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MATERNAL AND FETAL OUTCOME OF GESTATIONAL DIABETES MELLITUS IN A TERTIARY CARE HOSPITAL

Obstetrics & Gynaecology

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ABSTRACT

Background: Gestational diabetes mellitus is the development of glucose intolerance during pregnancy and reverts to normal during puerperium. The condition occurs exclusively in the antenatal period where there is certain physiological maladaptation in the regulation of carbohydrate metabolism in pregnancy. It can cause a wide range of complications as well as long term implications in both the mother and fetus. **Objective:** To determine maternal and foetal outcomes among women with gestational diabetes mellitus attending tertiary care hospital antenatal clinics. **Material and methods:** A prospective observational study was done on 200 patients diagnosed with GDM. Height, weight, and blood pressure were measured at every visit. Through proper history taking, clinical examination and lab investigations, glycemic control was achieved, patients were followed up for feto-maternal outcomes. After diagnosis of gestational diabetes mellitus patient were given meal plan and oral hypoglycemic agent (metformin) or insulin as per severity of disease. Data was analysed with SPSS software and appropriate statistical tests were applied. **Results:** Maximum patients were from age group 21- 30 years (55.5%). 36.5% were primigravida. Maximum occurrence seen between 29-36 weeks of gestation (78%). 55.5% women were started on insulin and remaining were on meal plan and Metformin. Majority (47%) delivered via LSCS. 16.5% had polyhydramnios, 24% preeclampsia and 13% urinary tract infection. 94.5% were live births, IUD seen in 2.5% and early neonatal death in 3%. In the post-partum follow up for OGTT, BSL was found to be elevated in 43 women and 146 had normal OGTT. GDM women who were on insulin found to be glucose intolerant. **Conclusion:** Gestational diabetes mellitus is prevalent antenatal women and is associated with increased risk of pregnancy and delivery complications. Majority may become overt diabetics in the future leading to morbidity in various forms.

KEYWORDS

Gestational Diabetes Mellitus, Maternal Outcomes, Fetal Outcomes, Oral Glucose Tolerance Test.

INTRODUCTION:

Gestational diabetes mellitus is the development of glucose intolerance during pregnancy and reverts to normal during puerperium. Depending on the type of population and the diagnostic criteria used, gestational diabetes is said to complicate 1-16% of all pregnancies[1]. American college of obstetricians and Gynaecology (ACOG) on contrary advocates selective screening for patients with high risk factors such as history of previous GDM, strong family history of diabetes, member of an ethnic group with high prevalence of GDM, maternal age more than 25 years, obesity, persistent glycosuria, macrosomia (birth weight>4gm) polycystic ovarian syndrome, spontaneous abortions and unexplained still births[2].

Maternal complications are increased incidence of asymptomatic bacteriuria, urinary tract infections, and increased incidence of preeclampsia and risk of polyhydramnios which may increase the incidence of preterm labour, placental abruption and post-partum haemorrhage. By definition it is "carbohydrate intolerance with onset or first recognition during pregnancy"[3].

The worldwide prevalence ranges between 11-14%. The prevalence is slightly higher in the Indian population (16.5%)[4], as Indians are inherently more vulnerable to get affected owing to hereditary and genetic makeup and ethnicity. The International Diabetic Federation found that one out of seven births in India is affected by GDM. Risk of developing diabetes mellitus and the complications in fetus are macrosomia, which will increase risk of operative delivery and shoulder dystocia, increase incidence of hypoglycemia, hypocalcemia, congenital malformations, polycythemia, hyperbilirubinemia, respiratory distress syndrome, and long term complications are obesity, development of type 2 diabetes mellitus during childhood, impaired motor functions and higher rates of in attention and hyperactivity[5]. A largeproportion of women also progress to become overt diabetics in the future hampering their quality of life by causing morbidity in various forms. Therefore, the major objective of this study was to determine maternal and foetal outcomes among women with gestational diabetes attending Mulago hospital antenatal clinics in tertiary care center.

MATERIAL AND METHODS:

Present study was a prospective observational study, carried out for 18 months at a tertiary care centre. All patients attending the Antenatal OPD at tertiary care hospital were offered a 75g Glucose Challenge Test (GCT). Those who had GCT values more than 140mg/dl were included in the study. Study involves 200 patients diagnosed with GDM irrespective of the period of gestation. Height, weight, and blood pressure were measured at every visit. Thorough proper history taking, clinical examination and lab investigations was done. Glycemic control was achieved on medical nutrition therapy or insulin and these patients are followed up from antenatal period till six weeks delivery. Feto-maternal complications, perinatal outcome, the number of patients developing glucose intolerance postpartum (diagnosed by 75 g OGTT) are evaluated during the study period. After diagnosis of gestational diabetes mellitus patient were given meal plan and oral hypoglycemic agent (metformin) or insulin as per severity of disease. During this period if sugar is not control by oral hypoglycemic drug, then shifted to insulin.

