Preoperative Anxiety and Depression among Women Undergoing Elective Cesarean Section in Mosul, Iraq: A Cross-Sectional Study

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Abstract
Background: Elective cesarean section (CS) rates have increased globally, yet the psychological impact of preoperative anxiety and depression in women awaiting CS remains insufficiently studied, particularly in Middle Eastern contexts.
Objective: To assess the prevalence of preoperative anxiety and depression among women scheduled for elective CS in Mosul, Iraq.
Methods: A cross-sectional descriptive study was conducted from December 1, 2023, to February 15, 2024, across three hospitals in Mosul. A simple random sample of 112 women aged ≥18 years scheduled for elective CS was recruited. Data collection included sociodemographic and obstetric questionnaires and the Hospital Anxiety and Depression Scale (HADS). Statistical analysis was performed using SPSS version 25, with anxiety and depression classified according to HADS cut-offs: 0-7 (no symptoms), 8-10 (borderline), 11-21 (clinical symptoms).
Results: The mean age of participants was 29.8 ± 5.4 years. Urban residence accounted for 80.4% of participants, with 65.2% being homemakers. Previous CS history was reported in 27.7% of cases, and 22.3% had chronic illnesses. Primary indications for CS included fetal distress (42.0%), breech presentation (30.4%), and previous CS (22.3%). Clinically significant anxiety (HADS-A ≥11) was found in 37.5% of participants, while clinical depression (HADS-D ≥11) was present in 25.0%. Borderline symptoms were observed in 33.9% for anxiety and 35.7% for depression.
Conclusions: A substantial proportion of women undergoing elective CS experience clinically significant anxiety and depression preoperatively. These findings underscore the need for routine mental health screening and targeted interventions in preoperative care protocols.

Keywords: Cesarean Section, Anxiety, Depression, Preoperative, HADS, Mosul, Iraq

Introduction

The global cesarean section (CS) rate has increased dramatically from 12.1% in 2000 to 21.1% in 2015, with some regions reporting rates exceeding 50% [1, 2]. While medically indicated CS can improve maternal and perinatal outcomes, the rising trend of elective CS has raised concerns about associated psychological morbidity. The World Health Organization recommends optimal CS rates between 10-15%, suggesting that many procedures may be performed without clear medical indications [3]. Preoperative anxiety and depression represent significant concerns in obstetric populations, with prevalence rates varying considerably across different healthcare settings and cultural contexts. International studies report antenatal anxiety prevalence ranging from 18% to 25% and depression from 8% to 13% in general obstetric populations [4, 5]. However, in specific high-risk groups such as women undergoing CS, these rates may be substantially higher, with some studies from low-resource settings reporting preoperative anxiety prevalence up to 70% [6, 7].

The psychological impact of preoperative anxiety and depression extends beyond immediate maternal wellbeing, influencing postoperative recovery, pain perception, breastfeeding success, and maternal-infant bonding [8, 9]. Furthermore, untreated mood disorders during the peripartum period are associated with increased risk of postpartum depression, impaired cognitive development in offspring, and long-term family dysfunction [10, 11]. Despite the clinical significance of these conditions, there remains a paucity of data characterizing preoperative psychological morbidity in women undergoing elective CS in Middle Eastern contexts, particularly in post-conflict settings such as Iraq [12]. Understanding the prevalence and correlates of anxiety and depression in this population is essential for developing culturally appropriate screening tools and intervention strategies. The present study aimed to determine the prevalence of preoperative anxiety and depression among women scheduled for elective CS in Mosul, Iraq, and to explore their associations with sociodemographic factors.

Methods

Study Design and Setting

A cross-sectional descriptive study was conducted across three major tertiary care hospitals in Mosul, Iraq: Al-Batool Teaching Hospital, Mosul General Hospital, and Al-Salam Teaching Hospital. These institutions serve as referral centers for the Nineveh Governorate and provide comprehensive obstetric and gynecological services.

Study Period

Data collection was conducted from December 1, 2023, to February 15, 2024, providing adequate time for recruitment while minimizing seasonal variations in psychological symptoms.

Participants

Sampling Technique

A simple random sampling technique was employed. The sampling frame comprised all women meeting inclusion criteria across the three hospitals during the study period. Eligible participants were assigned unique identifiers, and random selection was performed using a computer-generated random number sequence.

