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Maternal and perinatal outcome in gestational diabetes

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Abstract
Background: Gestational diabetes is defined as glucose intolerance with its first onset or first recognition during pregnancy. Gestational diabetes patients are at an increased risk for both maternal and poor fetal outcome.
Aim: This study was done to determine adverse maternal and perinatl outcome in women diagnosed with gestational diabetes.
Materials and Methods: It is a retrospective study of women who were attending antenatal OPD and delivered in our institution and were diagnosed with gestational diabetes. Case records of previous two years of delivered women with gestational diabetes were studied from January 2016 to December 2017.Their demographic chracterstics, associated maternal comorbidities, adverse maternal and perinatal outcome were noted.
Results: A total of 40 of gestational diabetes in our institution were studied between this 2 year period. 60% of patients belong to the age group 25-30 years. 20% belong to the rural and 80% belong to urban population. GDM patients had a higher rate of associated comorbidities like PIH, Hypothyroidism, high incidence of UTI and candidiasis, higher rate of cesarean delivery, higher admissions to NICU. 42.5% of patients had their blood glucose level controlled on di *et al.* one while rest required oral hypoglycemic and/or insulin. Majority of second gravida patients had GDM in their first pregnancy also.
Conclusion: Since the prevalence and diagnosis of GDM is on an increase and is associated with adverse maternal as well as adverse fetal outcome, early diagnosis and a good control of blood sugar levels should be done in order to achieve optimal maternal and perinatal outcome.

Keywords: Gestational diabetes, gestational hypertension, cesarean section, birth weight, NICU

Introduction
Pregnancy is a diabetogenic state due to increased insulin resistance in pregnancy and various placental hormones like HPL. Indian population is considered high risk for developing diabetes. Women with GDM were characterized as presenting a greater prevalence of some of the risk factor known for the pathology: age, weight and parity, macrosomia and a previous stillbirth (Reichelt) [8] The incidence of gestational diabetes is on an increase due to universal screening protocol, changing lifestyle, increasing BMI, sedentary lifestyle. World Health Organization defines gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognized during pregnancy. Different institutions recommend different screening and diagnostic criteria for gestational diabetes.

Materials and Methods: It is a retrospective case series study of 40 patients who were diagnosed with gestational diabetes and delivered in our institute between Jan 2016 to Dec 2017.Most patients had a GTT done at 24 weeks. It was done earlier if any high risk characters like previous still birth, family history of diabetes were present. If negative, the test was repeated at 32 weeks and 36 weeks. Diagnosis of GDM was made by GTT using 75 g glucose. Patient was labeled as GDM if any one value is more than criteria (fasting blood sugar [BS] 92 mg/dl, 1 h BS 180 mg/dl, and 2 h BS 153 mg/dl). Initially, patients were started on diabetic diet with some physical exercises. Diet was started by a dietician. If BS levels were not controlled on diabetic diet, then women were either started on oral hypoglycemic agent or insulin in collaboration with endocrinologist.
The women received regular antenatal care. All antenatal investigations were performed. Level II ultrasound (anomaly screen) was performed at 18–20 weeks in all patients. Any antenatal complications were noted and treated, particularly Gestational Hypertension, Hypothyroidism, urinary tract infection (UTI), candidiasis, etc.

Results: The prevalence of GDM in our study was.

Table 1: Baseline characterstics of women with GDM

Baseline characters	Number		Percentage
Elderly gravid >30 years	12		30
Religion	32 hindu	8 muslim	80,20
Rural Population	8		20
Urban Population	32		80
Family history of Diabetes	12		30

Table 2: Modes of Treatment of GDM patients

Modes of Treatment	Number	Percentage
Diet alone	17	42.5
Oral Hypoglycemic Agents	11	27.5
Insulin	6	15
OHA and Insulin	6	15

Table 3: Antenatal and Postnatal Complications

Antenatal Compilcations	Number	Percentage
Gestational Hypertension	15	37
Chronic Hypertension	4	10
Hypothyroidism	22	55
Oligohydramnios	7	17
Polyhydramnios	5	12.5
UTI	16	40
Candidiasis	4	10
APH	1	2
PPH	6	15

Table 4: Gestational Age at delivery

Gestational age	Number	Percentage
37-40 weeks	29	72.5
34-37 weeks	10	25
<34 weeks	1	2

Table 5: Mode of Delivery

Mode of delivery	Number	Percentage
Cesarean Section	31	77.5
Vaginal Delivery	9	22.5

Indication for cesarean delivery was as follows: 27.5% for previous cesarean, 25% for non progress of labour, 25 for fetal distress, 5% for breech.

