hypocalcaemia are proportionately more in GDM group than in Non-GDM group. 33.3% of GDM group had no neonatal complications, whereas 79% of Non-GDM group had no neonatal complications which was statistically highly significant (p value 0.000). 6.66% of GDM women had birth asphyxia of their babies in comparison to 4.16% of Non-GDM women for the same. Out of all neonatal complications, only hyperbilirubinaemia cases were found to be statistically significantly associated with GDM (p value < 0.05).

BMI (kg/m^2)	GDM		Non-GDM		Total	
	Number (50)	%	Number (50)	%	Number (50)	%
< 25	4	8	40	80	44	44
25-29	12	24	8	16	20	20
≥ 30	34	68	2	4	36	36
Mean	29.81		23.00		26.40	
S.D	3.76		3.39		4.94	

Table 3. Distribution of GDM and Non-GDM Cases according to BMI

Table 3 shows that 68% women of GDM group had BMI ≥ 30 kg/m^2 showing a highly significant association (p value 0.000) between obesity (BMI ≥ 30 kg/m^2) and GDM. Mean BMI was higher in women with GDM (29.81 ± 3.76 kg/m^2) than Non-GDM (23.00 ± 3.39 kg/m^2). The mean BMI of total patients was found out to be (26.40 ± 4.94 kg/m^2).

Maternal Complications	GDM with BMI ≥ 25		GDM with BMI < 25		P value
	Number (45)	%	Number (5)	%	
Polyhydramnios	5	11.11	1	20	0.562
UTI	10	22.22	1	20	0.909
Preterm Labour	6	13.33	0	0	0.384
IUGR	5	11.11	0	0	0.432
Vaginal Candidiasis	4	8.88	2	40	0.042

Table 4. Distribution of GDM Patients according to Maternal Complications in Relation to BMI

Table 4 suggests that maternal complications like UTI, preterm labour, IUGR are proportionately more in GDM with BMI ≥ 25 than GDM with BMI < 25. But in relation to BMI, polyhydramnios and vaginal candidiasis are proportionately more in GDM with BMI < 25 than GDM with BMI ≥ 25. Only vaginal candidiasis is found to be statistically significantly associated with BMI (p value < 0.05).

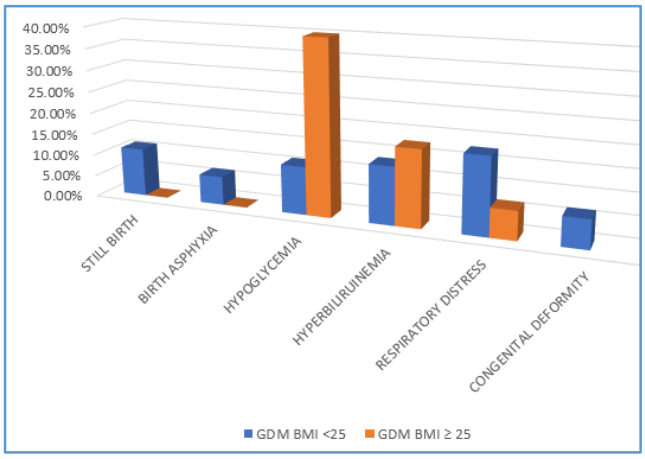

Figure 1. Distribution of GDM Patients according to Foetal Complications in Relation to BMI

Figure 1 illustrates that in GDM with BMI ≥ 25 respiratory distress was occurring in 17.7% of cases followed by hyperbilirubinaemia in 13.33%, and then still born and hypoglycaemia was occurring in the same number of patients followed by birth asphyxia and congenital deformity which accounts for lowest of GDM patients of BMI ≥ 25.

