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CROSS-SECTIONAL STUDY ON THE PREVALENCE OF GESTATIONAL DIABETES AND ITS MANAGEMENT PRACTICES

Original Article

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ABSTRACT

Background: Gestational diabetes mellitus (GDM) is a prevalent pregnancy-related condition characterized by glucose intolerance, increasing maternal and neonatal risks. Globally, GDM contributes significantly to adverse outcomes, including macrosomia, preeclampsia, and neonatal hypoglycemia. Early identification and management are critical to reducing these complications. However, limited knowledge, attitudes, and practices (KAP) among women with GDM and regional disparities in healthcare access often lead to suboptimal outcomes, particularly in resource-limited settings like Pakistan.

Objective: To assess the prevalence of GDM and evaluate the knowledge, attitudes, and practices (KAP) regarding its management among affected women in Karachi, Pakistan.

Methods: This cross-sectional study was conducted in selected hospitals in Karachi, Pakistan, from July 2023 to January 2024. A total of 189 participants diagnosed with GDM at 24–34 weeks of gestation were recruited using consecutive sampling. Data were collected using a structured, pre-validated questionnaire, which assessed demographic details, clinical history, and KAP scores. Statistical analyses, including Spearman correlation and multivariate logistic regression, were used to evaluate associations between knowledge, attitudes, and practices. Ethical approval was obtained from institutional review boards.

Results: The mean age of participants was 30.4 ± 4.2 years, with 57% (n=108) reporting a family history of diabetes. The average BMI was 28.7 ± 3.5 kg/m², with 77% categorized as overweight or obese. Mean KAP scores were 10.9 ± 2.8 (knowledge), 32.8 ± 4.5 (attitude), and 12.4 ± 2.9 (practice), with 68% (n=129), 73% (n=138), and 65% (n=123) achieving good scores, respectively. Knowledge and attitude scores were positively correlated ($r=0.329$, $p<0.001$). Higher knowledge scores were independently associated with better practices (OR: 1.145, 95% CI: 1.051–1.247, $p=0.002$).

Conclusion: This study highlights moderate knowledge and practices but strong attitudes toward GDM management among women in Karachi. Educational interventions are essential to improve self-management and healthcare outcomes.

Keywords: Attitude, Body Mass Index, Diabetes Mellitus, Gestational, Knowledge, Obesity, Practice.

INTRODUCTION

Gestational diabetes mellitus (GDM) is a significant public health concern, affecting a substantial proportion of pregnancies worldwide (1). It is characterized by glucose intolerance that is first identified during pregnancy, resulting from the interplay of hormonal, genetic, and environmental factors (2, 3). GDM not only increases the risk of adverse maternal outcomes, such as preeclampsia and cesarean delivery, but also poses substantial risks to the fetus, including macrosomia, neonatal hypoglycemia, and future metabolic disorders. Furthermore, women diagnosed with GDM have an elevated risk of developing type 2 diabetes later in life, underscoring the long-term implications of this condition on health systems and society (4, 5).

Despite global efforts to standardize screening and management practices, significant disparities exist in the diagnosis and care of GDM across different regions and populations (6, 7). Variations in screening protocols, awareness levels, and healthcare access contribute to inconsistent detection rates and suboptimal management, particularly in low-resource settings. Additionally, knowledge, attitudes, and practices surrounding GDM management among patients vary widely, influencing adherence to prescribed treatments and lifestyle modifications (8). Addressing these gaps requires a comprehensive understanding of demographic and clinical factors, as well as patient education and behavioral patterns (9, 10).

This study was designed to explore the prevalence of GDM and evaluate the knowledge, attitudes, and practices of affected women within a representative population. By identifying areas of strength and deficiency in GDM management, the research aims to provide evidence-based recommendations for improving maternal and neonatal outcomes. The ultimate objective is to generate insights that can inform targeted interventions and policy changes, ensuring better healthcare delivery and patient support in managing gestational diabetes (11).

