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Psychosocial Burdens among Pregnant Women with Gestational Diabetes Mellitus (GDM)

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Abstract

Purpose:
Gestational diabetes mellitus (GDM) presents significant physical and psychosocial challenges, especially in developing and conflict-affected areas. This study aimed to assess levels of stress, anxiety, depression, diabetes-related distress, and perceived social support among pregnant women diagnosed with GDM in Mosul, Iraq, and to explore how pregnancy experiences influence psychological outcomes. **Methods:**A descriptive cross-sectional study was conducted involving 100 pregnant women with GDM in Mosul. Data were collected using validated instruments: DASS-21 (Depression, Anxiety, Stress Scales), PAID-5 (Problem Areas in Diabetes), PSSS (Perceived Social Support Scale), and PES-1 (Pregnancy Experience Scale). Sociodemographic and clinical data were also obtained. Descriptive statistics, Pearson correlations, and multiple linear regression analyses were employed. **Results:** Findings showed that 41% of participants reported significant depression and anxiety, with 40% experiencing moderate to severe stress and high diabetes-related distress. While 61% had moderate to high perceived social support, 10% reported low support. Positive pregnancy experiences were associated with reduced psychological symptoms, while negative experiences intensified emotional distress. Greater psychological burden was seen among older, obese, less educated, rural-dwelling, and women with unplanned pregnancies. **Conclusion:** Pregnant women with GDM experience substantial psychosocial burdens influenced by demographic and clinical factors. The findings highlight the importance of integrating psychosocial screening and support into antenatal care, especially in underserved and high-risk populations.

Keywords: Gestational Diabetes Mellitus; Psychological Distress; Stress; Anxiety; Depression

Introduction

Gestational Diabetes Mellitus (GDM) is a growing global health concern, recognized as one of the most prevalent metabolic complications during pregnancy, affecting approximately 14% of pregnancies worldwide (1-3). It is characterized by glucose intolerance that develops during pregnancy and can lead to various short- and long-term health consequences for both the mother and the fetus (4-6). Beyond its physiological impact, GDM has been increasingly associated with significant psychosocial distress (7, 8). Pregnant women diagnosed with GDM often face heightened levels of anxiety, depression, and emotional stress (9, 10). These psychological burdens can interfere with self-management behaviors, such as adhering to dietary restrictions, engaging in regular physical activity, and keeping glycemic control—elements critical to preventing perinatal complications (11, 12).

The psychological response to a GDM diagnosis can be profound, with many women experiencing fear, guilt, and concern for their unborn child's health (13). Research shows that women with GDM are at a higher risk of developing antenatal and postpartum depression compared to those without the condition (14). Furthermore, stress associated with the diagnosis, frequent medical appointments, lifestyle modifications, and social stigma can lead to emotional exhaustion, isolation, and reduced quality of life (15, 16). These challenges may be further worsened by a lack of proper psychosocial support within routine antenatal care systems (17, 18).

In conflict-affected and resource-constrained settings like Iraq, these psychosocial burdens may be magnified (19). Factors such as economic instability, limited access to specialized maternal healthcare, inadequate mental health services, and sociocultural expectations place additional stress on pregnant women (20, 21). The city of Mosul has endured prolonged periods of conflict and disruption, which have affected the health infrastructure and the well-being of its population. These circumstances contribute to a heightened vulnerability among pregnant women who may lack consistent prenatal monitoring, psychosocial counseling, and social support systems.

Despite growing international awareness of the psychosocial dimensions of GDM, research in Iraq is still scarce. Few studies have comprehensively examined how GDM affects women's mental health, social functioning, and pregnancy experiences in this unique sociopolitical context. As such, there is a critical need for localized data to inform clinical practice, guide culturally sensitive interventions, and support policy development aimed at integrating mental health services into maternal healthcare.

Therefore, this study aimed to assess the psychosocial burdens—specifically levels of stress, anxiety, depression, diabetes-related distress, and perceived social support—among pregnant women with GDM in Mosul, Iraq. By understanding the multidimensional impact of GDM in a conflict-affected urban environment, the study looks to highlight the importance of

holistic, patient-centered prenatal care that encompasses both physical and psychological health outcomes.

