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Original Research Article

PREVALENCE OF GESTATIONAL DIABETES AND RELATED COMPLICATIONS IN DISTRICT SIALKOT

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Abstract: *Gestational diabetes mellitus (GDM) is a prevalent medical complication during pregnancy, associated with adverse maternal and neonatal outcomes. Understanding the impact of GDM on pregnancy complications is essential for effective management and care.* ***Objective:*** *This study aimed to compare the incidence of various complications between pregnant women with and without GDM.* ***Method:*** *A total of 200 pregnant women were recruited from Govt. Sardar Begum Teaching Hospital Sialkot and Civil Hospital Sialkot. These patients were given 75 g oral glucose irrespective of the meals, and their plasma glucose was estimated at two h. Patients with plasma glucose values of 140 mg/dl were labelled GDM; the rest were the control or non-GDM groups. All GDM patients were followed up and treated with diet and insulin therapy till delivery to know maternal and fetal outcomes.* ***Results:*** *Among the enrolled pregnant women, 70 (35%) were diagnosed with GDM. Significant differences were observed between the Non-GDM and GDM groups in terms of Cesarean section delivery (23.8% vs 55.7%, P=0.001), hypertension (13.8% vs 74.3%, P=0.031), and preterm birth (17.7% vs 24.3%, P=0.001). However, no significant difference was found in the incidence of fetal abnormalities between the two groups (9.2% vs. 8.6%, P=0.012). Additionally, the risk of intrauterine fetal demise was comparable between the Non-GDM and GDM groups (10.0% vs. 11.4%, P=0.031).* ***Conclusion:*** *Pregnant women with GDM are at increased risk of Cesarean section delivery, hypertension, and preterm birth compared to those without GDM. However, the incidence of fetal abnormalities and intrauterine fetal demise does not significantly differ between the two groups. Early detection and management of GDM are crucial to minimise adverse pregnancy outcomes.*

Keywords: Gestational Diabetes Mellitus, Macrosoma, Hypertension, Intra Uterine Fetal Demise, Preterm, Premature Babies

Introduction

Gestational Diabetes Mellitus is widespread in pregnancy nowadays. During pregnancy, it is not linked to any particular factor. It can happen and be diagnosed at any stage (1). Children are also more likely to become overweight, syndrome of metabolism and type II diabetes during early stages and adolescence (2). Almost 22 % of pregnancies may be affected by GDM, depending on the population characteristics and the diagnostic standards available. The obesity epidemic is expected to cause the incidence of GD to keep increasing throughout the ensuing decades (3). The primary causes of insulin resistance that characterise a typical pregnancy are an increased mother's weight and the placenta's hormones blocking the insulin (4). Elevated resistance to insulin has been related to Diabetes in gestation. Due to its unique role in insulin sensitivity regulation, resistin is one of the adipokines linked to these disorders, even if the exact pathophysiological pathways are still unclear (5). Resistin has been exclusively prepared and exposed to organism adipocytes. Recombinant resistance is given to healthy mice, reducing their ability to tolerate glucose and resulting in insulin resistance. Anti-resistin antibodies, on the other hand, cause fat mice to absorb more glucose. Therefore, high levels of resistance in the blood have been related to being overweight and having an enhanced chance of insulin resistance (6).

Obesity hurts the metabolism of the body and the organic event of adipocytes. This alteration causes macrophages due to the increase in lipolysis and proinflammatory, which successively induces a significant amount of proinflammatory comprised of tumour necrosis factor (TNF)-α, interleukin (IL)-1β; this direct intermediary gives instructions to adipocytes to create a state that is insulin resistance. After this event, a state of Inflammation and insulin resistance increased during this regenerative loop. Inflammatory pathways always have an impression of a significant impact on glucose regulation. During pregnancy, this must have a salient role in the production of insulin resistance (7).

Resistin levels are more significant in healthy pregnant women than in females who are in gestation (8). However, alterations in the resistance state throughout pregnancy are unclear (9). Resistance levels remain in the first two trimesters, and level uptake is maintained within the last trimester. On the other hand, resistance levels gradually decline from 10 to 14 weeks of gestation. Several researches on GD have recently been published with controversial findings (10). Insulin resistance and the emergence of resistance are causally related to higher resistance levels in obese people (11).

Gestational Diabetes Mellitus is a widespread issue in public that has two short and long-term adversities for unborn babies and diabetic mothers. At present, it affects a considerable portion of the female population. According to reports, GDM occurs in 4% of pregnancies, and its frequency has been increasing fast. GDM is recognised as a population comprised of females who have a significant threat of developing type 2 diabetes in the years after

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pregnancy, as well as an increased risk for potential morbidity and tolerance of glucose is not established well (12).