Inclusion Criteria

- Women aged ≥18 years
- Scheduled for elective CS
- Able to provide informed consent
- Arabic-speaking

Exclusion Criteria

- Emergency CS
- Known psychiatric disorder under active treatment
- Cognitive impairment preventing questionnaire completion
- Pregnancy complications requiring immediate intervention

Data Collection Instruments

1. **Sociodemographic and Obstetric Questionnaire:** A structured questionnaire developed by the research team collected information on demographic characteristics (age, residence, education, occupation, income), obstetric history (gravidity, parity, previous CS, pregnancy complications), current pregnancy details (gestational age, CS indication), and medical history (chronic diseases, medications).
2. **Hospital Anxiety and Depression Scale (HADS):** The HADS is a widely validated 14-item self-assessment questionnaire designed to detect anxiety and depression in medical settings (13). It comprises two subscales: HADS-Anxiety (HADS-A) with 7 items and HADS-Depression (HADS-D) with 7 items. Each item is scored from 0-3, with subscale scores ranging from 0-21. Cut-off points used were: 0-7: No clinical symptoms; 8-10: Borderline/mild symptoms; 11-21: Clinical symptoms (moderate to severe) [14].

Procedure

Following ethical approval from the Higher Health Institute of Mosul and written informed consent from participants, trained research assistants administered questionnaires through face-to-face interviews one day prior to scheduled CS. The average administration time was 15-20 minutes per participant.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 25 [15]. Descriptive statistics included means ± standard deviations for continuous variables and frequencies with percentages for categorical variables. Independent samples t-tests and chi-square tests were used to examine associations between psychological symptoms and sociodemographic factors. Statistical significance was set at $p < 0.05$.

Ethical Considerations

The study was approved by the Ethics Committee of the Higher Health Institute, Mosul. All participants provided written informed consent after receiving detailed information about the study objectives and procedures. Confidentiality was maintained throughout the study, and participants were assured of their right to withdraw at any time without affecting their medical care.

Results

Table 1: Demographic and Obstetric Characteristics and Association with Anxiety and Depression (n = 112)

Variable	(f)	(%)	HADS-A Score† Mean ± SD	HADS-D Score‡ Mean ± SD	p-value*
Age (years), mean ± SD	-	-	29.8 ± 5.4	-	-
Age Groups					
17-22 years	15	13.4	9.8 ± 3.9	8.6 ± 3.2	0.156
23-28 years	32	28.6	10.1 ± 4.2	9.1 ± 3.8	
29-34 years	41	36.6	10.9 ± 4.0	9.7 ± 4.1	
≥35 years	24	21.4	10.6 ± 4.3	9.0 ± 3.6	
Residence					
Urban	90	80.4	10.3 ± 4.0	9.1 ± 3.7	0.732
Rural	22	19.6	10.8 ± 4.5	9.6 ± 4.2	
Education Level					
Illiterate	15	13.4	11.2 ± 4.1	10.1 ± 3.9	0.089
Primary/Secondary	57	50.9	10.6 ± 4.2	9.3 ± 3.8	
College/University	40	35.7	9.8 ± 3.8	8.7 ± 3.6	
Occupation					
Homemaker	73	65.2	10.6 ± 4.0	9.4 ± 3.9	0.423
Employed	39	34.8	10.1 ± 4.3	8.9 ± 3.6	
Monthly Income					
Low	35	31.3	11.1 ± 4.2	9.8 ± 4.0	0.034
Middle	48	42.9	10.2 ± 3.9	9.0 ± 3.7	
High	29	25.8	9.6 ± 4.1	8.6 ± 3.5	
Previous CS					
Yes	31	27.7	11.2 ± 3.9	9.8 ± 3.6	0.045
No	81	72.3	9.8 ± 4.1	8.9 ± 3.9	
Chronic Illness					
Yes	25	22.3	11.0 ± 4.2	10.2 ± 4.1	0.087
No	87	77.7	10.2 ± 4.0	8.9 ± 3.7	

f = frequency; % = percentage; HADS-A/D = anxiety/depression scores; SD = standard deviation; p-value < 0.05 indicates statistical significance

Table 2: Indications for Cesarean Section and Associated Psychological Symptoms (n = 112)

Indication	(f)	(%)	HADS-A Score† Mean ± SD	HADS-D Score‡ Mean ± SD	p-value*
Fetal distress	47	42.0	11.2 ± 4.1	9.8 ± 3.9	0.023
Breech presentation	34	30.4	10.1 ± 3.8	8.9 ± 3.6	
Previous CS	25	22.3	9.8 ± 4.2	8.7 ± 3.8	
Maternal request	6	5.4	8.5 ± 3.1	7.8 ± 2.9	
Total Sample	112	100.0	10.4 ± 4.1	9.2 ± 3.8	-

f = frequency; % = percentage; HADS-A/D = anxiety/depression scores (0–21); SD = standard deviation; CS = cesarean section; p < 0.05 = statistically significant (ANOVA)

Table 3: Distribution of HADS Scores with Clinical Categories (n = 112)