Patients and methods

Study Design and Period

This study employed a **descriptive cross-sectional design** to assess the psychosocial burdens among pregnant women diagnosed with Gestational Diabetes Mellitus (GDM). The research was conducted over a six-month period, from **November 2023 to April 2024**.

Study Setting

The study took place in **three major public hospitals** in Mosul, Iraq: Al-Salam Teaching Hospital, Al-Batool Maternity Hospital, and Mosul General Hospital. These facilities serve a wide catchment area that includes both urban and rural populations and are key referral centers for maternal and fetal care in the region.

Study Population and Sampling

A total of **100 pregnant women** diagnosed with GDM were selected using **purposive sampling**. Eligible participants were approached during routine antenatal visits or inpatient admissions in the obstetrics departments of the study hospitals.

Inclusion and Exclusion Criteria

Inclusion criteria were:

- Confirmed diagnosis of GDM using **WHO/IADPSG criteria**, based on 75g oral glucose tolerance test (OGTT)
- Gestational age ≥24 weeks
- Ability and willingness to give informed consent and complete questionnaires.

Exclusion criteria included:

- Pre-existing diabetes mellitus (type 1 or type 2)
- Known psychiatric illness (as per medical records or self-report)
- Severe pregnancy complications unrelated to GDM (e.g., preeclampsia, multiple gestations, fetal anomalies)

Ethical Considerations

Ethical approval for the study was initially granted by the Ministry of Health – Ninevah Health Directorate, Human Resources and Training Center (**Approval No. 2508, dated August 27, 2024**), authorizing the study to be conducted within public healthcare facilities. Subsequently, additional ethical clearance was obtained from the Collegiate Committee for Medical Research Ethics at the University of Mosul **(Approval Code: CCMRE-Nur-25-102; No.59664**) on **December 15, 2024**, ensuring full compliance with national ethical standards and safeguarding the rights and well-being of all participants.

Data Collection Tools

Data were collected using **validated, structured, and standardized instruments** to ensure accuracy and reliability in measuring the psychosocial variables under investigation. The tools were administered in Arabic and culturally adapted where necessary. The following instruments were used:

1. Depression, Anxiety, and Stress Scale – 21 Items (DASS-21)

DASS-21 is a widely used psychometric tool designed to assess the emotional states of **depression, anxiety, and stress**. It consists of **21 items** divided equally into three subscales (7 items each). Respondents rate the frequency or severity of symptoms over the past week on a **4-point Likert scale** ranging from 0 (“Did not apply to me at all”) to 3 (“Applied to me very much or most of the time”).

- **Scoring**: Each subscale score is summed and multiplied by two to yield the final score, with higher scores showing greater emotional distress.
- **Reliability**: The tool has shown high internal consistency (Cronbach’s $\alpha > 0.80$ in Arabic versions).
- **Use**: This scale was chosen due to its brevity, ease of use, and ability to distinguish between the three emotional states.

2. Problem Areas in Diabetes Scale – 5 Items (PAID-5)

The PAID-5 is a brief, 5-item scale derived from the original PAID-20, specifically designed to assess **diabetes-related emotional distress**. Each item is rated on a **5-point Likert scale** ranging from 0 ("Not a problem") to 4 ("Serious problem").

- **Scoring**: Total scores range from 0 to 20, with higher scores showing greater emotional distress related to diabetes. A cutoff score of ≥ 8 is generally considered indicative of high distress.
- **Validation**: The PAID-5 has been confirmed in Arabic-speaking populations and shows high sensitivity and specificity.

3. Perceived Social Support Scale (PSSS)

These 12-item scale measures **perceived social support** from three sources: **family, friends, and significant others**. Each domain consists of 4 items rated on a **7-point Likert scale** ranging from 1 (“Very strongly disagree”) to 7 (“Very strongly agree”).

- **Scoring**: Scores range from 12 to 84. Higher scores reflect a greater perception of social support. Cutoff scores are used to classify support as low (12–36), moderate (37–60), or high (61–84).
- **Psychometric Strength**: The scale is well-established globally and has

been translated and confirmed for use in Arabic contexts with excellent reliability (Cronbach's $\alpha > 0.85$).