DISCUSSION

GDM has been associated with neonatal morbidity and mortality including macrosomia, shoulder dystocia, other birth injuries and neonatal hypoglycaemia in addition to congenital anomalies and still births.[10,11] Further, the offspring are potentially at a higher risk of developing childhood obesity later in life.[12,13] Women with GDM have higher rates of caesarean deliveries and pregnancy-induced hypertension[14,15] and are at increased risk of future diabetes, predominantly type 2 DM as are their children.[16] Thus, GDM offers an important opportunity for the development, testing and implementation of clinical strategies for diabetes prevention.[17]

In the present study maternal complications like UTI, polyhydramnios, IUGR and vaginal candidiasis are proportionately more in GDM group than in Non-GDM group. The study by Bhat et al (2010)[18] showed a 14.7% incidence of polyhydramnios in GDM vs. 2.7% in controls, which was quite similar to our study. Another study by Chanu et al (2015)[19]- the incidence of the same was 18.03% in GDM cases, which was slightly higher than our study. In a study conducted by Makwana M et al (2017),[20] the incidence of UTI in GDM vs. Non-GDM group were 28.95% vs. 2.51%. Several studies have found out that the frequency of preterm labour is upto 20% higher in GDM pregnancies.[21] Also in a study conducted by Chanu et al (2015),[19] the same incidence was 16% which was quite similar to our study. The incidence of vaginal candidiasis was also higher in GDM than Non-GDM group, i.e. 15.79% vs. 5.25% the same study. Both findings were quite similar to our study. In a study conducted by Sudhansu SN et al (2014)[21] the incidence of vaginal candidiasis, polyhydramnios and preterm labour were 23%, 8% and 4% in GDM cases respectively, whereas in our study it was 12% for all in GDM cases.

Neonatal complications like hyperbilirubinaemia, hypoglycaemia, respiratory distress, polycythaemia, hypocalcaemia were proportionately more in GDM group than in Non-GDM group. Hyperbilirubinaemia cases were found to be statistically significantly associated with GDM (p value < 0.05). Opara et al (2010)[22] found hypoglycaemia in 63.8% of babies born to mothers with diabetes, whereas in the present study it is only 15.5%. Opara et al (2010)[22] found neonatal hyperbilirubinaemia in 57.4% of cases in contrast to the present study, where only 6 (13.3%) babies born to GDM mother had jaundice. In a study by Pikee Saxena et al (2011),[23] biochemical and metabolic assessment revealed that hypocalcaemia (14%), hyperbilirubinaemia (34%) and polycythaemia (8%) were significantly higher in neonates born to diabetic mothers. Kalyani KR et al (2014)[24] found that 21.2% of women with GDM had their babies with RDS as against 9.4% in the Non-GDM group, whereas in our study 17.7% of GDM had RDS as against 10.4% of Non-GDM group which is almost similar.

Mean BMI was higher in women with GDM (29.81 ± 3.76 kg/m^2) than Non-GDM (23.00 ± 3.39 kg/m^2). Nilofer AR et al (2012)[25] found obesity in 88.89% of GDM patients, whereas in our study 68% of GDM women were obese. In a study by Rajput R et al (2013),[26] a significant association was found between prevalence of GDM and increasing BMI of participants (p < 0.001).

In our study maternal complications like UTI, preterm labour and IUGR are proportionately more in GDM with BMI ≥ 25 than GDM with BMI < 25. Frederick et al (2006)[27] found that every unit increase in pre-pregnancy BMI resulted in an 8% increased risk of pre-eclampsia. In our study IUGR occurs in 11.11% of GDM patients whose BMI ≥ 25, which may result from developing pre-eclampsia.

Foetal complications with GDM in relation to BMI is not statistically significant (P value > 0.05). Sebire et al (2001)[28] found that maternal obesity was associated with a higher foetal death rate (odds ratio of 1.4 with a rate of 7 per 1000), which is similar to our study. In a study by Meher-un-nisa et al (2009),[29] perinatal mortality rate remained relatively high in the obese group (9-25/1000) as compared to the control group (3/1000).

CONCLUSION

The present study illustrates that many maternal and foetal complications are significantly more among GDM population compared to Non-GDM group. Women of GDM group had BMI ≥ 30 kg/m^2 showing a highly significant association (p value= 0.000) between obesity (BMI ≥ 30 kg/m^2) and GDM. But good maternal and foetal outcome can be expected from early and meticulous prenatal and intranatal care.

Due to high prevalence of GDM in India, early universal screening is essential. Screening for glucose intolerance during the early weeks of pregnancy is beneficial, as this policy would help in identifying undiagnosed diabetes prior to conception and to render appropriate care.

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