

## FETOMATERNAL OUTCOME OF GESTATIONAL DIABETES MELLITUS IN PRIMIGRAVIDA DELIVERED AT TERTIARY CARE HOSPITAL

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### ABSTRACT

**Objective:** To determine the Prevalence of gestational diabetes mellitus (GDM) in primigravida and their feto-maternal outcome who delivered at tertiary care hospital in western Rajasthan.

**Methods:** A retrospective chart review study will be conducted on primigravida delivered at the department of Obstetrics and Gynaecology, MDM Hospital Dr. S. N. Medical College, Jodhpur, Rajasthan, India from May 2022 to December 2022.

**Results:** The prevalence of GDM in primigravida was 6.42%, maximum occurrence between 34 and 36 weeks of gestation (53.3%). 8.8% of GDM patients had a preterm delivery, out of these 8 women polyhydramnios were seen in 4 women. 49% had lower segment cesarean section and 3% had instrument delivery. preeclampsia was seen in 25.56%, urinary tract infection in 10%, preterm labor was seen in 8.89%, premature rupture of membrane was seen in 5.56% of the study population. 10% of babies were low birth weight. The incidence of congenital anomalies was seen in 6.6%. Intrauterine death was seen in 2 babies who had congenital anomalies.

**Conclusion:** GDM is associated with adverse complications in both the mother and fetus.

**Keywords:** Feto-maternal outcome, Gestational diabetes mellitus, Primigravida.

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### INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as any degree of carbohydrate intolerance in a pregnant woman, which is first recognized during pregnancy only [1]. The importance of GDM is that two generations are at risk of developing diabetes. Women with a history of GDM are at increased risk of future diabetes, as are their children [2]. GDM mothers suffer from increased incidence of preeclampsia, labor complications, increased number of operative deliveries, and postpartum sepsis. The pregnancy of a diabetic woman carries a significantly greater risk for spontaneous abortion, stillbirth, congenital malformations, and perinatal morbidity and mortality. A fetal and neonatal mortality rate was as high as 65% before the development of specialized maternal and neonatal care [3].

If the mother has type 1 diabetes, the risk of the offspring developing the disease is 1–4%. If the father has type 1 diabetes, the risk to the offspring is 10%. If both parents are diabetic, the risk is approximately 20%. Appropriate prenatal screening, diagnosis, and treatment of GDM are the initial interventions in the continuum of type 2 diabetes from mother to child and from pre-diabetes to type 2 diabetes [4].

In Indian context, screening is essential in all pregnant women as Indian women have an eleven-fold [5] increased risk of developing glucose intolerance during pregnancy compared to Caucasian women. Hence, universal screening during pregnancy has become important in our country. However, compared to selective screening, universal screening detects more cases and improves maternal and fetal prognosis [6,7].

### Aim

The aim is to determine the prevalence of GDM in primigravida and their fetomaternal outcome when delivered at tertiary care hospital in western Rajasthan.

### METHODS

This is a retrospective chart review study which will be conducted on primigravida delivered at the department of Obstetrics and Gynaecology, MDM Hospital Dr. S. N. Medical College, Jodhpur, Rajasthan, India, from May 2022 to December 2022. Patients with history of DM before the onset of pregnancy, major chronic diseases such as carcinoma, tuberculosis, congestive cardiac failure, renal failure, and advanced liver failure, pregnancy with more than one fetus, asthma requiring medication, hematological or autoimmune disease such as sickle cells disease, other hemoglobinopathy, lupus or antiphospholipid antibody syndrome were excluded from the study.

The sample size was calculated at 95% confidence interval and 20% relative allowable error using the formula for the sample size for estimation of a single sample proportion –

$$N = \frac{(Z_{1-\alpha/2})^2 P (1 - P)}{E^2}$$

Where,

$Z_{1-\alpha/2}$  = Standard normal deviate for 95% confidence interval (taken as 1.96)

p = Expected prevalence of GDM in Primigravida

Primigravida delivered at tertiary care hospital (taken as 6.6% prevalence as reported by Kalra *et al.* [8]).

