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**Original Research Article**

# Fetomaternal outcome in pregnancy with diabetes mellitus

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## ABSTRACT

**Background:** South Asian population has more prevalence of diabetes mellitus in pregnancy which can impact both mother and foetus and can also increase the risk of future diabetes.
**Methods:** Seventy pregnant women hospitalised at SVP from August 2021 to May 2024 for diabetes mellitus during pregnancy were the subjects of the current ambisprective cohort research.
**Results:** There were 45 women (64.28%) with gestational diabetes mellitus and 25 women (35.72%) with overt diabetes among the 70 women who were reported. The following complications were seen in the pregnant women in this study: 24 cases of polyhydramnios (34.28% of the total), 18 cases of macrosomia in the foetus (25.7%), 1 case of foetal cardiac abnormality (1.4%), and 40 cases of caesarean section (57.15% of the total).
**Conclusions:** In order to attain positive fetomaternal outcomes, preventive medicine should prioritise the early screening and diagnosis of diabetes during pregnancy, as this condition has negative consequences on the mother and the unborn child.

**Keywords:** Diabetes mellitus, Gestational, Maternal, Fetomaternal outcome

## INTRODUCTION

"Carbohydrate intolerance of variable severity with the onset or first diagnosed during present pregnancy" is the definition of gestational diabetes mellitus (GDM).[1] An increase in both the rate and amount of insulin release, along with a decrease in insulin sensitivity at the cellular level, characterises pregnancy as a diabetogenic state. Although gestational diabetes is most commonly diagnosed in women with preexisting conditions, it can also be diagnosed in pregnant women with fasting plasma glucose (FPG) levels of 126 mg/dl or above and glucose levels of at least 200 mg/dl 2 hours after taking 75 gm of oral glucose for the first time. It is more common for women who have diabetes that becomes apparent during the first trimester of pregnancy to continue to have the condition after giving birth.[1]

The American Diabetes Association reports that around seven percent of all pregnancies are complicated by diabetes. The prevalence of diabetes mellitus among Indian women is 11.3 times higher than that of white women.[2] An important foetal teratogen is hyperglycemia. Since genuine gestational diabetes typically appears in the second half of pregnancy- by which point foetal organogenesis is complete- the risk of congenital deformity is higher in pregnancies with overt diabetes. The prevalence of congenital malformations increases three to tenfold.[3] Dyslipidaemia, hypertension, and obesity all raise the risk of cardiovascular problems.

The study set out to examine the effects of diabetes on pregnant women and their unborn children.

## METHODS

The present study was an ambisprective cohort study that included 70 patients with diabetes mellitus in pregnancy who attended the obstetrics and gynaecology department of the tertiary care hospital, SVP hospital in Ahmedabad,

India, from August 2021 to May 2024. In selected cases, 75 grams of oral glucose in 300 ml water was given irrespective of their fasting status; and 2 hours later blood sugar was taken.

Criteria for diagnosis was according to DIPSI criteria of 2 hours blood sugar level of 140 mg% and above.[4] Patients diagnosed as having diabetes mellites were closely monitored. All the women who were diagnosed with GDM and Overt DM at our institute and with documented evidence of diabetes mellitus before pregnancy were also included in the study. Those women who were delivered outside and lost for follow-up were excluded from our study.

## RESULTS

Our institute evaluated 70 pregnant individuals with diabetes from August 2021 to May 2024. Researchers looked at the foetal and maternal outcomes of 45 (64.28%) individuals with gestational diabetes and 25 (35.72%) patients with overt diabetes.

**Table 1: Distribution according to parity (n=70).**

| Gravida | N (%) |
|---|---|
| **Primi** | 29 (41.4) |
| **Multi** | 41 (58.6) |

**Table 2: HbA1C levels (n=70).**

| HbA1c (%) | N (%) |
|---|---|
| **<6** | 50 (71.42) |
| **6-8** | 16 (22.86) |
| **>8** | 4 (5.7) |

**Table 3: Treatment modality (n=70).**

| Type of treatment | N (%) |
|---|---|
| **Injection insulin** | 40 (57.14) |
| **Oral hypoglycaemic agents** | 20 (28.57) |
| **Nutritional therapy** | 10 (14.28) |

The percentage of primigravidas was 41.6% out of 70 instances, whereas the percentage of multigravidas was 29.4%. From this group, 50 patients (71.42%) exhibited HbA1c levels below 6%, 16 patients (22.86%) exhibited levels between 6-8%, and 4 patients (5.7%) exhibited levels above 8%. In this study, 18 individuals (26.7% of the total) had a positive family history of diabetes, which is a major risk factor for both gestational diabetes and overt diabetes. Twenty cases (28.5%) needed oral haematopoietic agents (OHA), forty cases (57.14%) needed insulin therapy, and ten cases (14.2%) needed nutritional therapy alone.

In 24 cases (34.28%), the ultrasound findings suggested polyhydramnios; in 40 cases (57.12%), they indicated an appropriate amount of fluid; and in 6 cases (8.5%), they indicated oligohydramnios. The total number of cases with a macrocosmic foetus, defined as an EFW more than 4 kg, was 18, or 25.7%. Only four instances (2.8%) had an EFW less than 2 kg with IUGR, while 38 out of 70 cases had an EFW ranging from 2.6 to 3.9 kg.

