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Preoperative Anxiety and Associated Factors Among Women Undergoing Cesarean Section: A Cross-Sectional Study

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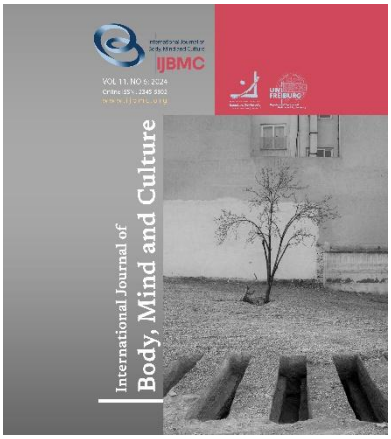

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ABSTRACT

Objective: Preoperative anxiety is a common issue among women undergoing cesarean sections, leading to various negative psychological and physiological effects. This study aims to assess preoperative anxiety and its contributing factors among women undergoing cesarean sections, as well as explore the relationship between preoperative anxiety levels and reproductive variables.

Methods and Materials: A descriptive cross-sectional study was conducted at Women's Obstetrics Gynecology Hospital, Al-Hindia Hospital for Education, Al-Zahraa Hospital for Maternity, and Khadeejat Al-Kubra Women's Hospital between October 4, 2023, and March 9, 2024. A purposive sample of 160 women undergoing cesarean sections was selected. A questionnaire, developed after a comprehensive literature review, was used to collect data. The questionnaire's validity and reliability were confirmed. Descriptive and inferential statistical methods were employed to analyze the data.

Findings: The findings revealed that 63.8% of the participants experienced moderate levels of preoperative anxiety, 25.6% reported mild anxiety, and 10.6% exhibited severe anxiety. Significant associations were identified between preoperative anxiety levels and factors such as family income, previous miscarriages, pregnancy complications, and the classification of the cesarean section (elective or emergency).

Conclusion: The study concluded that the majority of women undergoing cesarean sections experience moderate preoperative anxiety. It highlights the need for preoperative counseling and anxiety-reduction interventions for expectant mothers. The study recommends the development and implementation of educational programs to enhance women's understanding of preoperative anxiety and its management.

Keywords: Preoperative anxiety, Cesarean section, Elective cesarean, Emergency cesarean, Family income, Pregnancy complications

Introduction

The Cesarean section is one of the most common obstetric and reproductive surgeries. Pregnancy and childbirth are often described as wonderful experiences; yet, many pregnant women face anxiety during pregnancy, with their anxiety levels peaking before a cesarean section. Preoperative anxiety significantly affects puerperium, newborn care, and postoperative recovery for women undergoing cesarean sections. Moreover, heightened anxiety can reduce uterine contractions and negatively affect lactation through its impact on the neuroendocrine system (Bang et al., 2023). Preoperative anxiety has been linked to several adverse physiological and psychological outcomes, including the

need for higher doses of anesthetics, increased postoperative pain, greater analgesic intake, increased morbidity, delayed recovery, and prolonged hospital stays (Woldegerima et al., 2018).

Preoperative anxiety is especially prevalent among women undergoing cesarean sections compared to other surgical procedures, particularly in low-resource settings. The prevalence of preoperative anxiety in cesarean-section patients ranges from 73.3% to 86%, according to various studies (Fentie et al., 2022). This prevalence is slightly lower in Western populations, ranging from 60% to 80%, though it has been reported to be as low as 11% in some studies (Woldegerima et al., 2018). Women electing to undergo cesarean sections often report heightened nervousness, with obstetric patients generally experiencing higher levels of anxiety than the broader surgical population.

The World Health Organization suggests that increasing cesarean section rates above 10% does not necessarily correlate with improved maternal or infant mortality rates (Alsufyani et al., 2024; Alsufyani et al., 2020). This observation highlights a paradox in the obstetric care landscape: despite the relatively high prevalence of cesarean deliveries, a significant proportion of women—between 60% to 70%—report anxiety before surgery, with as many as 11% to 80% experiencing severe levels of anxiety (Gul & Kirca, 2020).

In addition to anxiety, women undergoing cesarean sections frequently report feelings of helplessness and diminished self-esteem. The primary contributors to preoperative anxiety include concerns over surgical risks, the success of the procedure, and potential complications. Anxiety during pregnancy is known to elevate cortisol levels and pro-inflammatory cytokines while reducing breastfeeding success (Mostafayi et al., 2021). Women who have untreated preoperative anxiety face an increased risk of both acute and long-term perioperative complications, including challenging pain management post-surgery and greater hemodynamic instability. Furthermore, anxiety in these patients often leads to dissatisfaction with their medical care and erosion of trust in healthcare providers. This situation results in prolonged and unanticipated hospital stays, incurring additional costs for both patients and their families.

The impact of preoperative anxiety is far-reaching, extending beyond the mother's physical health. Elevated preoperative anxiety is associated with negative obstetric outcomes, such as delayed breastfeeding initiation, potential neurological impairment in the fetus, and future mental health issues for the child (Dibabu et al., 2023; Seksio et al., 2022). A study by Dibabu et al., (2023) found that cortisol levels were elevated during emergency cesarean sections compared to elective procedures, demonstrating a clear physiological response to increased anxiety levels. The study revealed that, although cortisol levels rose in both elective and emergency surgeries, the increase was more pronounced during emergency procedures, indicating heightened stress (Dibabu et al., 2023).