Table 6: Perinatal Outcome

Perinatal outcome	Number	Percentage
NICU admission	15	37.5
Hyperbilirubinemia	8	2
Hypoglycemia	6	15

Table 7: Birth Weight of Fetuses born to GDM Mothers

Birth Weight	<2.5 Kg	2.5 -3 kg	>3 kg
Number	5	21	14
Percentage	12.5	52.5	35

Discussion

Baseline characters: Dudhwadkar AR *et al.* [1] GDM comprises of 4.2% of the total patients screened. All patients were from lower socio economic strata. maximum patients (56%) were clustered in the age group of 26-30 years and 30% of patients were over 30 years of age. In the present study, 28% patients were primigravida while 72% patients were multigravida.

The study by Rajput *et al.*, showed that higher parity would have a higher rate of GDM.7 Positive family history as a risk factor was noted in 20% patients in this study.

Prakash GT [2] the average age was 28 years. The median gravidity was two. Fifty-three women (38%) were primigravida. Forty-nine women had prior history of abortion, intrauterine death or both and 25 (18%) of them satisfied the definition of BOH. Twenty women (23%) had a history of GDM, and 60 women (43%) had a first-degree relative having diabetes.

Kumari, *et al.* [3] found prevalence of GDM to be 5.7% in their study. There was no significant difference in age, BMI, and religion in both groups. However, there was a significant difference in socioeconomic status with a significantly higher number of women in middle socioeconomic class in GDM (63.5%) as compared to control (46.6%) (P = 0.001). Family history of diabetes was observed in a significantly higher number of GDM patients (22.4%) as compared to control group (10%) (P = 0.002).

Prakash G [4] the majority of the study subjects were in the age group of 26–30 years (59.3%). The mean age of the GDM patients was 27.2 years and the majority (80.6%) had the BMI of more than 25.

Most of them were primi gravida and majority belong to the lower middle and upper lower type of socio-economic class. The risk factors found to be associated with the gestational diabetes among the study population were age more than 30 years, BMI of more than 25, family history both father and mother being diabetic, having a bad obstetric history, primigravida and the mothers who had gained more than 7 kgs in the first two trimesters.

Rajput R *et al.* [5] GDM was diagnosed in 43 (7.1%) women. The mean age of participants was 23.62 ± 3.42 yr (range 18-38). The prevalence rate was higher in women aged 26-30 and >30 yr (11.57 and 34.8%, respectively) and this observation was found to be statistically significant. GDM rate increased with increasing educational qualification of the participants with highest being in women who were graduate or above (14.3%). This observation was found to be statistically significant. The prevalence of GDM was found to be higher in women belonging to upper and upper middle class (5/20, 25% and 20/119, 16.8%, respectively) and it was statistically significant. 16.3% women with GDM had positive family history compared to 7.6% women without GDM. The association of history of GDM in previous pregnancy with GDM in index pregnancy was found to be significant.

Madi *et al.* [7] In their study, the prevalence of GDM was 1.3%. In our study 60% patients were in the age group 25 -30 years whereas 30% were in the age group more than 30 years.17.5% patients had a history of previous neonatal death and 25% had a history of previous spontaneous abortion.

Control of Blood Sugar Levels: In our study 17 patients were managed on dietary control where as 72.5% required either insulin or metformin or both. Prakash GT [2] 17% were managed with dietary advice alone. 18% were treated with metformin. 58% received insulin, and 7% were treated with metformin and insulin.

Kumari, *et al.* [3] found a total of 79.41% were controlled on diet, whereas 12.35% required insulin and 8.23% were treated with oral hypoglycemic agent (metformin).

Syeda Birjees [9] Observed a significant direct correlation with blood glucose fasting levels of the patients and complications in current pregnancy.

E. G. Deryabina *et al.* [10] all women in their study with GDM were managed by dietary regulation.

Gestational Age at delivery: Dudhwadkar AR *et al.* [1] reported 78% of the delivered babies were full term, but 22% were pre term. Prakash GT [2] the mean gestational age at delivery was 37 weeks. Kumari, *et al.* [3] Preterm delivery rate was higher (10.6%) in GDM patients as compared to control group (3.1%). In our study 72.5% were term deliveries and rest were preterm.

Antenatal complications*:* Dudhwadkar AR *et al.* [1] ANC risk factors were detected in 90% patients. Preeclampsia complicating pregnancy was noted in 13 patients (26%). Hypothyroidism was seen in 3 patients (6%). 9 patients (18%) had bad obstetric history.

