



## A Study of Fetomaternal Outcome of Pregnancy in Mothers with Gestational Diabetes

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### Abstract

**Introduction:** Gestational diabetes mellitus (GDM) is defined as glucose intolerance diagnosed for the first time during pregnancy<sup>(1)</sup>. Indian women have an eleven fold increased risk of developing glucose intolerance during pregnancy compared to Caucasian women<sup>(2)</sup>. Studies suggest there would be a further increase to 20% in incidence rates. Gestational Diabetes not only plays a role in altering the immediate maternal and fetal outcomes but also increases the risk of type 2 diabetes in the future for both mother (A relative risk of 7.43)<sup>(3)</sup> and the baby<sup>(4)</sup>.

**Methods:** A cohort study conducted in 202 patients consisting of 101 patients of pregnant women with GDM risk and normal pregnancy each at Department of Paediatrics, Hitech Medical college, Bhubaneswar over a period of 2 years.

**Results:** Major outcomes included 83(82.2%) women having gestational diabetes had underwent Cesarean Sections and had 4 macrosomic babies. The babies of these mothers also had the most tendencies to develop hyperbilirubinemia and accounted for a total of 19 NICU admissions with 2 stillbirths.

**Conclusion:** Gestational Diabetes Mellitus is associated with significant maternal and fetal outcomes.

**Keywords:** Gestational Diabetes Mellitus, Outcome, LSCS, Complications.

### Introduction

Diabetes is a one of the major public health problems in India with prevalence rates reported to be between 4.6% and 14% in urban areas, and 1.7% and 13.2% in rural areas. The incidence of diabetes continues to rise and increasingly affects individuals of all ages including young adults and children, women of childbearing age are at increased risk of diabetes during pregnancy<sup>(5)</sup>. Diabetes is the most common endocrine disorder complicating pregnancy.

Gestational diabetes mellitus (GDM) is defined by WHO as glucose intolerance diagnosed for the first time during pregnancy. The prevalence of Gestational Diabetes has been reported in ranges from Kashmir (3.8%)<sup>(6)</sup>, Western India (9.5%)<sup>(7)</sup> and 17.9% in the state of Tamilnadu<sup>(8)</sup>. Indian women have an eleven fold increased risk of developing glucose intolerance during pregnancy compared to Caucasian women. Studies suggest there would be an increase to 20% in incidence rates. Gestational Diabetes not only

plays a role in altering the immediate maternal and fetal outcomes but also increases the risk of type 2 diabetes in the future for both mother. Hyperglycemia when occurs in early gestational period during the period of organogenesis, like it is in the case of uncontrolled Type 1 Diabetes and Type 2 Diabetes, is associated with risk of significant congenital abnormalities, Macrosomia, Stillbirth, Birth asphyxia and Preterm delivery, The same type of complications can be noted with GDM but they are comparatively less frequent and also not as severe because of the late onset of hyperglycemia.<sup>(9)</sup>

Complications of GDM in mothers include Polyhydramnios, Pre-eclampsia, Prolonged labour, Obstructed labour, Caesarean section, Uterine atony, Postpartum haemorrhage, Infection, Recurrent GDM and increased risk for Type 2 diabetes in the future. Even among women who have a normal postpartum glucose tolerance test, the risk of future diabetes may be up to seven-fold higher than in women without histories of GDM.<sup>(10)</sup>

The Numerous complications in the foetus include Unexplained Intra-uterine death, CNS and CVS anomalies, LGA babies, Macrosomia, Increased fat mass, Prematurity, Perinatal Asphyxia, Metabolic complications (Hypoglycemia and Hypocalcemia), Polycythemia and hyperviscosity, Hyperbilirubinemia, Stillbirth, Congenital malformation, Shoulder dystocia, Birth injuries, Transient tachypnea, Cardiomyopathy, Infant respiratory distress syndrome, Spontaneous abortion, Increase in the future risk of Obesity, Increase in the future risk of Type 1 and Type 2 Diabetes, Increase in future metabolic syndromes. The aim of this study was to assess the maternal and fetal outcomes in pregnancies complicated by GDM in order to help understand this ever important topic further.