The risk of low sugar levels in newborns' blood and nerve injuries is higher in newborns' bones—gestational diabetes is linked to maternal and fetal complications. Treatment options include non-pharmacologic therapy, insulin, and oral therapy. In pregnancy, the balance between insulin resistance and secretion disturbs and causes hyperglycemia. Gestational diabetes is related to maternal and fetal complications. Pregnancy-related diabetes can have serious adverse effects on fetal and neonatal outcomes (13).

GDM has a multifactorial aetiology that is still not fully understood. Pregnancy hyperglycemia occurs in the majority of GDM patients due to reduced glucose tolerance caused by insulin signalling cascade abnormalities and malfunction of the pancreatic beta-cell, which is the result of chronic insulin resistance (14). During the last trimester, the placenta produces more hormones that cause diabetes, such as estrogen, progesterone, and human placental lactogen. Pregnancy is followed by progressive insulin resistance (15). GDM does, however, pose a severe threat to feto-maternal, neonatal, and morbidity rates (13, 16). The child and the mother's future threat of cardiovascular disease, diabetes of type 2, and obesity (17). Thus, the study aimed to determine the percentage of pregnant females with GDM in the Sialkot district and evaluate the associated complications.

Methodology

Three hundred patients were recruited from two primary healthcare facilities Govt. Sardar Begum Teaching Hospital Sialkot and Civil Hospital Sialkot serve as primary centres for prenatal care in the Sialkot city region. Patients were predominantly pregnant women attending routine check-ups. The sample was divided into two groups: a healthy group comprising non-diabetic participants and a study group comprising gestational diabetic patients. Inclusion criteria involved individuals aged between 25 to 45 years. Data collection was facilitated through structured questionnaires, capturing demographic details such as age, weight, blood pressure during pregnancy, ethnicity, family diabetic history, and weight. After the questionnaire was completed, participants underwent an oral glucose tolerance test (OGTT) to measure blood glucose levels.

Participants were instructed to undergo a fasting period of 10 to 12 hours, during which only water intake was permitted in small quantities. Fasting blood samples were obtained in the morning. Following the fasting test, participants consumed a standardised 75 grams of glucose solution dissolved in water.

During the glucose tolerance test, participants refrained from consuming any food and were only allowed to consume the prescribed glucose solution. Blood samples were collected at post-glucose ingestion intervals, typically at one and two hours. Participants were advised to remain resting to minimise energy expenditure, ensuring the integrity of test results. Patients with plasma glucose values of 140 mg/dl were labelled GDM; the rest were labelled as the control or non-GDM groups. Data analysis was conducted using SPSS software, version 26. Descriptive statistics, including frequencies, number of observations, and percentages, were computed. Additionally, inferential statistical tests such as Independent Sample T-tests were employed to ascertain the prevalence of diabetes among pregnant women.

Results

Two hundred pregnant women were enrolled in this hospital for delivery during the study period. Of these, 70 (35%) were chosen to undergo examination and testing for gestational diabetes mellitus (GDM) (Figure 1).

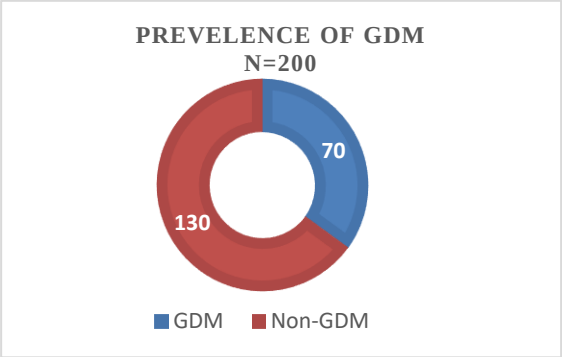

Figure 1: Distribution of GDM and Non-GDM among the study population

Table 1 compares various complications observed in pregnant women, stratified into two groups based on the presence or absence of Gestational Diabetes Mellitus (GDM). The non-GDM group consisted of 130 individuals, while the GDM group comprised 70 participants. Each complication's prevalence was assessed within these groups, with statistical significance indicated by the respective P-values.

Cesarean section (C-section) deliveries exhibited a notable discrepancy between the two groups. In the GDM cohort, 55.7% of pregnancies necessitated C-sections, contrasting sharply with the 23.8% rate observed in the Non-GDM group (P=0.001). This disparity underscores the heightened likelihood of C-section delivery associated with GDM.

Hypertension emerged as another significant concern, particularly prevalent among pregnant women with GDM. A striking 74.3% of individuals in the GDM group experienced hypertension during pregnancy, compared to a notably lower incidence of 13.8% in the non-GDM cohort (P=0.031). This finding emphasises the heightened risk of hypertensive disorders in GDM pregnancies.