Polyhydramnios was noted in 10 patients (20%).

Prakash GT [2] 31% had HTN of which 79.54% women had gestational HTN, and 20.45% women had chronic HTN. 30% had hypothyroidism.

Kumari, *et al.* [3] Gestational hypertension and preeclampsia (pregnancy-induced hypertension) were seen in a significantly higher number of cases in GDM patients as compared to controls (13.5% vs. 6.3%) whereas polyhydramnios was also seen in higher number in GDM (Prevalence of other antenatal complications such as UTI and candidiasis was similar in two groups. Postpartum hemorrhage and postpartum complication were also similar in two groups. Prakash G [4] Among the various complications acquired by the maternal mothers the most common was found to be the vaginal candidiasis (38.6%) followed by pre-mature rupture of membranes (18.6%). Out of the entire study subjects only 6 maternal mothers had developed hypertension and 17 had hypothyroidism. Ambarisha *et al.* [6] 63.49% cases developed co-morbidities with GDM.11.11% developed preeclampsia, 9.52% had polyhydramnios, 5.8% patients went into preterm labour, 1.58% cases had APH 1 and one case had PPH. Syeda Birjees [9] 26.7% had oligohydramnias, 40% had adequate liquor and 26.7% with polyhydramnias. In our study 37% had gestational hypertension, 55% patients had associated hypothyroidism, 40% developed UTI and 12.5% had polyhydramnios.

Mode of Delivery: Dudhwadkar AR *et al.* [1] 23 patients (46%) delivered vaginally. 14% were induced with PGE2 gel while 32% had spontaneous vaginal delivery. Vacuum assisted delivery was seen in 2% (n=1) patients. 52% patients underwent Lower segment caesarean section (LSCS).

Prakash GT [2] Seventy-four (56%) mothers delivered vaginally (7 required forceps assistance) and 58 (44%) required cesarean section. In comparison, 22% of controls underwent cesarean section. Thirty-four cesarean sections were elective. The indications were previous cesarean section (19), BOH (10), *in vitro* fertilization (4), and macrosomia (1). Twenty-four women underwent emergency cesarean section, and the most common indication was unsatisfactory progress of labor.

Kumari, *et al.* [3] There was no significant difference in the mode of delivery between the two groups Prakash G [4] The most common mode of delivery in our study population was elective caesarean (59.3%) and 28% had undergone emergency LSCS for causes like maternal and foetal distress Of the total babies delivered only 16 babies were delivered as postdated.

Syeda Birjees [9] 33.3% patients had normal vaginal delivery while 66.7% had interventional deliveries out of these 50% had LSCS, 10.0% had instrumental deliveries. In our study 77.5% had undergone cesarean section.

Perinatal Outcome: Dudhwadkar *AR et al.* [1] Perinatal mortality was seen in 8% patients with four perinatal deaths and two fetuses with anencephaly, 46 mothers (92%) took live babies home. 40% babies were >3.5 kg while 24% were 3.0 – 3.49kg. Both these groups together constituted 64% of all babies. 12% were <2.0 kg. A total of 8% babies had congenital malformations. Hyperbilirubinemia was seen in 10% babies. Prakash GT [2] The average birth weight was 2.85 kg. The average birth weight among controls was 2.75 kg. 22% had suffered complications, and they had been admitted to the Neonatal Intensive Care Unit (NICU). 4.5% had developed hypoglycemia which could be managed with oral feeds alone. Three neonates had congenital anomalies.

Kumari, *et al.* [3] Mean birth weight was significantly higher in (2848.8 ± 539.4 g) GDM group as compared to control (2707.5 ± 648.4 g) (P = 0.04). There was no significant difference in Apgar score at 1 and 5 min in two groups. Neonatal complications [Table 5] such as hypoglycemia was seen in significantly higher number of cases in GDM group (20.6%) as compared to control group (5.2%) (P = 0.001). However, incidence of hyperbilirubinemia and congenital malformations was not significantly different in two groups. Prakash G [4] The mean weight of the newborn was 3.26 kgs,which was found to be high than the national average which is 3 kgs.Ambarisha *et al.* [6] 19.57% cases developed macrosomia, 11.6% babies were admitted to NICU and 7.40 developed hypoglycemia and 3.70% had hyperbilirubinemia. 3.17% Intra Uterine Deaths and 1.05% still born were documented. In our study 35% were of birth weight more than 3 kgs. 52.5% had birth weight between 2.5 -3 kg.

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