METHODS

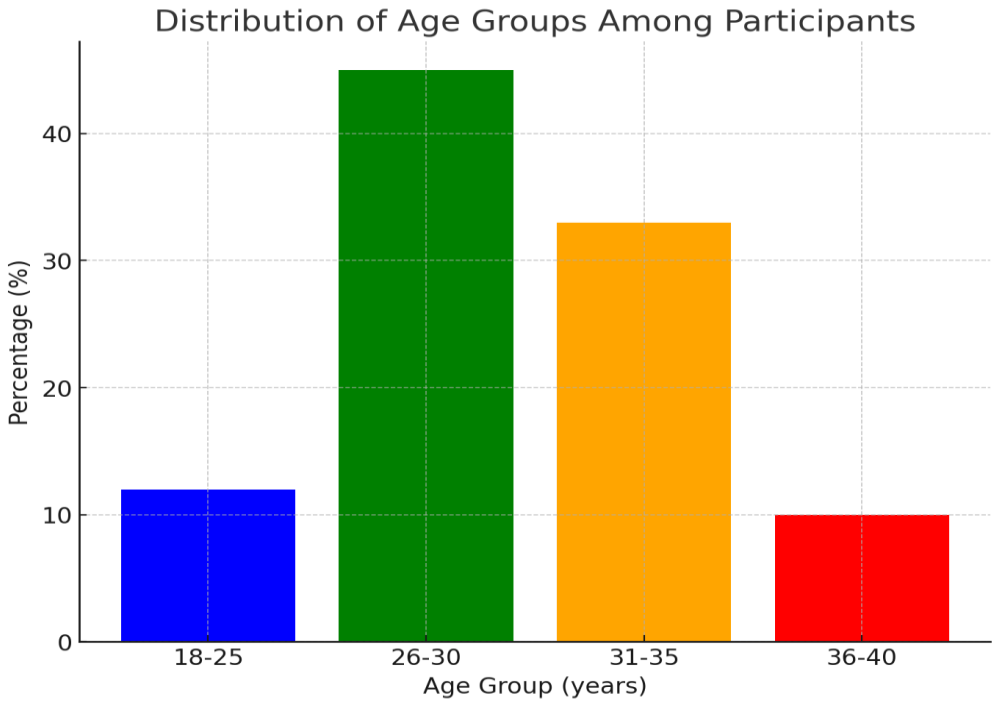
The study was conducted as a cross-sectional survey involving patients with gestational diabetes mellitus (GDM) at selected hospitals in Karachi, Pakistan, between July 2023 and January 2024. A total of 189 women diagnosed with GDM were recruited through consecutive sampling methods. Participants were included if they were between 24 and 34 weeks of gestation, had a confirmed diagnosis of GDM based on the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria, and provided informed consent to participate. Women with pre-existing diabetes, multiple pregnancies, significant co-morbid conditions such as renal or hepatic dysfunction, or those unwilling to participate were excluded from the study.

Data collection was performed using a structured, pre-validated questionnaire designed to capture demographic and clinical details, as well as assess participants' knowledge, attitudes, and practices (KAP) regarding GDM management. The knowledge section included questions about the causes, complications, and treatment modalities of GDM. The attitude section focused on perceptions about the importance of lifestyle changes and adherence to medical advice, while the practice section evaluated self-reported behaviors such as blood glucose monitoring, dietary compliance, and physical activity. Each domain was scored separately, with higher scores indicating better outcomes. The questionnaire was translated into Urdu to ensure comprehension and piloted on a small subset of the population for validation. Clinical and demographic data, including age, body mass index (BMI), family history of diabetes, and parity, were extracted from medical records. Spearman’s rank correlation was used to assess relationships between KAP scores. Multivariate logistic regression identified factors independently associated with good practice scores, defined as ≥14 out of a maximum of 16. Ethical approval for the study was obtained from the institutional review boards of participating hospitals, and strict confidentiality protocols were maintained throughout the study.