E = Relative allowable error (taken as 20% of P).

The sample size was calculated to be 89 women with GDM which were enhanced to round up the figure of 90 subjects.

The study was conducted by reviewing all the bedhead tickets of primigravida mothers delivered at MDM hospital and all the information regarding the status of presence or absence of GDM was

noted. If the mother happens to be suffering from GDM the details regarding treatment, duration of illness, mode of delivery, any antenatal, intranatal, or postnatal complication was noted. Information regarding the status of Neonate was collected by the bedhead tickets of the baby.

A diagnosis of GDM will be done as per DIPSI criteria [9]. The criteria used was that if the 2 h venous plasma glucose measured after 75 g oral glucose load in non-fasting state was  $\geq 140$  mg/dL (DIPSI criteria) the patient was labeled as GDM. The rest was classified as the normal glucose tolerant or the non-GDM group. The antenatal and the postnatal course of the women and the perinatal outcome were studied.

Ethical permission was obtained from ethics committee of the medical college. Written informed consent was obtained.

### Statistical analysis

The data collected during the study will be compiled using a Microsoft Excel spreadsheet and analyzed statistically using SPSS 22.0 software package (SPSS Inc., Chicago, IL, USA). The qualitative data will be expressed in numbers and percentages for categorical variables and the quantitative data expressed as mean and standard deviations for continuous variables. The difference in proportion will be analyzed using the Chi-square test. All results will be presented in the form of tables and graphs. A  $p < 0.05$  will be considered statistically significant.

### RESULTS

In this study, the maximum population of GDM patients came under the age group 26–30 years (31.1%). GDM in  $< 20$  year of age was encountered in 11.1% of the study population. The elderly gravidas ( $> 35$  years) covered 2.22%. In this study prevalence of GDM in primigravida was 6.42%. The maximum occurrence of GDM was between 34 and 36 weeks of gestation (53.3%) (Table 1 and Fig. 1).

In this study, 20% (18 patients) of patients had polyhydramnios in GDM patients. Out of these 18 women, 15 women were on insulin and 3 were on MNT. In the present study, 8.8% of GDM patients had preterm delivery (8 diabetic patients). Out of these 8 women urinary tract infection (UTI) and polyhydramnios were seen in 4 women, respectively (Table 2).

There is an increased risk of Operative delivery in pregnancies complicated with GDM. Majority of the study population delivered via

lower segment cesarean section (LSCS) (49%) out of which 21.2% had elective LSCS and 27.8% had emergency LSCS (Fig. 2).

47.7% of GDM patients were delivered via normal vaginal delivery. Moreover, 3% of the study population delivered through Instrumental delivery. The most common indications for emergency cesarean section followed in order (1) Failed induction, (2) Meconium stained liquor, (3) Fetal distress, (4) Cephalopelvic disproportion.

In our study, 54 out of 90 patients were treated with insulin (60%) and the remaining 36 (40%) women had their glycemic control achieved by MNT alone.

In our study preeclampsia was seen in 25.56%, UTI in 10%, preterm labor was seen in 8.89%, premature rupture of membrane was seen in 5.56% of study population (Table 3).

Out of the 90 GDM pregnancies, 84 were live birth (93.33%). Intra uterine death was seen in 2.22% of study population. Out of the 90 pregnancies, 1 was still born (1.11%) and early neonatal death (within 7 days) was seen in 3.33% (3 early neonatal death). Out of 3 neonatal death 1 had congenital Anomaly. 7 babies had the 10 min APGAR  $< 3$  and they had birth asphyxia. Out of these 7 babies 3 expired in the early neonatal period. Apgar score of zero was found in 3 babies which belonged to the intrauterine death and stillbirth (Table 4).

