

Original article:

A prospective study on gestational diabetes mellitus and pregnancy outcomes at a tertiary health care centre

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Abstract

Background: The prevalence of diabetes in pregnancy is increasing worldwide. Gestational diabetes mellitus (GDM) is a common pregnancy complication that affects both maternal and fetal outcomes. This study aimed to assess maternal and fetal outcomes in pregnant women with diabetes mellitus.

Methods: This prospective observational study was conducted at the Department of Obstetrics and Gynecology at a tertiary care hospital from February 2021 to July 2022. The study included 104 pregnant women with diabetes mellitus diagnosed in the 1st, 2nd, and 3rd trimester of pregnancy. Maternal and fetal outcomes were assessed, and data were analyzed using descriptive statistics.

Results: The mean age of the women was 26.47±2.83 years, and the majority of women (62.50%) belonged to the age group of 26-30 years. Maternal complications observed were pre-eclampsia (24.03%), polyhydramnios (15.38%), and preterm delivery (9.62%). Most patients (54.81%) were on insulin treatment. The majority of deliveries (84.62%) were caesarean section, and live birth was observed in 79.81% of neonates. Neonatal complications included respiratory distress syndrome (12.50%) and hypoglycemia (8.65%).

Conclusion: Pregnant women with diabetes mellitus are at increased risk of adverse maternal and fetal outcomes. Timely diagnosis and appropriate management can help to reduce these complications. Further studies are required to develop effective preventive strategies and interventions to improve the outcomes of pregnant women with diabetes mellitus.

Keywords: Pregnancy, diabetes mellitus, gestational diabetes mellitus, maternal complications, fetal outcomes, neonatal complications, NICU admission

Introduction:

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%),² Western India (9.5%)³ and 17.9% in the state of Tamilnadu.^{1,4} In 2019 the global prevalence of Hyperglycemia

in Pregnancy (HIP) in the age group 20-49 years was estimated to be 20.4 million or 15.8% of live births.⁵ 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.⁶ 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 present research is to study various fetal and maternal outcome in pregnancy complicated by diabetes mellitus.

Material and methods:

The study was a prospective observational study that took place in the Department of Obstetrics and Gynecology at a tertiary care hospital from February 2021 to July 2022. The study aimed to evaluate the effect of gestational diabetes mellitus (GDM) on maternal and fetal outcomes. The sample size was 104 pregnant women who met the inclusion criteria and gave written informed consent to participate in the study.

Inclusion criteria for the study included pregnant women aged over 18 years, pregnant women diagnosed with diabetes in the 1st, 2nd, and 3rd trimesters of pregnancy, and pregnant women who tested positive by DIPSI and were subsequently diagnosed with GDM in the 1st, 2nd, and 3rd trimesters of pregnancy. Women who agreed to participate in the study were included.

Exclusion criteria for the study included pregnant women with diabetes who had other complications such as essential hypertension, renal disease, heart disease, epilepsy, and women who were not willing to participate in the study.

Data was collected using a structured questionnaire and medical records of the study participants. The data collected included demographic characteristics, medical history, obstetric history, and maternal and fetal outcomes.

Maternal outcomes that were assessed included gestational hypertension, preeclampsia, gestational age at delivery, mode of delivery, postpartum hemorrhage, and maternal morbidity and mortality. Fetal outcomes that were assessed included birth weight, Apgar score, neonatal hypoglycemia, respiratory distress syndrome, and stillbirth.

Descriptive statistics were used to summarize the data, and inferential statistics were used to test the study hypotheses. Bivariate and multivariate logistic regression analyses were conducted to determine the association between GDM and maternal and fetal outcomes while controlling for potential confounding factors.

Ethical considerations were taken into account throughout the study, and all participants provided written informed consent. The study protocol was reviewed and approved by the Institutional Review Board (IRB) before the study commenced.

Results:

In present study, out of total 104 women with diabetes mellitus majority of women belonged to age group 26 – 30 years with 65(62.50%) cases, followed by age group 21-25 years with 32(30.77%) cases, age group 31-35 years including 4(3.85%) cases and least cases were observed in age group <20 years with only 3 (2.88%) cases. Mean age of women was 26.47±2.83 years.

In present study, following maternal complication were observed 25(24.03) of women had coexistent Pre-Eclampsia, Polyhydramnios was observed in 16 (15.38%)and preterm was noted in 10(9.62%) women.

In present study, majority of patients 57(54.81%) were on insulin treatment, 34(32.69%) were on MNT and 11(10.58%) were on OHA, whereas 2(1.92%) were on insulin/OHA.

TABLE NO. 1: DISTRIBUTION OF PATIENTS AS PER MODE OF DELIVERY

MODE OF DELIVERY	NO	%
INSTRUMENTAL	2	1.92
LSCS	88	84.62
NVD	14	13.46
Total	104	100

In our study, out of 104 patients 14(13.46%) were delivered vaginally, 88(84.62%) underwent caesarean section whereas 2(1.92%) patients underwent instrumental vaginal delivery.

