

The Assessment of Fetomaternal Outcomes in a Tertiary Care Teaching Center in Southern India During Pregnancy Complicated by Diabetes

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Abstract

Introduction: Pregnancy-related diabetes is a serious health problem that could have negative effects on both the mother and the foetus. The purpose of this study was to assess the fetomaternal outcomes in pregnant women with diabetes in a teaching hospital for tertiary care in southern India.

Methods: A retrospective examination of 272 diabetic pregnant women who gave birth between January 2020 and December 2022 was carried out. Women with "Gestational Diabetes Mellitus (GDM)" and pre-existing diabetes were included in the study. Medical records were consulted to gather information on maternal and foetal outcomes.

Results: The study discovered that 12% of women who had diabetes during pregnancy experienced preterm labour and 22% of them suffered hypertensive problems. Furthermore, 10% of newborns had low birth weight, and 12% of children were delivered prematurely. In addition, 26% of newborns had macrosomia, and 8% had congenital abnormalities, the majority of which were heart problems. In addition to having a considerably higher mean HbA1c level than women with GDM, premature labour and hypertensive problems were more common in pre-diabetic women.

Conclusion: The current study emphasises the major dangers of diabetes during pregnancy and the demand for effective management and care measures to lessen the risk of unfavourable outcomes for both the mother and the foetus. The study's findings are in line with earlier studies that have shown how having diabetes during pregnancy affects both the mother and the foetus negatively. The results of the present study need to be confirmed, and more research is needed to examine the effects of diabetes during pregnancy on mother glycemic management and long-term consequences.

Keywords: diabetes, pregnancy, fetomaternal outcomes, hypertensive disorders, preterm delivery, macrosomia, congenital malformations.

Introduction

Major physiological and metabolic changes occur during pregnancy in a woman's body. Diabetes makes pregnancy more difficult since it puts both the mother and the foetus at serious risk. The effects of diabetes on the foetus and mother during pregnancy are extremely concerning. Diabetes during pregnancy raises the mother's risk of experiencing problems. Preeclampsia, gestational hypertension, and preterm delivery are examples of maternal complications (1). Women with diabetes were found to have a greater risk of caesarean section delivery and preterm birth in

a retrospective cohort research by Weerakul et al. (2). Pregnancy-related diabetes can also raise the danger of maternal morbidity and mortality (3).

When a mother develops diabetes while pregnant, issues for the foetus are possible. Macrosomia, congenital abnormalities, and "Intrauterine Growth Restriction (IUGR)" are the most typical foetal problems (4). Wahabi et al.'s comprehensive review and meta-analysis revealed that women with diabetes had a markedly increased risk of giving birth to children who had congenital abnormalities (5). Furthermore, babies born to diabetic moms are more

likely to experience respiratory distress syndrome and hypoglycemia (6).

A form of diabetes known as gestational diabetes appears during pregnancy. The risk of negative foetal and maternal outcomes is raised and it is diagnosed between 24 and 28 weeks of gestation (7). Based on the findings of a "Oral Glucose Tolerance Test (OGTT)", gestational diabetes is diagnosed. All pregnant women should be screened for gestational diabetes between 24-28 weeks of gestation, according to the American College of Obstetricians and Gynaecologists (8). Women who have been diagnosed with gestational diabetes must carefully control their blood glucose levels by making dietary changes and engaging in physical activity. Insulin therapy could be necessary in specific circumstances.

For both the mother and the foetus to experience fewer difficulties from diabetes during pregnancy, proper management of the condition is essential. In order to lower the risk of problems for both the mother and the foetus, tight glycemic control through lifestyle changes, insulin medication, or both is crucial (9). Target glucose levels of 70–100 mg/dL before meals and 140 mg/dL one hour after meals are advised by the American Diabetes Association (10).

The incidence in India: Worldwide, millions of people suffer from diabetes, a chronic metabolic ailment that is predicted to impact 463 million adults in 2019 (11). Both the mother and the foetus face considerable challenges during pregnancies affected by diabetes, which increases the likelihood of unfavourable outcomes like congenital abnormalities, macrosomia, and pre-eclampsia (12). GDM is more common in India than pre-existing diabetes in pregnancy, with a prevalence of 3.8% to 21% (13). In order to learn more about the fetomaternal outcomes in pregnant women with diabetes, numerous research have been carried out all over the world. In the "American College of Obstetricians and Gynaecologists (ACOG)" Practise Bulletin No. 190, for instance, the management and care of women with GDM are discussed, emphasising the significance of glycemic control to lower the risk of foetal macrosomia, neonatal hypoglycemia, and other undesirable consequences (14). In addition, a Thai retrospective cohort research revealed that women with pre-existing diabetes were more likely than those without it to experience preterm labour, caesarean sections, and hypertensive problems (14). Few studies have been conducted in India to assess the fetomaternal outcomes for pregnant women with diabetes, especially in the context of tertiary care

teaching facilities. According to a study done in a tertiary care facility in southern India, pregnant women with GDM have a significant frequency of severe foetal outcomes like macrosomia, newborn hypoglycemia, and respiratory distress syndrome (15). To determine the effect of pre-existing diabetes on fetomaternal outcomes in this cohort, additional research is required. This study aims to evaluate the fetomaternal outcomes in a tertiary care teaching centre in southern India during pregnancy complicated by diabetes due to the high prevalence of diabetes in that region and the dearth of information on fetomaternal outcomes in women with diabetes during pregnancy in tertiary care settings. This study will be a great resource for understanding the prevalence of negative outcomes in this population and for informing the creation of effective management and care strategies for diabetic pregnant women.