**Table 4: USG findings in pregnancy with DM (n=70).**

| USG findings | | N (%) |
|---|---|---|
| **Liquor** | Polyhydramnios | 24 (34.28) |
| | Oligohydramnios | 6 (8.5) |
| | Adequate liquor | 40 (57.12) |
| **Macrosomia** | | 18 (25.7) |
| **IUGR** | | 4 (2.8) |
| **Cardiac anomaly-VSD** | | 1 (1.4) |

**Table 5: Associated maternal complications and conditions (n=70).**

| Associated maternal conditions | N (%) |
|---|---|
| **PIH** | 14 (20) |
| **Gestational hypertension** | 8 (11.8) |
| **Associated maternal complications** | |
| DKA | 2 (2.85) |
| HELLP syndrome | 1 (1.42) |
| PPH | 1 (1.42) |
| Polyhydramnios | 24 (34.28) |
| Wound gap | 4 (5.7) |

**Table 6: Indications of NICU admissions (n=70).**

| NICU admissions/fetal complication | N (%) |
|---|---|
| **RBS monitoring** | 11 (15.7) |
| **Hypoglycaemia** | 8 (11.4) |
| **Hyperbilirubinemia** | 13 (18.57) |
| **Respiratory distress syndrome** | 7 (10) |
| **Cardiac anomaly-VSD** | 1 (1.4) |

There were 14 cases of pregnancy-induced hypertension (20%) and 8 cases of gestational hypertension (11.4%). Of the 70 cases, 30 were delivered vaginally (42.85% of the time) and 40 were delivered by c-section (57.15% of the time). Diabetic keto acidosis was observed in two cases, HELLP syndrome in one, and postpartum haemorrhage in one, all of which were treated with uterotonics and uterine artery ligation. Out of the total number of cases documented with wound gaps after delivery, 4 (5.7%) were associated with scars from c-sections and 1 with episiotomies.

For various reasons, 32 infants had to be admitted to the neonatal intensive care unit. Out of all the neonates admitted, 11 (15.7%) were monitored for red blood cell (RBS) levels, 13 (18.57%) for hyperbilirubinemia, 7 (10%) for respiratory distress syndrome, and 1 (1%) for a workup for a possible congenital heart abnormality; the baby was ultimately confirmed with ventricular septal defect (VSD).

## DISCUSSION

Many factors increase the likelihood that a pregnant woman may develop diabetes mellitus, including being overweight, a history of gestational diabetes in a prior pregnancy, polycystic ovarian syndrome (PCOS), and a direct family history of the disease. The results reveal that among the cases, 26.7% had a positive history of diabetes in their family. Nanda et al also discovered a similar finding, at 23.9%. Foetal congenital anomalies in children born to mothers with diabetes include spina bifida, hydrocephalus, microcephaly, micrognathia, anencephaly, ear and ocular abnormalities like microphthalmia and lens opacity, and cardiac defects like tetralogy of Fallot or ventricular septal defect.[6] Similar to a study published by Shefali et al, which found foetal abnormalities in 1.4% of cases, Saxena et al reported a greater incidence of foetal anomaly at 10%, and the present study indicated a 1.4% incidence of congenital anomaly (VSD).[7,8]

Studies have shown that compared to normal pregnancies, pregnancies involving diabetes mellitus are associated with an increased risk of newborn problems and NICU admissions. A total of 32 infants (45.71%) were admitted to the neonatal intensive care unit (NICU) after delivery due to various difficulties, including hyperbilirubinemia, respiratory distress syndrome, congenital abnormality, RBS monitoring, and other similar issues. The 10% incidence of respiratory distress syndrome in infants is comparable to the 12% reported in a 2016 study by Dhudhwadkar et al.[9]

According to Muche et al, the rate of poor maternal outcomes is much greater in pregnancies characterised by diabetes mellitus (52.9% versus 29.5% in normal pregnancies), including PIH (5.3%), induction of labour (13.5%), PROM (9.9%), and APH (7.5%).[10] Obesity, advanced maternal age, a family history of diabetes or hypertension, and a gestational diabetes mellitus triple the risk of preeclampsia in women.[10] Several studies point to insulin resistance as a factor in the development of hypertensive diseases in pregnancy, including diabetes mellitus and its accompanying hypertension, which can cause vasoconstriction and salt retention.[10] Polyhydramnios (34.2%), PIH (20%), and gestational hypertension (11.4%) were relatively more common than other conditions among the 50.5% patients in this study that had an associated maternal ailment and bad maternal outcome. The current investigation found 24 cases (34.28%) of polyhydramnios, which is consistent with the findings of Bhat et al.[11] In the experimental group, 14.7% of cases had polyhydramnios, whereas just 2.7% of the control group did. One of the two potential causes of polyhydramnios in diabetic pregnancies is foetal polyuria, which occurs when the baby has high blood sugar levels.[12] A change in water concentration within the amniotic cavity due to an osmotic gradient caused by an increase in glucose concentration in the amniotic fluid, is another potential explanation.[13]

The percentage of cases delivered via c-section in this study (57.15% versus 60% in Kale et al) is comparable to that in that other study.[14] An 18% rate of cesarean delivery and a 4.9% incidence of PPH were reported by Muche et al.[10] Although polyhydramnios and large babies are associated with an increased risk of postpartum haemorrhage and uterine atony, only one patient (1.4%) in the current study experienced PPH. Diabetes can slow or prevent the healing of wounds; 5.7% of women in this study experienced a wound gap after giving birth, and 7.0% of women in a 2016 study by Dudhwadkar et al also experienced sepsis after giving birth.[9]

## CONCLUSION

In pregnancy, diabetes mellitus is a major health concern that affects 25% of pregnancies. It increases the risk of bad outcomes for both the mother and the child, as well as metabolic issues in the long run. It is advised that all regular patients visiting the antenatal outpatient clinic undergo screening to identify and prevent problems, as this is an increasing issue in public health.

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