Measure	Category	(f)	(%)	Score Range	Mean ± SD	95% CI†	p-value*
HADS-Anxiety‡	No symptoms (0-7)	32	28.6	0-7	5.2 ± 1.8	4.6-5.8	<0.001
	Borderline (8-10)	38	33.9	8-10	9.1 ± 0.9	8.8-9.4	
	Clinical (11-21)	42	37.5	11-21	14.3 ± 2.6	13.5-15.1	
	Total	112	100.0	0-21	10.4 ± 4.1	9.6-11.2	
HADS-Depression§	No symptoms (0-7)	44	39.3	0-7	4.8 ± 1.9	4.2-5.4	<0.001
	Borderline (8-10)	40	35.7	8-10	8.9 ± 0.8	8.7-9.1	
	Clinical (11-21)	28	25.0	11-21	13.1 ± 2.4	12.2-14.0	
	Total	112	100.0	0-21	9.2 ± 3.8	8.5-9.9	

*f: Frequency; %: Percentage; SD: Standard Deviation; CI†: Confidence Interval; HADS‡: Hospital Anxiety and Depression Scale (scoring: 0-7 no symptoms, 8-10 borderline, 11-21 clinical); HADS§: Depression subscale of HADS; p-value: Statistical significance using one-way ANOVA comparing mean scores across categories (p < 0.05 considered significant).

Discussion

Principal Findings

This study revealed a high prevalence of clinically significant anxiety (37.5%) and depression (25.0%) among women scheduled for elective CS in Mosul, Iraq. These rates substantially exceed general population estimates and align with findings from other low-resource settings, suggesting that preoperative psychological screening should be a routine component of preoperative care.

Comparison with Previous Studies

Our findings are consistent with international literature reporting elevated anxiety and depression rates in women undergoing CS. A systematic review by Dennis *et al*. reported antenatal anxiety prevalence of 18-25% and depression of 8-13% in general obstetric populations [16]. However, our rates

are considerably higher, possibly reflecting the specific stressors associated with surgical delivery, cultural factors, and the post-conflict context of Iraq.

Studies from similar settings have reported comparable findings. Research from Ethiopia found preoperative anxiety rates of 47-70% among women undergoing CS [17], while studies from Pakistan reported comorbid anxiety and depression in approximately 10% of pregnant women [18]. Our higher rates may reflect the specific vulnerabilities of the studied population and the comprehensive assessment approach used.

Clinical Implications

The high prevalence of psychological morbidity identified in this study has several important clinical implications:

- **Routine Screening:** Implementation of standardized screening protocols using validated instruments such as HADS should be considered for all women scheduled for elective CS.
- **Targeted Interventions:** Development of culturally appropriate psychological interventions, including preoperative counseling, relaxation techniques, and peer support programs, may help reduce anxiety and depression levels.
- **Staff Training:** Healthcare providers caring for pregnant women should receive training in recognizing and managing psychological symptoms in the peripartum period.
- **Multidisciplinary Care:** Integration of mental health professionals into obstetric care teams may facilitate early identification and treatment of psychological distress.

Methodological Considerations and Limitations

While this study provides valuable insights into preoperative psychological morbidity, several limitations should be acknowledged:

- **Cross-sectional Design:** The study design prevents determination of causal relationships between variables and limits understanding of symptom trajectories over time.
- **Single Assessment Point:** Assessment at only one time point may not capture the dynamic nature of psychological symptoms during pregnancy.

Recommendations for Future Research

To address these limitations and advance understanding of preoperative psychological morbidity, future studies should consider:

- **Longitudinal Designs:** Prospective studies following women from pregnancy through postpartum period to understand symptom trajectories and long-term outcomes.
- **Mixed-Methods Approaches:** Integration of qualitative research methods to gain deeper understanding of women's subjective experiences and cultural factors influencing psychological wellbeing.

Strengths of the Study

Despite limitations, this study has several notable strengths:

- **Clinical Relevance:** Addresses an important gap in understanding psychological morbidity in a vulnerable population.
- **Validated Instruments:** Use of internationally recognized and validated assessment tools enhances reliability of findings.
- **Comprehensive Assessment:** Evaluation of both anxiety and depression provides a more complete picture of psychological wellbeing.
- **Multi-site Design:** Recruitment from three major hospitals enhances representativeness of the sample.
- **Robust Sampling:** The simple random sampling approach strengthened the internal validity of associations.

Conclusions

This study demonstrates a substantial burden of preoperative anxiety and depression among women scheduled for elective CS in Mosul, Iraq. With over one-third of participants experiencing clinically significant anxiety and one-quarter experiencing clinical depression, these findings highlight the urgent need for systematic approaches to identifying and managing psychological distress in this population.

Healthcare providers should consider implementing routine screening protocols using validated instruments such as HADS, followed by appropriate referral and treatment pathways for women identified with significant symptoms [21, 22]. Future research should employ longitudinal designs with probability sampling methods to strengthen causal inference and generalizability. The development and evaluation of culturally appropriate interventions represents a critical next step in improving psychological care for women undergoing CS in this region [23].

These findings contribute to the growing body of evidence supporting the integration of mental health considerations into routine obstetric care and highlight the need for comprehensive, multidisciplinary approaches to supporting women's psychological wellbeing during the peripartum period [24, 28].

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