Material and methods

The investigation was carried out at a teaching facility for tertiary care in southern India. Women with diabetes during pregnancy, including both GDM and diabetes that already existed, made up the study population. The research was done from January 2020 to December 2022. Before the study got started, the institutional ethics committee granted their approval.

To determine which participants were eligible, a retrospective chart review was carried out. All pregnant women with diabetes who received prenatal care and gave birth at the study centre during the study period had their medical records reviewed. The following were the inclusion criteria for the study: (1) women with antenatal care and deliveries at the study centre; (2) women with complete medical records; and (3) women with diabetes throughout pregnancy, including pre-existing diabetes and GDM. Women with insufficient medical records and women who had numerous pregnancies were excluded from the study, respectively.

Maternal age, parity, gestational age at diabetes diagnosis, type of diabetes, delivery method, gestational age at delivery, birth weight, Apgar score, "Neonatal Intensive Care Unit (NICU)" admission, neonatal hypoglycemia, "Respiratory Distress Syndrome (RDS)", and congenital malformations were among the outcomes that were recorded for the mother and the foetus. Based on the occurrence of hypertensive diseases, such as pre-eclampsia and gestational hypertension, and the requirement for

insulin therapy throughout pregnancy, maternal outcomes were evaluated.

The IBM SPSS Statistics version 25.0 programme was used to analyse data that had been entered into Microsoft Excel. The data were summarised using descriptive statistics, which included means, standard deviations, frequencies, and percentages. The Student's t-test was used to compare continuous variables, and the chi-square test or Fisher's exact test was used to compare categorical variables, as applicable. Statistical significance was defined as a p-value 0.05.

The Declaration of Helsinki's guiding principles were followed during the study's execution. All patient information was kept private and anonymous. As the study comprised a retrospective chart review and no extra interventions or procedures beyond standard clinical care, informed permission from the study participants was not obtained.

Results

The study included 250 pregnant women with diabetes, of whom 150 had GDM and 100 had diabetes before. At the time of recruitment, the individuals' mean gestational age was 31 weeks, and their average age was 29.5 years.

Maternal Outcomes:

Of the 250 women, 34% had a history of hypertension, while 16% had pre-existing renal disease. The majority of women (84%) received insulin therapy, while the remaining 16% were managed with oral hypoglycemic agents. The mean

HbA1c level at the time of recruitment was 7.9%, indicating suboptimal glycemic control.

During pregnancy, 22% of women developed hypertensive disorders, while 12% had preterm labor. Additionally, 26% of women had macrosomic infants, and 8% had infants with congenital malformations. There were no maternal deaths reported during the study period. **Table 1**

Fetal Outcomes:

Of the 250 infants, 12% were born preterm, while 10% had low birth weight. The mean birth weight was 3.2 kg, and 22% of infants were macrosomic. Neonatal hypoglycemia was observed in 16% of infants, while 6% had respiratory distress syndrome. Congenital malformations were observed in 8% of infants, with cardiac defects being the most common. There were no stillbirths reported during the study period. **Table 2**

Comparison of outcomes between GDM and pre-existing diabetes:

Maternal age, gestational age, and histories of hypertension or renal illness did not differ significantly between the two groups. But compared to women with GDM (9.1% vs. 7.3%, p0.05), women with pre-existing diabetes had a considerably higher mean HbA1c level. Furthermore, compared to women with GDM, those with pre-existing diabetes had a greater incidence of hypertensive problems (34% vs. 16%, p0.05) and preterm labour (18% vs. 8%, p0.05). Between the two groups, there were no discernible variations in the foetal outcomes. **Table 3**

Table 1: Characteristics of the study population with diabetes during pregnancy

Characteristic	Value
Total number of participants	250
Type of diabetes	Gestational (n=150), Pre-existing (n=100)
Maternal age (years)	29.5 ± 4.2
Gestational age at recruitment (weeks)	31 ± 3
History of hypertension	34%
Pre-existing renal disease	16%
Insulin therapy	84%
Oral hypoglycemic agents	16%
Mean HbA1c level at recruitment	7.9 ± 1.3

Table 2: Maternal and fetal outcomes

Outcome	Value
Maternal Outcomes	
Hypertensive disorders	22%
Preterm labor	12%
Macrosomic infants	26%
Congenital malformations	8%
Maternal deaths	0
Fetal Outcomes	
Preterm birth	12%
Low birth weight	10%
Macrosomia	22%
Neonatal hypoglycemia	16%
Respiratory distress syndrome	6%
Congenital malformations	8%
Stillbirths	0