All women with GDM coming in ANC OPD and ward and those who are willing to participate in the study after informed consent were included int the study. Female not giving consent for participation in study or pregnant women with pre-existing diabetes were excluded.All data was collected and compiled in Microsoft excel, mean was calculated for quantitative data and percentage and proportion for qualitative data. Analysis was done using SPSS software and appropriate test were used. Proportion and Chi square tests were used to see association between the variables.

RESULTS:

Age and gestational details of the patients:

In this study maximum population of GDM patients came under the age group 21- 30 years (55.5%).GDM in below 20 years pregnancy was encountered in 12% of study population. The multigravida covered 63.5%. 73 women were primigravida (36.5%). (Table 1)

Table 1: Age and gestational details of the patients:

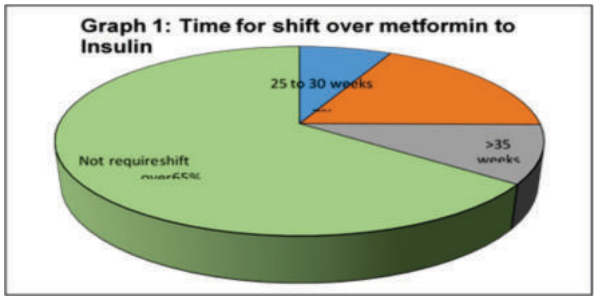
Age group and gestational details		Frequency	Percent
Age Groups (Years)	<20	24	12%
	21-30	111	55.5%
	31-40	65	32.5%
Gravida Status	Primigravida	73	36.5%
	Multigravida	127	63.5%
Gestational Age (weeks)	≤ 20	5	2.5%

	21 – 28	17	8.5%
	29 – 36	156	78%
	>36	22	11%
Total	200	100%	

Gestational age at diagnosis shows, maximum occurrence was between 29 – 36 weeks of gestation (78%), 11% of GDM occurred between >36 weeks of gestation. The occurrence was 8.5 % in gestation between 21- 28 weeks and only 2.5% in gestation age <210 weeks. (Table 1)

Anti-diabetic Treatment:
Regarding treatment, 117 out of 200 women were started on insulin (55.5%) and the remaining 83 (41.5%) women had their glycemic control achieved with meal plan and oral hypoglycemic agent (metformin).

Out of these 83 women, 57 require shift over from metformin to insulin. Maximum shift was seen in 30 to 35 weeks of gestation(18.1%). (Graph 1)



Mode of Delivery:
Majority of the study population delivered via lower segment caesarean section (47%) out of which 19.4% had elective LSCS and 29.2 % had emergency LSCS.

Common indications for emergency LSCS were failed induction (60.2%), Meconium stained liquor (16.3%), Fetal distress (14.5%) and Cephalo-pelvic disproportion in labour (9%). The indications for elective LSCS included Cephalo- pelvic disproportion and repeat LSCS. 53% of the study population delivered vaginally out of which 47% delivered via normal delivery and 6% via instrumental delivery. The most common indication for instrumental delivery was large baby with birth weight more than 3.5 kg.

Adverse Maternal Outcomes:
48 (24%) women had preeclampsia (32 had severe and 16 had mild preeclampsia), polyhydramnios was seen in 33 (16.5%) of the study population. 26 (13%) women had urinary tract infection, 11 (7.5%) had preterm labour. (Table 2)

Table 2: Adverse Maternal Outcomes:

Adverse Maternal Outcomes	Frequency	Percent
LSCS	94	47%
Preeclampsia	48	24%
Polyhydramnios	33	16.5%
Urinary tract Infection	26	13%
Preterm Labour	11	7.5%
Premature Rupture of Membrane	08	4%

Fetal Outcomes:
189 were live birth (94.5%). Intra uterine death was seen in 2.5% (n= 5) and early neonatal death (within 7 days) was seen in 6 (3%) patients. The causes of early neonatal death in order are respiratory distress syndrome (n=4), hypoglycemia and HIE (n=3), sepsis (n=1).