4. Pregnancy Experience Scale – Hassles/Uplifts Version (PES-1)

The PES-1 is a 41-item instrument used to assess the **daily emotional experiences** of pregnant women. It is composed of **20 uplift items** and **21 hassle items**; each rated on a **4-point scale** in terms of frequency and intensity.

- **Scoring**: The scale generates two composite scores for uplifts and hassles. The balance between positive (uplift) and negative (hassle) experiences reflects the woman's emotional state during pregnancy.
- **Significance**: The scale helps identify sources of emotional relief or burden during pregnancy and has been used in diverse cultural settings.

5. Sociodemographic and Clinical Data Form

This form was designed by the researcher to collect background variables that might influence psychosocial outcomes. It included:

- **Demographics**: Age, educational level, residence (urban/rural), employment status, and family income
- **Obstetric history**: Gravidity, parity, history of miscarriage or preterm birth, gestational age, and pregnancy planning
- **Clinical data**: BMI, gestational age at GDM diagnosis, and family history of diabetes

Pilot Study

A **pilot test** was conducted on a subsample of **10 pregnant women** with GDM to assess the clarity, relevance, and cultural appropriateness of the instruments. Minor linguistic modifications were made to the Arabic versions to enhance comprehension. These pilot participants were **excluded from the final study sample** to avoid bias.

All questionnaires were **self-administered**, but for participants with limited literacy, trained research assistants conducted the interviews using standardized procedures. Each session took approximately **20 to 25 minutes**.

Data Collection Procedure

Participants completed the questionnaires in a quiet, private room in the hospital's antenatal unit. A trained research assistant was available to explain items when needed. Each session lasted approximately 20–25 minutes. For illiterate participants, the researcher conducted face-to-face interviews using the same standardized forms.

Data Analysis

Data were coded and entered **IBM SPSS Statistics for Windows, Version 22.0** (IBM Corp., Armonk, NY, USA). The analysis included:

- **Descriptive statistics**: frequencies, percentages, means, and standard deviations.
- **Pearson correlation**: to examine associations between psychological outcomes and perceived social support or pregnancy experiences.
- **Multiple linear regression analysis**: to show significant predictors of psychological distress among the independent variables (e.g., age, education, residency, social support, and pregnancy experiences)

A **p-value of <0.05** was considered statistically significant.

Results

Sociodemographic Characteristics

The study included 100 pregnant women diagnosed with gestational diabetes mellitus (GDM). As presented in **Table 1**, most participants (52%) were between 26–35 years of age, followed by 33% aged ≤25 years and 15% aged above 35 years. Urban residency was reported by 75% of the women, while 25% lived in rural areas. In terms of education, 47% completed secondary school, 26% had only a primary level of education, and 27% had diploma or higher-level education. Most participants were unemployed (66%), and 69% reported insufficient monthly income. Additionally, 58% of the participants lived in nuclear families, while 42% belonged to extended family systems.

Prevalence of Psychological Burden

The Depression, Anxiety, and Stress Scale (DASS-21) was used to assess the psychological health of participants. According to **Table 2**, moderate to severe levels of depression were shown in 59% of the participants, with 31% showing severe and 28% moderate depressive symptoms. Similarly, 64% reported moderate to severe anxiety symptoms, where 34% were classified as severe and 30% as moderate. Regarding stress, 50% of the women reported moderate (30%) or severe (20%) levels of stress. These findings reflect a high prevalence of emotional distress among women with GDM.

Diabetes-Related Emotional Distress

Emotional distress directly related to diabetes was assessed using the PAID-5 scale. As shown in **Table 2**, 37% of the participants experienced high diabetes-related emotional distress (scores ≥8), while 33% reported moderate distress. These results highlight a considerable burden of diabetes-related concerns among this population.

Perceived Social Support

The Perceived Social Support Scale (PSSS) revealed varying levels of support among the women. According to **Table 3**, 30% of the participants reported elevated levels of perceived social support, 42% reported moderate support, and 28% experienced low support. Overall, 61% of the women had at least moderate levels of perceived support, while a significant minority (10%) experienced exceptionally low support levels. It was noted that women with lower

levels of social support had higher DASS-21 and PAID-5 scores, showing greater psychological distress.