Despite the prevalence of preoperative anxiety and its well-documented impacts, few studies have explored specific factors contributing to anxiety in women undergoing cesarean sections, particularly in developing countries. Furthermore, the current body of literature is limited in providing a comprehensive global perspective on this issue. This study seeks to address these gaps by examining preoperative anxiety levels and identifying key contributing factors, including reproductive variables, in women undergoing cesarean sections. A better understanding of these factors is necessary to develop targeted interventions that can mitigate anxiety and improve both maternal and neonatal outcomes.

Methods and Materials

Study Design and Participants

A cross-sectional study was conducted at the Women's Obstetrics Gynecology Hospital, Al-Hindia Hospital for Education, Al-Zahraa Hospital for Maternity, and Khadeejat Al-Kubra Women's Hospital from October 4, 2023, to March 9, 2024. The study utilized a non-probability (purposive) sample of 160 women undergoing cesarean sections.

The sample size of 160 was chosen based on a power analysis to ensure adequate statistical power to detect significant associations between variables, assuming an effect size of 0.3, a significance level of 0.05, and a power of 0.80. Additionally, the sample size aligns with similar studies examining preoperative anxiety in obstetric patients, which often recommend sample sizes in the range of 100-200 participants to provide reliable findings while balancing logistical feasibility.

Since a non-probability (purposive) sampling method was used, potential biases could arise related to the representativeness of the sample. To mitigate selection bias, the researchers ensured that participants were recruited from four different hospitals with varying patient populations, which enhanced the diversity of the sample in terms of socioeconomic background, education level, and obstetric history. Additionally, to minimize response bias, the data collectors were trained to maintain a neutral tone and avoid leading questions during interviews. The interview process was standardized across all participants to further ensure consistency and reduce interviewer bias.

Data Collection Tools

A questionnaire was developed specifically for this study based on a comprehensive review of the literature. It consisted of three parts:

Part I: Demographic characteristics (6 items)

Part II: Reproductive characteristics (11 items)

Part III: Preoperative anxiety assessment (20 items)

The data were collected through direct interviews with each participant to ensure clarity and understanding.

The validity and reliability of the questionnaire were rigorously assessed. Content validity was established through expert review, wherein three experts in obstetrics and psychology evaluated the questionnaire to ensure it adequately covered the relevant dimensions of preoperative anxiety. Construct validity was assessed by conducting exploratory factor analysis (EFA) to confirm that the items measured the intended constructs .Reliability was evaluated using Cronbach's alpha, with a value of 0.82, indicating good internal consistency for the anxiety assessment items. Additionally, a pilot test was conducted with 20 participants to verify the clarity of the questionnaire items and to make any necessary adjustments before full-scale data collection.

Data analysis

Data were analyzed using both descriptive and inferential statistical methods. Descriptive statistics, such as frequencies, means, and percentages, were used to summarize demographic, reproductive, and anxiety-related data. Inferential analyses, including chi-square tests and logistic regression, were conducted to explore associations between preoperative anxiety levels and related factors.

Findings and Results

This research study was conducted to determine the level of anxiety before surgery, and 160 participants participated in the course research study. Table 1 shows that most of the women are: those aged 23–30 years (50.6%). Those who live in urban areas (68.1%); the women who read and write (28.1%); most women are housewives (75%); with sufficient to some extent (51.9%); and those with an overweight BMI (53.8%). Table 2 reveals that the majority of the women are those gestational ages at term (85.6%); those who have multiparous (66.9%); those with no previous miscarriage (68.8%); those with no current pregnancy complications (70.6%); those with no previous cesarean section (58.1%); those who have had no surgical complications (84.4%); those with a have had no Complications in previous anesthesia (87.5 %); those with choice of general anesthesia in current CS (59.4%); and those who have no previous surgery in last Technique of the anesthesia through CS (45%); those with the governmental hospital performing surgery (81.3%); those who have a maternal choice cesarean section (31.9%); and most of the women are elective CS (79.4%). Table 3 shows preoperative anxiety levels for women undergoing cesarean section. Regarding this table, the percentage of women with a moderate assessment of preoperative anxiety levels was 63.8%, while those with a mild assessment were 25.6%, and the percentage of women with severe preoperative anxiety levels was only 10.6%.