TABLE NO. 2: DISTRIBUTION OF PATIENTS AS PER FETAL OUTCOME

FETAL OUTCOME	No.	%
Live Birth	83	79.81
Preterm	10	9.62
Early Neonatal Death	6	5.77
IUD	5	4.81
Total	104	100

In present study, out of 104 patients, following fetal outcomes are observed such as live birth was observed in 83(79.81%), preterm was observed in 10 (9.62%), 6(5.77%) had early neonatal death, whereas IUD was observed in 5(4.81%).

TABLE NO. 3: DISTRIBUTION OF PATIENTS AS PER FETAL WEIGHT

FETAL WEIGHT	No	%
<2.5	10	9.62
2.6 - 3.5	58	55.77
3.6 - 4	31	29.81
>4	5	4.81
Total	104	100

In present study, majority of 58(55.77%) neonates weighed between 2.6 – 3.5 kg, and 5(4.81%) had macrosomia due to high birth weight. Whereas 10(9.62%) neonates had low birth weight. Mean birth weight was 3.07±0.77 kg.

TABLE NO.4: DISTRIBUTION OF PATIENTS AS PER NICU ADMISSION AND NEONATAL COMPLICATION

NEONATAL COMPLICATION	No	%
HIE	3	2.88
HYPOGLYCEMIA	9	8.65
LBW	3	2.88
RDS	13	12.50
Total	28	26.92

In present study, 28(26.92%) babies required NICU admission due to following complication, out of which 13(12.50%) were due to RDS, 9(8.65%) were due to hypoglycemia, and 3(2.88%) were due to HIE and LBW.

Discussion:

The present study was a prospective observational study conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital from February 2021 to July 2022. The study included 104 pregnant women with diabetes, either diagnosed in the first, second, or third trimester of pregnancy or diagnosed with gestational diabetes mellitus (GDM) after testing positive by DIPSI. The mean age of the women was 26.47±2.83 years, and the majority of them belonged to the age group of 26-30 years.

Maternal complications were observed in a significant proportion of the study population, with 24.03% of women having coexistent pre-eclampsia, 15.38% having polyhydramnios, and 9.62% experiencing preterm labor. The most common mode of delivery was caesarean section, with 84.62% of women undergoing this procedure. The proportion of live births was 79.81%, while 9.62% of neonates were born preterm, and 4.81% experienced intrauterine death. The majority of neonates weighed between 2.6-3.5 kg, and 4.81% had

macrosomia. Furthermore, 26.92% of neonates required NICU admission due to various complications, including respiratory distress syndrome (RDS), hypoglycemia, and low birth weight.

The results of the present study are consistent with previous studies reporting an increased risk of maternal and fetal complications in women with diabetes during pregnancy. In particular, the high proportion of caesarean sections and preterm labor observed in this study highlights the need for close monitoring and management of pregnant women with diabetes. Additionally, the high proportion of neonates requiring NICU admission due to various complications highlights the need for timely intervention and close monitoring of neonates born to mothers with diabetes^{7,8,9,10}

In present study, out of 104 women with DM, 28 (26.92%) were having few risks factor during past pregnancy, among which spontaneous abortion was noted in 16(15.38%), Previous History of DM was noted in 8(7.69%) and intrauterine demise (IUD) was noted in 4(3.85%).

Similar result was observed in a study conducted by Makwana M et al. found that among 38 women with DM, risk factors such as history of abortion was noted in 6(15.79%), history of GDM in pre-pregnancy was noted in 3(7.89%) and history of Perinatal losses (SB, IUD) was noted in 6(15.79%) cases.¹¹

Whereas a study conducted by Kalra, et al. found that History of perinatal losses was noted in 5(15.15%) patient's past history of GDM was noted in 4(12.12%).¹² In present study, following maternal complication were observed. 25(24.03%) of women had coexistent Pre-Eclampsia, Polyhydramnios was observed in 16 (15.38%) and preterm was noted in 10(9.62%) women.

A study conducted by Lanke S. H.et al., observed that 13(12.9%) was developed preeclampsia and 16(15.8) babies were delivered preterm and polyhydramnios was observed in 5(5%) women.¹³ Rathod JK et al. during study observed that maternal complications associated with gestational diabetes mellitus, such as preeclampsia was found in 10(20%) Preterm labour was found in 5(10%), whereas Polyhydramnios was found in majority of 22(44%) women.⁶⁴ Another study conducted by Fareed P et al. found that found various maternal complication in GDM 47% patients had polyhydramnios and 44% developed preeclampsia. Preterm labour was common in 23% of GDM patients.¹⁴

Conclusion:

In conclusion, the present study highlights the significant burden of maternal and fetal complications in women with diabetes during pregnancy. The findings underscore the importance of close monitoring and management of pregnant women with diabetes to reduce the risk of adverse outcomes. Further studies are needed to identify effective strategies for managing diabetes during pregnancy and improving outcomes for both mothers and neonates.

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