### Materials and Methods

The study was a cohort study conducted in the Department of Paediatrics (NICU), Department of Obstetrics and Gynaecology (Out Patient

Department, Ward, Labor room), at Hitech Medical College and Hospital, Bhubaneswar over the period of two years between November 2016 – October 2018. 101 pregnant women with Gestational Diabetes Mellitus diagnosed based on NDDG criteria as study group and were compared with 101 normal pregnant women (control group). HbA1c values were also taken

Prior Informed consent was taken from all the patients. Detailed history was taken including age, BMI, family history, obstetric history and outcome. Detailed examination was done.

All the parameters concerning the maternal and fetal outcome such as PPH, Polyhydramnios, mode of delivery, gestational age, birth weight, sex, birth injuries, congenital anomalies were noted.

### Exclusion Criteria

- All Women with pre-existing diabetes since before pregnancy.
- Pregnant women with diabetes having any other medical complications like essential hypertension, renal disease, heart disease or epilepsy.

Statistical Analysis was done using IBM SPSS software. Pearson's chi-squared test was used to determine the significant difference between the expected frequencies and the observed frequencies in both groups. P values <0.01 were taken as significant findings.

### Results and Discussion

In the total number of patients studied, 101 women were taken as the GDM study group where as the second group was a control group consisting of 101 normal pregnant women.

The mean age of the whole study population was 25.88. The minimum age was 18 and maximum was 34. As depicted in Table.1, In the Gestational Diabetes Group, 2 patients (2%) were below 20 years. 42 patients were between 20-25 years of age. A total of 57 patients consisting of 48 patients (47.5%) between 25-30 years and 9 patients (8.9%) above 30 years.

**Table 1** Age distribution in the study population

AGE DISTRIBUTION	Study Group (n=101)	Control Group(n=101)	P Value
<20 years	2 (2%)	8 (7.9%)	0.940
20-25 years	42 (41.6%)	36 (31.7%)	
25-30 years	49 (48.5%)	42 (45.5%)	
>30 years	8 (7.9%)	15 (14.9%)	
<b>At risk for GDM</b>	<b>57 (56.44%)</b>		

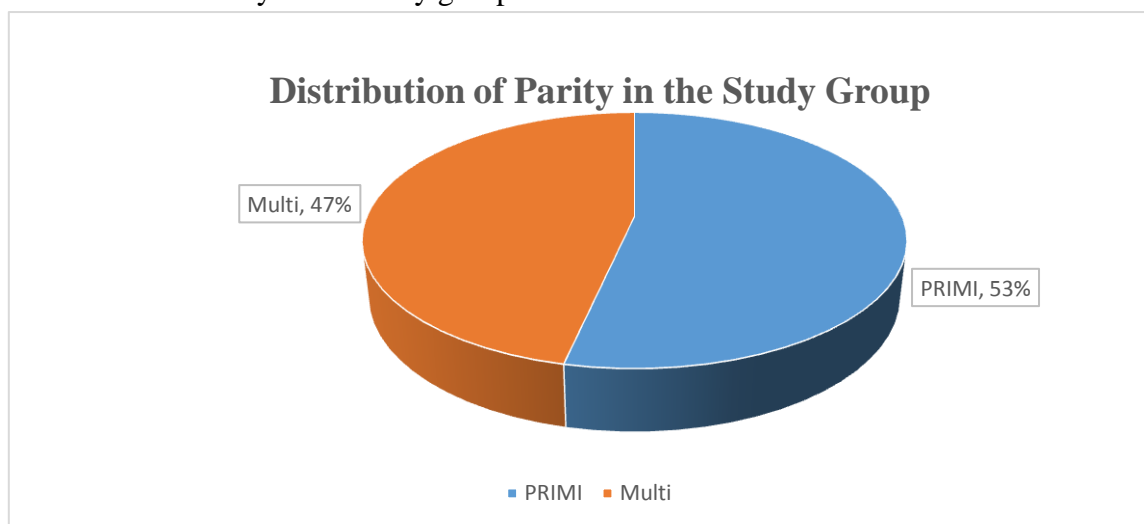
Table 2 shows it was found that Out of the 101 GDM group mothers in the study, 14.9% had normal BMI (18.5-24.9 kg/m<sup>2</sup>), whereas 65.3% were overweight (BMI ≥ 25 kg/m<sup>2</sup>). and 19.8%

(BMI >30 kg/m<sup>2</sup>) were obese whereas the control group were of 33 normal, 51 overweight and 20 obese pregnant women respectively.

