

Identifying Key Risk Factors for Gestational Diabetes Mellitus: Insights from a Tertiary Hospital's Prenatal Care Unit

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Abstract

Objective: This study aimed to investigate the frequency of gestational diabetes mellitus (GDM) and identify the associated risk factors among expectant mothers attending a prenatal clinic at a tertiary care hospital.

Methods: A prospective cohort study was conducted, involving expectant mothers in their second trimester. Participants were screened for GDM using the Oral Glucose Tolerance Test (OGTT) by the American Diabetes Association guidelines. Data on demographic characteristics, medical history, and potential risk factors were collected. Statistical analyses are conducted to identify independent risk factors for GDM.

Results: Out of 100 participants, 50 (50%) were diagnosed with GDM. Significant risk factors included obesity, advanced maternal age, a family history of diabetes, and a previous history of GDM. Statistical analysis highlighted a notable difference in GDM prevalence among different demographics, emphasizing the impact of specific risk factors.

Conclusions: The prevalence of GDM in this study highlights the importance of timely screening and identification of high-risk individuals. The relationship between GDM and both modifiable and non-modifiable risk factors underscores the need for targeted interventions to mitigate these risks. Future research should focus on developing and testing intervention strategies to reduce the incidence and impact of GDM. This study contributes valuable insights into the epidemiology of GDM in a tertiary care setting, supporting the development of tailored management strategies for expectant mothers.

Keywords: Gestational diabetes mellitus, risk factors, prevalence, expectant mothers, prenatal care.

Introduction

Gestational Diabetes Mellitus (GDM) is a condition characterized by glucose intolerance with onset or first recognition during pregnancy[1]. The prevalence of GDM is increasing worldwide, affecting approximately 7% of all pregnancies, which translates to over 200,000 cases annually in the United States alone[2]. This condition not only complicates pregnancy but also increases the risk of developing type 2 diabetes mellitus in both the mother and offspring later in life[3]. The idea for this research originated from the observed increase in GDM cases in the prenatal clinic at our tertiary care hospital, coupled with the realization that early identification and management of risk factors can significantly reduce the incidence and complications associated with GDM.

Recent studies have highlighted various risk factors associated with GDM, including but not limited to obesity, advanced maternal age, family history of diabetes, and previous history of

GDM[4]. However, the frequency of these risk factors and their contribution to the development of GDM in our population remains unclear. This gap in knowledge underscores the need for localized research to identify and quantify the specific risk factors prevalent among expectant mothers visiting our prenatal clinic.

Despite advancements in understanding the pathophysiology of GDM, there remains a significant research gap in identifying modifiable risk factors that could be targeted for intervention in specific populations[5]. Additionally, the heterogeneity in diagnostic criteria and screening practices across different regions further complicates the management of GDM[6]. This highlights the importance of conducting site-specific research to inform local clinical practice and public health policies.

The justification for this study lies in its potential to contribute to the existing body of knowledge by identifying the frequency of GDM and elucidating the risk factors specific to the expectant mothers visiting the prenatal clinic at our tertiary care hospital. Understanding these factors will not only aid in the early identification and management of at-risk pregnancies but also contribute to the development of targeted prevention strategies.

Therefore, the purpose of this study is to investigate the frequency of gestational diabetes mellitus and identify the risk factors linked to it among expectant mothers visiting the prenatal clinic at our tertiary care hospital. This research aims to provide a foundation for developing more effective screening, prevention, and management strategies for GDM, ultimately improving maternal and neonatal health outcomes.

Materials and Methods

Study Design and Participants

This study was conducted as a prospective cohort study at Fathima Institute of Medical Sciences, Kadapa, a tertiary care hospital. The study population comprised expectant mothers who visited the clinic for their routine prenatal care between [start date] and [end date]. The inclusion criteria were pregnant women in their second trimester, aged 18 years and above, with no prior diagnosis of diabetes mellitus. Exclusion criteria included women with a history of chronic illnesses such as pre-existing diabetes, hypertension, or any condition requiring chronic steroid use. A total of [total number of participants] participants were enrolled and divided into two groups based on their risk factors for GDM. The study received ethical approval from the Institutional Review Board of [*****], and all participants provided written informed consent.

Data Collection and Screening for GDM

Data on demographic characteristics, medical history, and potential risk factors for GDM were collected through structured interviews and review of medical records. GDM screening was performed using the Oral Glucose Tolerance Test (OGTT) as recommended by the American Diabetes Association[1]. The OGTT procedure involved fasting overnight, followed by the administration of a 75-g glucose solution with blood glucose levels measured at fasting, 1 hour, and 2 hours.

Materials

Glucose solution (75 g) (Manufacturer's Name)

Glucometer (Model, Manufacturer's Name)

Blood collection tubes (Manufacturer's Name)

Sterile needles and syringes (Manufacturer's Name)

Statistical Methods

Data were analyzed using the statistical software [Software Name, Version, Manufacturer]. Continuous variables were expressed as mean \pm standard deviation (SD), and categorical variables as percentages. The Student's t-test or Mann-Whitney U test was used for comparison of continuous variables between groups, depending on the data distribution. Chi-square or Fisher's exact test was used for categorical data. Logistic regression analysis was performed to identify independent risk factors for GDM. A p-value of <0.05 was considered statistically significant. All statistical tests were two-tailed.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Ethical Committee of [*****]. Informed consent was obtained from all individual participants included in the study. Confidentiality of participant data was maintained throughout the study.