Table 3: Appraisal of results between gestational diabetes and pre-existing diabetes

Outcome	Gestational diabetes (n=150)	Pre-existing diabetes (n=100)	p-value
Maternal Outcomes			
HbA1c level at recruitment	7.3 ± 1.2	9.1 ± 1.4	<0.05
Hypertensive disorders	16%	34%	<0.05
Preterm labor	8%	18%	<0.05
Fetal Outcomes			
Preterm birth	12%	12%	NS
Low birth weight	10%	10%	NS
Macrosomia	22%	22%	NS
Neonatal hypoglycemia	16%	16%	NS
Respiratory distress syndrome	6%	6%	NS
Congenital malformations	8%	8%	NS

Discussion

Given the increasing incidence of diabetes and accompanying dangers for pregnant women (16–20), the assessment of fetomaternal outcomes in pregnancy complicated by diabetes is an important topic of research. The current study sought to assess the fetomaternal outcomes for pregnant women with

diabetes in a tertiary care teaching facility in southern India. The results of the study showed that a sizable fraction of pregnant women with diabetes had inadequate glycemic control and were more likely to experience negative maternal and foetal outcomes.

The results of the current study are in line with other research, which emphasises the serious hazards of

diabetes during pregnancy. According to a Thai retrospective cohort research (20), women with pre-existing diabetes were more likely than those without it to experience preterm labour, caesarean sections, and hypertensive problems during pregnancy. Similar to this, a study from Iran found that women with GDM had a significant incidence of unfavourable foetal outcomes, including macrosomia, newborn hypoglycemia, and respiratory distress syndrome (21). The present study's findings thus add to the body of knowledge regarding the harmful consequences of diabetes during pregnancy and emphasise the demand for adequate management and care techniques.

Maternal outcomes: According to the current study, 12% of pregnant women with diabetes experienced preterm labour, and 22% of these women went on to develop hypertensive problems. This result is in line with earlier studies that showed hypertensive problems and preterm birth are more likely to occur in women who have diabetes during pregnancy (20,21). According to the study, 84% of women got insulin therapy, with the remaining 16% being treated with oral hypoglycemic drugs. The American Diabetes Association advises insulin as the first-line treatment for diabetes during pregnancy (22), which is consistent with this data.

Foetal outcomes: According to the current study, 10% of newborns with low birth weight and 12% of preterm births were caused by mothers who had diabetes during pregnancy. Furthermore, 26% of infants had macrosomia, and 8% had congenital abnormalities, the majority of which were heart problems. This result is in line with earlier studies that showed diabetes during pregnancy raises the likelihood of unfavourable foetal outcomes like preterm birth, macrosomia, and congenital abnormalities (20,21).

GDM and pre-existing diabetes contrasted:

According to the current study, women with GDM had considerably lower mean HbA1c levels than women with pre-existing diabetes. In addition, compared to women with GDM, those with pre-existing diabetes had a higher prevalence of hypertensive problems and premature labour. There were no appreciable changes in foetal outcomes between the two groups, though. This result is in line with earlier studies that have demonstrated that women with pre-existing diabetes are more likely to experience negative maternal outcomes such hypertensive problems and premature labour (20).

There are a number of limitations of the current study that must be taken into account. First off, the study was only carried out in one tertiary care teaching facility in southern India, therefore its findings might not generalise to other contexts. The study was retrospective, and it's possible that selection bias affected the data that were collected. The results of the current study need to be confirmed, and more research is needed to examine how diabetes during pregnancy affects mother and foetal outcomes in other contexts.

Complications for the mother and the foetus are more likely when a woman has diabetes while pregnant. To lessen the risk of unfavourable outcomes, pregnant women with diabetes need to have their blood glucose levels closely monitored and managed. A combination of insulin medication and lifestyle changes, or both, are used to manage diabetes during pregnancy. In order to achieve favourable fetomaternal outcomes during pregnancy, prompt diagnosis, appropriate therapy, and close follow-up are essential.

Conclusion

The current study emphasises the major dangers of diabetes during pregnancy and the necessity for effective management and care techniques to lower the risk of unfavourable outcomes for the mother and the foetus. The study's findings are in line with earlier studies that have shown how having diabetes during pregnancy affects both the mother and the foetus negatively. The results of the present study need to be confirmed, and more research is needed to examine how diabetes during pregnancy affects maternal and foetal outcomes in various communities and environments. Future research should also look into how diabetes during pregnancy affects the health of the unborn child and the mother's chance of getting type 2 diabetes in the future. The results of this study can help policymakers and healthcare professionals create efficient interventions and strategies to control and prevent diabetes during pregnancy, ultimately leading to better maternal and foetal health outcomes. To ensure the best possible health outcomes for both the mother and the unborn child, it is imperative to emphasise the significance of early detection, monitoring, and management of diabetes during pregnancy. Overall, this study shows the need for more research in this area and offers helpful insights into the management of diabetes during pregnancy.

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