Out of the 6 early neonatal deaths, 4 had congenital anomalies. 11% of babies were low birth weight (n= 22), Macrosomia (> 4kg) was seen in 14% of the babies (n = 28). Birth trauma and shoulder dystocia was seen in 3 babies. Out of the 28 babies who were macrosomic, 25 were delivered by LSCS, 2 via instrumental and 1 via labour naturally. (Table 3)

Table 3: Adverse Fetal Outcomes:

Adverse Fetal Outcomes	Frequency	Percent
Intra-uterine Deaths	5	2.5%
Early Neonatal Death	6	3%
Apgar Score <3	18	9%
Low birth Weight	22	11%
Macrosomia	28	14%
Shoulder Dystocia / Trauma	3	1.5%
Congenital Anomalies	11	5.5%

The incidence of congenital anomalies was seen in 11 (5.5%). Almost 50% of these congenital anomalies occurred in early onset GDM (n =6), where the gestation age was less than 20 weeks. The most common congenital anomaly encountered in order were single umbilical artery, spina bifida, septal defects and duodenal atresia. (Table 3)

Post-partum Follow-up for OGTT:
In the post-partum follow up 200 GDM mothers the attrition rate was 11 (5.5%). Of the remaining 189 women the OGTT was performed at 6 weeks post- partum and was found to be elevated in 43 women. In these 43 women, 29 women were on insulin and 14 women were on meal plan. The remaining 146 women had normal OGTT values. This implied that GDM women who were treated on insulin were glucose intolerant in the postpartum period as well and the p value was statistically significant.

DISCUSSION:
GDM has been diagnosed as a clinical entity for the past 50 years. Early studies have strongly indicated untreated carbohydrate intolerance during pregnancy is associated with higher rates of maternal mortality and morbidity[6]. The purpose of screening, treatment and management of GDM is to prevent still birth, congenital anomalies, preeclampsia, and intrauterine death and decrease the incidence of macrosomic babies and cesarean section rates thereby reducing maternal and perinatal morbidity and mortality. The findings of the present study confirmed that GDM patients are liable to have adverse pregnancy outcomes[6].

The maximum incidence of GDM occurred between 21 to 30 years of age (55.5%). **Ismail NA et al**[7] reported the maximum mean maternal age of GDM in their study was 27.9 years. The increasing incidence was seen in higher parity which was also reported by **Farook et al**[8]**.** In this study similar findings were observed (56.2 % in multigravida and 43.8 % in primi-gravidas).The maximum numbers of GDM cases were detected between 29 to 36 weeks of gestation (78%), which can be attributed to the fact that the maximum insulin resistance occurs at this age which was also reinforced by **Hotamisligil GS et al**[9]**. Mutummatou leid et al**[10] studied that caesarean section rates was higher in women with GDM (52%). In this study, the incidence of caesarean section was higher (47%) when compared to normal labour natural (53%).

Ameya R et a[11]studied the feto-maternal outcomes in GDM and found that preeclampsia complicating pregnancy was found in 26 % of GDM mothers. In this study also, 26 % of GDM mothers had associated GDM complicating pregnancy.

Mutummatou leidi et al[10] observed increasing frequency of preterm labour and polyhydramnios in GDM patients. **Krishnamoorthy et al**[12] studied that the incidence of preeclampsia in GDM was 30% and preterm labor and PROM was 9% and 8 % respectively. In this study preterm labour was encountered in 7.5% of the population and PROM in 4%.

As far as the fetal complications were concerned congenital anomalies were encountered in 5.5% of the study population, while according to **Ameya et al**[11] 8% had congenital anomalies. The incidence of macrosomia was 14% in this study whereas higher incidence was noted in the other studies (40% in study by **Ameya et al**[11]and 23 % in study by **Mutummatou et al**[10]). Adverse fetal outcome (still born intrauterine death, early neonatal death) was seen in 5.5% of the study population and shoulder dystocia was seen only in 1.5% of the study population.

During antenatal period, 55.5% were on insulin and 44.5% on metformin and oral hypoglycemic agent and 28.5% require shift over from metformin to insulin. Maximum shift was seen in 30 to 35 weeks of gestation (18.1%).During the postpartum follow up at six weeks, 21% of the women were glucose intolerant and those on insulin had twice the risk of being glucose intolerant than those on meal plan alone. **Kjos et al**[13]performed 75 gm OGTT 5 to 8 weeks after delivery in 246

women with GDM and found 19% had abnormal OGTT, out of which 10% had impaired glucose tolerance and 9% had T2DM. 16.9% of the population were glucose intolerant in the study by **Ameya et al**[11].

CONCLUSION:

Gestational Diabetes Mellites is associated with adverse complications in both the mother and fetus. A large proportion of women also progress to become overt diabetics in the future hampering with their quality of life by causing morbidity in various forms. Therefore, all antenatal women attending the OPD should be offered a simple Glucose challenge test and if found negative the test has to be repeated every trimester. Once diagnosed with GDM appropriate glycemic control either via insulin or meal plan and oral hypoglycemic drug has to be achieved for good pregnancy outcome and to prevent the complications. Proper counselling should be given to the patient at the time of discharge to have her sugars checked in the postpartum period.

Conflicts Of Interest: No

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