Most 47.78% of the babies born to GDM mothers had birth weights ranging from 2.5 to 3.5 kg. 10% of babies were low birth weight and 30% weighed between 3.6 and 4 kg. Shoulder dystocia and birth trauma were seen in 2 patients. The incidence of congenital anomalies was seen in 6.6%. Intrauterine death was seen in 2 babies who had congenital anomalies. Out of these 3 early neonatal death baby 1 baby had congenital anomalies. 3 congenital anomalies compatible with life.

### DISCUSSION

GDM has been diagnosed as a clinical entity for the past 50 years. Early studies have strongly indicated that untreated carbohydrate intolerance during pregnancy is associated with higher rates of maternal mortality and morbidity. The purpose of screening, treatment, and management of GDM is to prevent stillbirth, congenital anomalies, pre eclampsia, and intrauterine death and decrease the incidence of macrosomic babies

**Table 1: Sociodemography of study subjects**

|                       | GDM, n (%)       |
|-----------------------|------------------|
| Age (years)           |                  |
| <20                   | 10 (11.1)        |
| 20–25                 | 23 (25.5)        |
| 26–30                 | 28 (31.1)        |
| 31–35                 | 27 (30)          |
| 36–40                 | 2 (2.22)         |
| Mean age              | 22.05 $\pm$ 3.15 |
| Gestation age (weeks) |                  |
| <20                   | 3 (3.33)         |
| 20–28                 | 8 (8.88)         |
| 28–34                 | 24 (26.66)       |
| 34–36                 | 48 (53.33)       |
| >36                   | 7 (7.77)         |

**Table 2: Clinical features as shown by study subjects**

|                                 | Number of patients (%) |
|---------------------------------|------------------------|
| Polyhydramnios                  |                        |
| Yes                             | 18 (20.00)             |
| No                              | 72 (80.00)             |
| Gestational age (weeks) (fetus) |                        |
| <37 (preterm)                   | 8 (8.89)               |
| $\geq 37$ (term)                | 82 (91.11)             |

**Table 3: Maternal outcome**

| Maternal outcome | Number of patients (%) |
|------------------|------------------------|
| Preeclampsia     | 23 (25.56)             |
| UTI              | 9 (10.00)              |
| Preterm labour   | 8 (8.89)               |
| PROM             | 5 (5.56)               |

UTI: Urinary tract infection, PROM: Premature rupture of membrane

**Table 4: Fetal outcome**

| Fetal outcome         | Number of patients (%) |
|-----------------------|------------------------|
| IUD                   | 2 (2.22)               |
| SB                    | 1 (1.11)               |
| LB                    | 84 (93.33)             |
| Early neonatal death  | 3 (3.33)               |
| Apgar score at 10 min |                        |
| 0                     | 3 (3.33)               |
| $\leq 3$              | 7 (7.78)               |
| $> 3$                 | 80 (88.89)             |
| Birth weight          |                        |
| <2.5                  | 9 (10.00)              |
| 2.5–3.5               | 43 (47.78)             |
| 3.6–4                 | 27 (30.00)             |
| >4                    | 11 (12.22)             |