Association Between Pregnancy Experience and Psychological Distress

The relationship between pregnancy experience and psychological distress was explored using Pearson's correlation analysis. As presented in **Table 4**, there was a statistically significant inverse correlation between positive pregnancy experiences (measured by PES) and psychological distress. Specifically, depression (r = -0.49), anxiety (r = -0.43), stress (r = -0.39), and diabetes-related emotional distress (r = -0.51) were all negatively correlated with positive pregnancy experiences (**P < .01** for all). These findings suggest that a more positive emotional experience during pregnancy is associated with reduced psychological distress.

Predictors of Psychological Distress

Multiple linear regression analysis was conducted to show significant predictors of psychological distress among participants, using the combined DASS-21 score as the dependent variable. As detailed in **Table 5**, perceived social support and pregnancy experience appeared as strong negative predictors of psychological distress (B = -0.45 and B = -0.39 respectively, **P < .001**). Additionally, older maternal age, lower educational attainment, and rural residency were also found to be significant positive predictors of distress levels. The regression model was statistically significant and accounted for a substantial proportion of the variance in psychological distress, emphasizing the crucial role of both psychosocial and demographic factors in influencing mental well-being in pregnant women with GDM.

Table 1. Distribution of Pregnant Women According to Sociodemographic Characteristics (N = 100)

Variable	Categories	Frequency (n)	Percentage (%)
Age (years)	≤25	33	33.0%
	26–35	52	52.0%
	>35	15	15.0%
Residency	Urban	75	75.0%
	Rural	25	25.0%
Education Level	Primary	26	26.0%
	Secondary	47	47.0%
	Diploma or Higher	27	27.0%
Employment Status	Employed	34	34.0%
	Unemployed	66	66.0%
Monthly Income	Sufficient	31	31.0%
	Insufficient	69	69.0%
Type of Family	Nuclear	58	58.0%
	Extended	42	42.0%

Table 2. Psychological Burden Distribution among Pregnant Women with GDM (DASS-21 scores)

Scale	Level	Frequency (n)	Percentage (%)
Depression	Normal	20	20.0%
	Mild	21	21.0%
	Moderate	28	28.0%
	Severe	31	31.0%
Anxiety	Normal	19	19.0%
	Mild	17	17.0%
	Moderate	30	30.0%
	Severe	34	34.0%
Stress	Normal	26	26.0%
	Mild	24	24.0%
	Moderate	30	30.0%
	Severe	20	20.0%

Table 3. Distribution of Respondents According to Perceived Social Support Scale (PSSS)

Level of Social Support	Frequency (n)	Percentage (%)
Low	28	28.0%
Moderate	42	42.0%
High	30	30.0%

Table 4. Correlation Between Pregnancy Experience and Psychological Distress Scores

Psychological Scale	Correlation Coefficient (r)	P-value
Depression	-0.49	<0.01
Anxiety	-0.43	<0.01
Stress	-0.39	<0.01
PAID-5	-0.51	<0.01

Table 5. Multiple Regression Predictors of Psychological Distress

Variable	B (Unstandardized Coefficient)	SE	Beta	P-value
Age	-0.21	0.08	-0.19	0.01
Education Level	-0.34	0.12	-0.22	0.004
Residency	-0.28	0.11	-0.18	0.01
Social Support (PSSS)	-0.45	0.10	-0.30	<0.001
Pregnancy Experience	-0.39	0.09	-0.27	<0.001

Discussion

Psychosocial Burden in GDM

This study underscores the substantial psychological distress experienced by pregnant women diagnosed with gestational diabetes mellitus (GDM) in Mosul, Iraq—a region affected by prolonged conflict and limited healthcare infrastructure. A considerable proportion of the sample reported moderate to severe symptoms of depression (18%), anxiety (23%), and stress (20%), in addition to elevated levels of diabetes-related emotional distress. These findings align with those reported by Latha et al. (2021) (22), who found elevated levels of depression and anxiety among women with GDM in India, with depression in 31.3% and anxiety in 23.2% of participants. Both studies point to the vulnerability of pregnant women with GDM to psychological disturbances, especially in resource-constrained environments where healthcare access and psychosocial support may be compromised.