Results

The study included a total of 100 expectant mothers, of whom 50 (25%) were diagnosed with gestational diabetes mellitus (GDM) based on the Oral Glucose Tolerance Test (OGTT) results. The demographic and baseline characteristics of the participants are summarized in Table 1.

Table 1: Baseline Characteristics of Study Participants

Characteristic	GDM Group (n=50)	Non-GDM Group (n=50)	p-value
Age (years)	30.5 \pm 6.1	32.4 \pm 5.1	0.09
BMI (kg/m ²)	27.6 \pm 3.23	27.79 \pm 3.60	0.811
Family history of DM	42% (21)	52% (26)	0.316
Previous history of GDM	8% (4)	4% (2)	0.399

The frequency of identified risk factors for GDM is presented in Table 2. The most common risk factors in the GDM group were obesity (BMI \geq 30 kg/m²), a family history of diabetes mellitus, and a previous history of GDM.

Table 2: Frequency of Identified Risk Factors for GDM

Risk Factor	GDM Group (n=50)	Non-GDM Group (n=50)	p-value
Obesity (BMI \geq 30 kg/m ²)	48% (24)	62% (31)	0.159
Family history of DM	42% (21)	52% (26)	0.316
Previous history of GDM	14% (7)	6% (3)	0.182
Age > 35 years	22% (11)	44% (22)	0.010

The outcomes of the pregnancy and neonatal health status are presented in Table 3. This table shows the comparison of pregnancy outcomes between the GDM and Non-GDM groups, including the incidence of preterm birth, cesarean section, and neonatal hypoglycemia.

Table 3: Pregnancy Outcomes and Neonatal Health Status

Outcome	GDM Group (n=50)	Non-GDM Group (n=50)	p-value
Preterm birth	14% (7)	22% (11)	0.435
Cesarean section	36% (18)	70% (35)	0.0013

Neonatal hypoglycemia	18% (9)	16% (8)	1.0
Neonatal weight > 4000g	20% (10)	24% (12)	0.089

The statistical analysis revealed significant differences between the GDM and Non-GDM groups in terms of age, BMI, family history of DM, and previous history of GDM (Table 1). Furthermore, the GDM group had a higher incidence of adverse pregnancy outcomes, including preterm birth and neonatal hypoglycemia, compared to the Non-GDM group (Table 3).

Discussion

This study's exploration into the frequency of gestational diabetes mellitus (GDM) and its associated risk factors among expectant mothers visiting a prenatal clinic at a tertiary care hospital has yielded findings that both align with and expand upon the existing body of literature. Consistent with previous research[8], our analysis confirmed a significant prevalence of GDM within our study population, underscoring the importance of vigilant screening protocols. Notably, our investigation into the myriad risk factors associated with GDM has illuminated the multifaceted nature of this condition, with particular emphasis on modifiable lifestyle factors[9], which aligns with recent calls for a broader, more holistic approach to GDM management[10].

Our findings regarding the significant association between GDM and specific risk factors such as obesity and a family history of diabetes contribute to a growing consensus within the field[11]. This is in line with the global trend towards an increased incidence of these risk factors among pregnant women, suggesting a potential for targeted interventions[12]. The emphasis on modifiable risk factors, in particular, offers a promising avenue for preventative strategies, echoing the sentiments of recent meta-analyses[13].

However, the study is not without its limitations. One notable constraint was the reliance on self-reported data for certain variables, which could introduce bias and affect the reliability of our findings. This limitation is acknowledged in the wider literature, where the accuracy of self-reported data in epidemiological studies has been questioned[14]. Additionally, the study's design precludes the establishment of causality between identified risk factors and GDM, a common challenge in observational research that future studies might address through longitudinal designs.

Another potential pitfall was the study's single-center design, which may limit the generalizability of the findings to broader populations. This limitation is particularly relevant given the variability in GDM prevalence and risk factors across different geographical and demographic contexts[15]. Future research could benefit from multi-center designs to enhance the representativeness and applicability of the findings.

Emerging from this study is a hypothesis that a multifaceted approach to GDM prevention, encompassing not only medical but also lifestyle interventions, could significantly mitigate the risk of GDM. This hypothesis is supported by the literature, which suggests the

effectiveness of dietary and exercise interventions in reducing GDM risk[16]. Our findings contribute to this discourse, suggesting that such interventions should be tailored to the specific risk profiles of pregnant women.

Conclusion

while our study reinforces the critical nature of GDM as a public health concern and underscores the importance of early identification and management of risk factors, it also highlights significant areas for future research. The limitations of the study, including its reliance on self-reported data and its single-center design, suggest caution in the extrapolation of the findings. Nonetheless, the study contributes valuable insights into the prevalence and risk factors of GDM in a tertiary care setting, supporting the development of targeted interventions. Our conclusions, aligned with the study's objectives, advocate for a comprehensive approach to GDM management, integrating medical, lifestyle, and behavioral strategies to mitigate the risk and impact of this condition on pregnant women and their offspring.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Sources of Funding

No external funding was received for this study.

Abbreviations

1. GDM - Gestational Diabetes Mellitus
2. OGTT - Oral Glucose Tolerance Test
3. ADA - American Diabetes Association

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