**Table 2** Distribution of BMI in the study population

BMI DISTRIBUTION	Study Group (n=101)	Control Group (n=101)	P Value
Normal	15 (14.9%)	33 (32.7%)	0.353
Overweight	66 (65.3%)	51 (50.5%)	
Obese	20 (19.8%)	17 (16.8%)	
<b>At risk for GDM</b>	<b>86 % (86.86%)</b>		

**Chart 1** Distribution of Parity in the study group



58 (57.4%) women in the gdm group were primiparous while the other 43 (42.6%) were multiparous in respect to 50, 51 parity in the non

diabetic group, converging to a total of 53% primi and 47% multiparity in the population.

**Table.3** Distribution of Risk Factors for GDM in the GDM Group

Risk Factors	Number of Patients with the risk factor (n=101)	Percentages
Age	57	56.44%
BMI	86	86.86%
Parity	43	42.6%
Family History of GDM	26	25.7%
Past History of GDM	4	3.96%
Prior Macrosomic baby	2	1.98%
Previous history of unexplained fetal death/Anamolies	-	-

According to the risk factors established by the 4th international workshop conference on GDM, 57 (56.44%) women in the GDM group were found to be at risk because of their age, of whom 48 women were between 25-30 years at moderate risk and 9 women over 30 years at high risk.

88(87.13%) women were found to be at risk because of their BMI of whom 66 (65.3%) were overweight and 20 (19.8%) were obese. 26 women in the GDM group had family history while only four women (3.96%) of the study population had

previous history of GDM. 2 women (1.98%) had a prior history of a macrosomic baby.

Maternal complications as seen in Table 4. were prominent in the GDM group and 83(82.2%) women had undergone LSCS while only 36 women from the normal group required other delivery methods. This was found to be a significant value. 13 developed preeclampsia and 13 babies were delivered preterm. 2 of the births for the GDM group were stillbirths.

**Table.4** Maternal Complications in Study Population

Maternal outcome	Study group	Percentage	Control Group	Percentage	P value
Preeclampsia	13	12.9%	6	5.9%	<0.001
polyhydramnios	5	5%	2	2%	
Preterm	16	15.8%	12	11.9%	
Mode of delivery (LSCS)	83	82.2%	36	35.6%	
Prolonged Labor	1	1.01%	-	-	NA
Still birth	2	2.02%	-	-	
Infections	2	2.02%	-	-	

Fetal and neonatal complications were also noted more prominently in the GDM group as 19 of the babies required NICU care and 6 babies were of very low birth weight while 18 were low birth

weight as shown in Table 5. 14 babies of GDM mothers developed Hyperbilirubinemia and 2 were born with congenital anomalies hydrocephalus and vsd.

**Table 4** Fetal Complications in the Study Population

Fetal Outcome	Study group	Percentage	Control Group	Percentage	P -Value	
Birth weight	vlbw	6	5.9%	2	2.0%	0.005
	lbw	18	17.8%	11	10.9%	
	Macrosomia	4	4.0%	1	1.0%	
Birth Injury	1	1.0%	-	-	NA	
Congenital Anomalies	2	2.0%	-	-	NA	
NICU Admissions	19	19.19%	15	14.9%	0.21	
Hypoglycemia	9	6.9%	2	2.0%	0.301	
Hypocalcemia	6	6.06%	1	1.0%		
Hyperbilirubinemia	14	14.14	5	5.05%		

9(6.9%) babies of diabetic mothers developed hypoglycaemia in relation to only 2(2%) from the non diabetic group. Mean and standard deviation of 8.908 and standard deviation of 0.66. six babies of the diabetic mothers had developed Hypocalcemia. Macrosomic babies were profoundly high 4% in diabetic group in comparison to 1%. As the risk factors and previous studies suggest<sup>(11)</sup>, 86% of the GDM group mothers were at risk based on their age over 25 years and overweight concluding that proper

screening and early knowledge of the risk factors does play a humungous role in reducing maternal and fetal complications in Gestational Diabetes Mellitus.

### Conclusion

The risk factors over the course of the study such as age, BMI, family and previous history strongly seem to indicate the unfavourable outcomes and complications gravitating more towards the pregnant women with GDM. Various outcomes

such as mode of delivery, preeclampsia, macrosomic babies, hyperbilirubinemia were profoundly found altered in pregnant women with Gestational Diabetes.

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