Interestingly, the incidence of fetal abnormalities did not exhibit a statistically significant difference between the two groups (P=0.012) despite slightly higher rates in the Non-GDM group (9.2%) compared to the GDM group (8.6%). This suggests that GDM may not substantially influence the occurrence of fetal abnormalities compared to other factors.

Preterm birth, a critical concern for neonatal health, demonstrated a notably elevated prevalence among pregnancies complicated by GDM. In the GDM group, 24.3% of births occurred prematurely, significantly higher than the 17.7% observed in the Non-GDM group (P=0.001). This finding highlights the heightened risk of preterm delivery associated with GDM.

Additionally, intrauterine fetal demise, while marginally more prevalent in the GDM group (11.4%) compared to the Non-GDM group (10.0%), did not demonstrate a

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statistically significant difference (P=0.031). This suggests a comparable risk of intrauterine fetal demise between the two groups, albeit with a slight elevation among GDM pregnancies.

Table 1: Comparison of complications

Complications	Non- GDM (n=130)	GDM (n=70)	*P*-value
C-Section	31(23.8%)	39(55.7%)	0.001
Hypertension	18(13.8%)	52(74.3%)	0.031
Fetal-Abnormalities	12(9.2%)	6(8.6%)	0.012
Preterm	23(17.7%)	17(24.3%)	0.001
Intra Uterine Fetal Demise	13 (10.0%)	8(11.4)	0.031

Discussion

The prevalence of gestational diabetes mellitus, a dangerous condition that influences many pregnancies, is rising. Provides indicates that early diagnosis improves treatment and outcomes, but this is constrained by ongoing controversy and inconsistency surrounding many elements of its diagnosis. After more muscular, evidence-based, improved diagnoses and treatment, better results for women and children could come from the national agreement in Pakistan on screening methods and diagnostic criteria for gestational diabetes. There is a critical need for well-designed research to guide judgments about the best procedure for detecting and treating gestational (18). A diabetes mellitus meta-analysis of 84 researchers describes that the rise of GDM was 20.9%, which concurred with our findings (19). This discrepancy may be due to the participants' different ages (30.2 vs. 28.5 years), as increasing maternal age is a known risk factor for GDM (35-45). Women who are 35 years of age or older have a higher risk of developing GDM, according to our study. This finding indicates that the incidence of GDM increases with maternal age, which may account for the high incidence of GDM. Our study confirmed previous research findings and showed that pregnancy is best planned before the age of 35 and that we should improve the GDM screening strategies for older pregnant women.

It is possible that metabolic changes are carefully controlled during pregnancy to give both the mother and the fetus the best substrate. Small changes in metabolism during pregnancy may affect future generations and the mother and fetus. Creating management strategies that create a maternal-fetal environment without endangering the mother, the child, or future generations is the challenge of the twenty-first century. In an ideal world, the debate on the most straightforward finding and solution procedures and indications for initiating treatments will be resolved (20).

Since women who are overweight are more likely to adopt GDM, the alarming rise in GDM prevalence that has been seen in recent years in the U.S. mirrors this risk factor. Obesity and GDM not only raise the risk of negative pregnancy and infant outcomes but are also linked to a higher threat of having type 2 diabetes afterwards life in both the mother and the baby, which could have a significant impact on future individual health and societal medical costs (21) Of 200 pregnant women who were enrolled in these hospitals for delivery during the study period, 70 (35 %) were screened out to be the cases of GDM. 70 GDM mothers in the study group along with 130(65%) non-GDM mothers as control were followed till delivery. In the study group, 55.7% Cesarean Section, hypertension 74.3%, Fetal Abnormalities 5 to 8%, Premature babies due to preterm (rupture of membrane) 24.3%, Intrauterine fetal demise 11.4 % as shown that every single complication has an effect on the health of the baby and mother they may get diabetes later in life and that can be dangerous for both of them and prove to be a lifelong threat.

Conclusion

In this study, pregnant women with Gestational Diabetes Mellitus (GDM) showed significantly higher rates of Cesarean section deliveries, hypertension, and preterm births compared to those without GDM. However, there were no significant differences in the incidence of fetal abnormalities or intrauterine fetal demise between the two groups. These findings highlight the importance of early detection and management of GDM to reduce the risk of adverse maternal and neonatal outcomes.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department concerned. (SBTH/APP/2022-10-12/01)
Consent for publication.
Approved
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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, and final approval.
Conception of Study, Final approval of manuscript.
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Study Design, Review of Literature.
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Data acquisition and analysis.

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