RESULTS

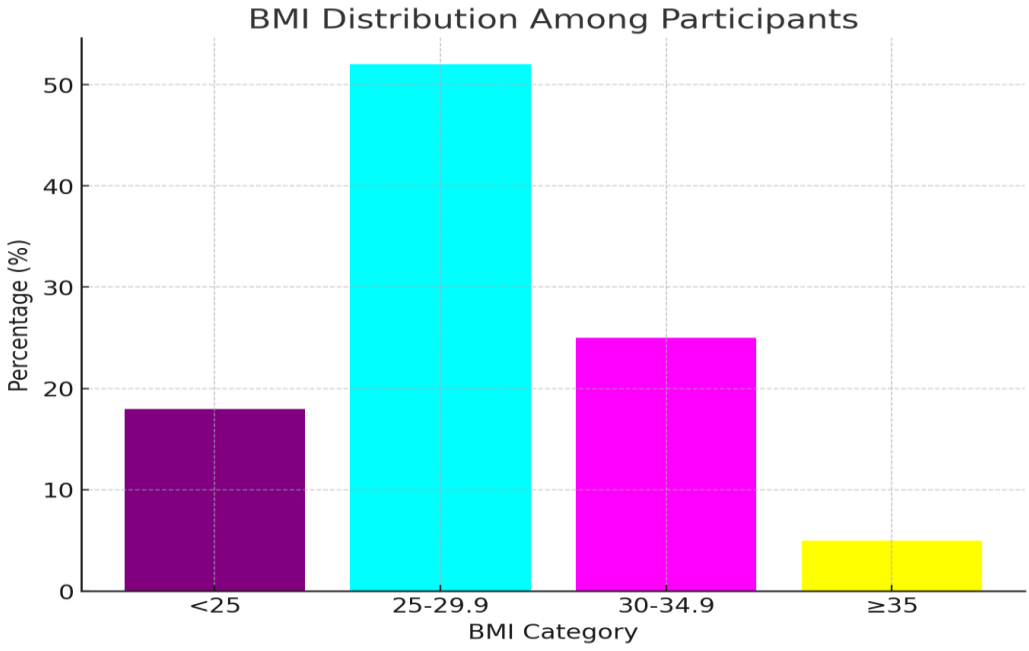
The study enrolled 189 participants with a mean age of 30.4 ± 4.2 years, with the majority (45%) falling within the 26–30 age group. The mean BMI was 28.7 ± 3.5 kg/m², with 52% categorized as overweight (BMI 25–29.9). Participants were at a mean gestational age of 28.1 ± 2.1 weeks at the time of data collection. A significant proportion (57%, n=108) reported a family history of diabetes, while the mean parity was 2.1 ± 1.2. Regarding practice domains, 73% of participants demonstrated good attitude scores, while 68% and 65% achieved good knowledge and practice scores, respectively.

Knowledge scores averaged 10.9 ± 2.8, with a positive correlation to attitude scores (r=0.329, p<0.001) and practice scores (r=0.348, p<0.001). Practice scores, averaging 12.4 ± 2.9, were independently associated with higher knowledge scores (OR: 1.145, 95% CI: 1.051–1.247, p=0.002) and attitude scores (OR: 1.132, 95% CI: 1.052–1.216, p<0.001). These results underline the critical role of education and positive attitudes in achieving effective self-management of GDM.



The chart illustrates the age group distribution among participants, with the majority (45%) falling in the 26–30 years category. This was followed by 33% in the 31–35 years group, 12% in the 18–25 years group, and 10% in the 36–40 years group, highlighting a concentration of participants in their late twenties and early thirties.

Figure 1 Distribution of Age Groups Among Participants



The chart shows the BMI distribution among participants, with the largest group (52%) classified as overweight (BMI 25–29.9), followed by 25% in the obese category (BMI 30–34.9), 18% in the normal range (<25), and 5% with a BMI ≥35. This emphasizes a high prevalence of overweight and obesity among the participants.

Figure 2 BMI Distribution Among Participants

Table 1 Demographic And Clinical Characteristics n=189

Variable	Mean	SD
Age (years)	30.4	4.2
BMI (kg/m²)	28.7	3.5
Gestational Age (weeks)	28.1	2.1
Family History of Diabetes	57% (n=108)	
Parity	2.1	1.2

Table 1 summarizes the demographic and clinical characteristics of the study participants (N=189). The mean age was 30.4 years (SD ± 4.2), with a mean BMI of 28.7 kg/m² (SD ± 3.5) and an average gestational age of 28.1 weeks (SD ± 2.1). A significant proportion (57%, n=108) reported a family history of diabetes, and the mean parity was 2.1 (SD ± 1.2). These findings highlight the diverse clinical and demographic profile of the participants.

Table 2 Knowledge, Attitude, And Practice Scores

Domain	Mean	SD	Good Performance (%)
Knowledge Score	10.9	2.8	68% (n=129)
Attitude Score	32.8	4.5	73% (n=138)
Practice Score	12.4	2.9	65% (n=123)

Table 2 presents the knowledge, attitude, and practice (KAP) scores of the participants. The mean knowledge score was 10.9 (SD ± 2.8), with 68% (n=129) demonstrating good performance. The mean attitude score was 32.8 (SD ± 4.5), with 73% (n=138) scoring well. Practice scores averaged 12.4 (SD ± 2.9), with 65% (n=123) achieving good performance. These results indicate relatively strong attitudes but room for improvement in knowledge and practices among participants.