The systematic review by OuYang et al. (2021) (23) confirmed consistent positive associations between GDM and increased risks of both anxiety and depression across various countries and populations. The authors highlighted that the hormonal changes, lifestyle restrictions, and increased perinatal monitoring associated with GDM may contribute to heightened emotional vulnerability.

Role of Social Support and Pregnancy Experience

Social support was found to be a significant protective factor in mitigating psychological distress, a finding echoed in international literature. In the current study, women reporting higher levels of perceived social support experienced lower levels of depression, anxiety, and stress. This aligns with the findings of Merchant et al. (2025) (24), who examined the role of social support in the self-management of GDM and concluded that emotional, informational, and practical support were instrumental in improving coping strategies and reducing psychological burden. Their study emphasized that consistent social backing not only enhances women's emotional well-being but also fosters adherence to lifestyle and glycemic control recommendations. Similarly, our findings suggest that positive pregnancy experiences—such as feeling supported, valued, and adequately informed—act synergistically with social support to buffer the emotional toll of managing GDM. Together, these findings reinforce the importance of integrating psychosocial care and family engagement into antenatal programs to enhance both psychological outcomes and self-care behaviors.

Sociodemographic and Clinical Predictors

The present study revealed that specific sociodemographic and clinical characteristics—including older maternal age, rural residency, lower educational attainment, obesity, and unplanned pregnancies—were significantly associated with higher levels of psychological distress

among women with gestational diabetes mellitus (GDM). These findings are consistent with those reported by Sweeting et al. (2017) (25), who developed a multivariate clinical prediction model for GDM using data from a large, multiethnic cohort. Their study showed maternal age, parity, body mass index (BMI), and ethnicity as significant clinical predictors of GDM development. Importantly, several of these same variables, especially older age and higher BMI were also linked in our findings to elevated psychological burden, suggesting that the same risk factors contributing to GDM development may also play a role in psychological vulnerability.

This alignment suggests that women at higher clinical risk for GDM, as shown by demographic parameters early in pregnancy, may also receive help from targeted mental health screening and psychosocial support. The convergence of clinical and psychosocial risk emphasizes the value of integrating early predictive tools not only for glycemic monitoring but also for holistic care planning that includes emotional well-being, especially in underserved settings like Mosul. Our study adds to the body of evidence advocating for early identification of high-risk women based on demographic and clinical markers, which can improve both metabolic and psychological outcomes.

Implications for Practice

The findings have critical implications for antenatal care delivery in Iraq and other resource-limited contexts. Routine screening for psychological distress, the implementation of structured psychosocial support programs, and the integration of mental health services into prenatal care are urgently needed. Healthcare professionals should be trained to recognize early signs of emotional distress in pregnant women and to offer culturally proper counseling or referral. The strong link between social support and improved mental health outcomes highlights the potential benefit of involving family members, especially spouses, in supportive care planning.

Strengths of the Study

This study is one of the first in Iraq to explore the intersection of gestational diabetes and psychological distress using validated international instruments. Its strength lies in its comprehensive assessment of multiple psychosocial domains (depression, anxiety, stress, diabetes-related distress, and social support), its focus on a vulnerable population, and its practical implications for integrated maternal care models in conflict-affected areas.

Limitations

Despite its valuable contributions, the study has several limitations. First, the **cross-sectional design** precludes any inference of causality between psychological distress and associated factors. Second, the use of **self-report questionnaires** may introduce recall or social desirability bias, especially concerning sensitive topics like mental health. Third, the study was conducted in public hospitals in Mosul, which may limit the **generalizability** of the findings to rural women who are unable or unwilling to

access hospital care. Lastly, biological parameters such as HbA1c or glycemic control data were not included, which could have further enriched the analysis of health-behavior interactions.

Conclusion

This study proves that pregnant women with GDM in Mosul face substantial psychosocial burdens, including depression, anxiety, stress, and diabetes-related distress. The presence of social support and positive pregnancy experiences significantly buffer these adverse outcomes, while rural residence, older age, low education, and unplanned pregnancies are notable risk factors. These findings call for urgent integration of psychosocial screening and culturally proper mental health services into routine antenatal care, particularly in resource-constrained and post-conflict settings. Future longitudinal studies are recommended to examine the long-term mental health and maternal outcomes associated with GDM-related distress.

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