IUD: Intrauterine death, SB: Still birth, LB: Live birth

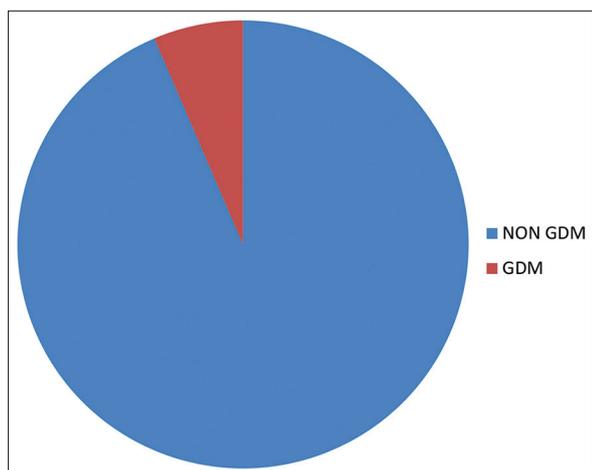


Fig. 1: Prevalence of gestational diabetes mellitus

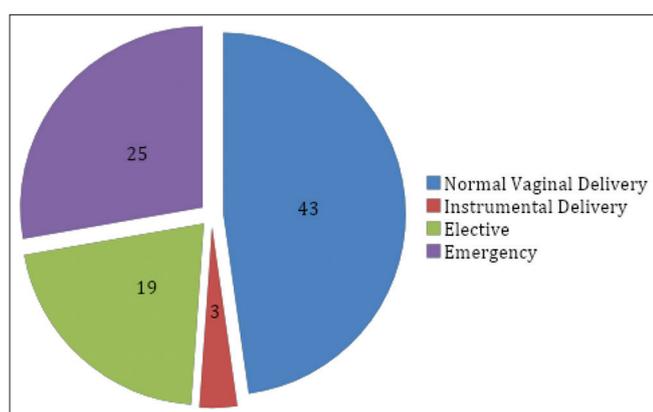


Fig. 2: Mode of delivery

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.

The prevalence of GDM in our study was 6.42%. Similarly, Kalra *et al.* (2013) [8], Wahi *et al.* (2011) [10] and Nilofer *et al.* (2012) [11] found similar prevalence in different sociodemographic conditions.

In our study, 32.22% of study population belonged to the high-risk group Age >30 years. Also, Wahi *et al.* [10] reported that women with GDM were of older age group.

The maximum number of GDM cases was detected between 34 and 36 weeks of gestation (53.3%), which can be attributed to the fact that the maximum insulin resistance occurs at this age which was also reinforced by Wahi *et al.* [10].

In this study, the incidence of cesarean section was higher (49%) when compared to normal vaginal delivery (47.7%). Also, Chanu *et al.* [12], Capula *et al.* (2013) [13] found higher cesarean rates. The increased rate of cesarean section in GDM is because of uncontrolled diabetes, macrosomia, and some cases landing into emergency cesarean section due to failed induction, meconium-stained liquor, and fetal distress.

In this study also, 25.5% of GDM mothers had preeclampsia complicating pregnancy similarly reported by Dudhwadkar and Fonseca [14].

In the present study, polyhydramnios were found in 20% of study population. This is because of fetal hyperglycemia causing fetal polyuria resulting in increased osmotic diuresis. Placentomegaly increasing the surface area of the placenta leading to increased amniotic fluid and

associated congenital anomalies and metabolic derangements. Chanu *et al.* [12] observed an increasing frequency of preterm labor and polyhydramnios in GDM patients.

In our study, preterm labor was encountered in 8.8% of the population and premature rupture of membrane in 5.6%. A similar incidence was seen by Seshiah *et al.* [9].

In our study, adverse fetal outcome (still birth, intrauterine death, early neonatal death) was encountered in 6.6% of the study population. Shoulder dystocia was encountered only in 2% of the study population. Similar to as reported in a study by Kalra *et al.* (2013) [8], Dudhwadkar and Fonseca [14] and Wahi *et al.* (2011) [10].

In the present study, still birth was reported in 1.11% of the study population, while higher in by Wahi *et al.* [10] and Kalra *et al.* [8].

In the present study, 6.6% of GDM patients were reported to have congenital anomalies in baby, similarly reported by Chanu *et al.* [15].

In the present study, UTI is present in 10% of study population but reported higher in Chanu *et al.* [15].

In this study, birth asphyxia was reported in 7.7% of study population which was higher than Wahi *et al.* [10] and Capula *et al.* [13].

## CONCLUSION

Based on the observations of this study, GDM 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 their quality of life by causing morbidity in various forms. Guidelines advocate for universal screening of all pregnant women at first antenatal contact. If the test is negative, screened test should be done at 24–28 weeks of gestation. Once diagnosed with GDM appropriate glycemic control either through insulin or meal plan has to be achieved for good pregnancy outcome and to prevent the complications.

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## AUTHORS' CONTRIBUTION

All the authors have contributed equally.

## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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