DISCUSSION

The findings of this study provided valuable insights into the prevalence of gestational diabetes mellitus (GDM) and its associated knowledge, attitudes, and practices (KAP) among women in Karachi, Pakistan. The results highlighted both strengths and gaps in the understanding and management of GDM within the study population (12, 13). The mean knowledge score of 10.9 suggested moderate awareness of GDM-related information, yet it remained insufficient to promote comprehensive self-management. This finding aligns with prior research, which emphasized that while general awareness of GDM is often present, a deeper understanding of its complications and management strategies is lacking in similar populations.Attitudes towards GDM were notably positive, with 73% of participants demonstrating favorable scores (14). This is encouraging, as a positive attitude often serves as a foundation for behavioral change and adherence to medical advice. However, the practice scores, while moderately high at 65%, indicated that translating knowledge and attitudes into effective self-management remains a challenge (15, 16). This gap is consistent with studies identifying barriers such as inadequate access to healthcare resources, limited family support, and cultural stigmas surrounding lifestyle modifications in managing GDM (17, 18). The demographic and clinical characteristics of the participants revealed additional areas for intervention. A high prevalence of overweight and obesity (77%) underscores the critical need for early nutritional counseling and weight management programs during antenatal care. Furthermore, 57% of participants reported a family history of diabetes, suggesting a potential genetic predisposition, which could be better addressed through targeted screening and education efforts (19, 20).

A recent comparative study examined the effectiveness of telemedicine versus standard prenatal care in managing blood glucose levels in women with gestational diabetes mellitus (GDM). This randomized controlled trial involved 309 participants, who were divided into a telemedicine-based management group and a standard clinical care group. The study found that glycemic qualification rates were significantly higher in the telemedicine group at various time points, particularly during the third trimester, indicating better glucose

control. Despite these improvements, there were no significant differences in adverse pregnancy outcomes, such as preterm birth or neonatal complications, between the two groups. This suggests that while telemedicine can enhance glycemic management, its impact on broader perinatal outcomes may require further investigation. The study highlights the potential of digital interventions to complement traditional prenatal care for women with GDM, particularly in settings with limited healthcare access (21).

A recent study compared the perinatal outcomes between early and late-diagnosed gestational diabetes mellitus (GDM) cases to understand the impact of diagnosis timing on pregnancy management and outcomes. The research analyzed 250 newly detected GDM cases, dividing them into an early diagnosis group (13–28 weeks) and a late diagnosis group (after 28 weeks). Findings revealed that women in the early diagnosis group had higher rates of maternal complications such as obesity (68.7% vs. 80.0%, p=0.047) and a history of fetal loss (24% vs. 10%, p=0.005) compared to the late group. However, the late group demonstrated significantly higher weight at diagnosis (69.93 ± 9.87 vs. 66.0 ± 11.07, p=0.004) and excess body weight above ideal (17.94 ± 8.54 vs. 14.13 ± 10.15, p=0.002). The study concluded that while early diagnosis and intervention are crucial for mitigating complications, addressing patient adherence and engagement in GDM management remains equally essential across all stages of detection (22).

While the study achieved its objectives, some limitations should be acknowledged. The cross-sectional design precludes causal inferences, and the sample size, although representative, may not capture the full diversity of women with GDM in Pakistan. Future research should focus on longitudinal studies to evaluate the long-term impact of educational and lifestyle interventions in improving outcomes for both mothers and infants.

CONCLUSION

The study underscores the critical need to enhance knowledge, attitudes, and practices related to gestational diabetes management among women. While positive attitudes were observed, gaps in knowledge and practices highlight the importance of targeted educational interventions to empower women in effectively managing their condition. Addressing these gaps can lead to improved maternal and neonatal outcomes, emphasizing the role of comprehensive strategies in mitigating the long-term health risks associated with gestational diabetes.

AUTHOR CONTRIBUTIONS

Author	Contribution
Sana Sattar	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Majida Khan*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Aleem Ejaz	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Mukhlis Ul Rehman	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Zainab Asif	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Asma Yousaf	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Maqsood ur Rehman	Contributed to study concept and Data collection Has given Final Approval of the version to be published
Abdul Sami Shaikh	Contributed to study concept and Data collection Writing - Review & Editing, Assistance with Data Curation

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