Table 1

Study Sample Socio-Demographical Data

Socio -Demographical Data	Rating & Intervals	Freq.	%
Age	≤ 22	39	24.4
	23 - 30	81	50.6
	31 - 38	36	22.5
	≥ 39	4	2.5
Residence	Urban	109	68.1
	Rural	51	31.9
Level of education	No read and write	32	20.0
	Read and write	45	28.1
	Primary	27	16.9
	Secondary	21	13.1
	Institute and above	35	21.9
Occupation status	Housewife	120	75.0
	Employed	30	18.8
	Student	10	6.3
Family income per month	Sufficient	64	40.0
	Sufficient to some extent	83	51.9
	Insufficient	13	8.1
BMI (kg/ m^2)	Underweight (Below 18.5)	1	0.6
	Normal weight (18.5 – 24.9)	33	20.6
	Overweight (25.0 – 29.9)	86	53.8
	Obesity (30.0 and Above)	40	25.0

Table 2

Reproductive Characteristic Summary of the Study Sample

Reproductive characteristic	Rating & Intervals	Freq.	%
Gestational age	Preterm	11	6.9
	Term	137	85.6
	Post-term	12	7.5
Parity	Primipara	53	33.1
	Multiparous	107	66.9
Previous miscarriage	Yes	50	31.3
	No	110	68.8
Current pregnancy complications	No	113	70.6
	Yes	47	29.4
Previous caesarean section	Yes	67	41.9
	No	93	58.1
Have had surgical complications	Yes	25	15.6
	No	135	84.4
Complications in previous anesthesia	Yes	20	12.5
	No	140	87.5
Choice of anesthesia in current CS	General	95	59.4
	Spinal	65	40.6
Technique of the anesthesia in the last CS	General anesthesia	62	38.8
	Spinal anesthesia	26	16.3
	No previous surgery	72	45.0
Hospital where the surgery will be performed	Governmental	130	81.3
	Private	30	18.8
Indication to have a cesarean section	Repeated cesarean section	26	16.3
	Twin	8	5.0
	Problem in Placenta	9	5.6
	Non- dilation of the cervix	36	22.5
	Fetal presentation	15	9.4
	Uterus abnormality	1	.6
	Hypertensive disorders of pregnancy	6	3.8
	Maternal choice	51	31.9
	Other	8	5.0
Classification of the surgery CS	Elective	127	79.4
	Emergency	33	20.6

Table 3

Overall Assessment of Preoperative Anxiety Levels and Associated Factors among Women Undergoing Caesarean Section

Levels	Freq.	%	MS.	Asses.
Mild	41	25.6	1.91	Moderate
Moderate	102	63.8		
Severe	17	10.6		
Total	160	100.0		

Freq: Frequency; MS: Mean of Scores; Mild: MS = 1-1.66; Moderate: MS = 1.67-2.33; Severe: MS 2.34-3.

Table 4

Relationship between the overall scores of the preoperative anxiety levels and associated factors among women undergoing Caesarean section and their socio-demographic data

Socio-demographical Data	Rating & Intervals	Mean	SD.	F	P-value
Age	≤ 22	1.90	0.40	0.481	0.69
	23 – 30	1.91	0.36		
	31 – 38	1.90	0.37		
	≥ 39	1.68	0.32		
Residence	Urban	1.94	0.36	3.002	0.08
	Rural	1.83	0.38		
Level of education	No, read and write	1.81	0.42	1.513	0.20
	Read and write	1.93	0.28		
	Primary	1.83	0.41		
	Secondary	1.88	0.45		
	Institute and above	2.01	0.30		
Occupation status	Housewife	1.87	0.39	1.325	0.26
	Employed	1.99	0.29		
	Student	1.96	0.34		
Family income per month	Sufficient	1.83	0.33	3.535	0.03
	Sufficient to some extent	1.97	0.39		
	Insufficient	1.78	0.32		
BMI (kg/ m^2)	Underweight (Below 18.5)	1.70	.	2.372	0.07
	Normal weight (18.5 – 24.9)	2.03	0.39		
	Overweight (25.0 – 29.9)	1.90	0.38		
	Obesity (30.0 and Above)	1.80	0.30		

* $P<0.05$

Table 5

Relationship between the overall scores of the preoperative anxiety levels and associated factors among women undergoing Caesarean section and their reproductive characteristics

Reproductive characteristic	Rating & Intervals	Mean	SD	F	P-value
Gestational age	Preterm	2.08	0.26	2.21	0.11
	Term	1.88	0.38		
	Post-term	2.03	0.38		
Parity	Primipara	1.94	0.33	0.85	0.36
	Multiparous	1.89	0.39		
Previous miscarriage	Yes	2.00	0.35	4.76	0.03*
	No	1.86	0.38		
Current pregnancy complications	No	1.84	0.36	10.90	0.01*
	Yes	2.05	0.36		
Previous caesarean section	Yes	1.89	0.41	0.11	0.74
	No	1.91	0.35		
Have had surgical complications	Yes	1.85	0.46	0.61	0.44
	No	1.92	0.36		
Complications in previous anesthesia	Yes	1.89	0.36	0.07	0.79
	No	1.91	0.38		
Choice of anesthesia in current CS	General	1.87	0.39	1.61	0.21
	Spinal	1.95	0.35		
Technique of the anesthesia in the last CS	General anesthesia	1.83	0.42	2.64	0.07
	Spinal anesthesia	1.88	0.39		
	No previous surgery	1.98	0.31		
Hospital where the surgery will be performed	Governmental	1.89	0.40	1.41	0.24
	Private	1.98	0.21		
Indication to have a cesarean section	Repeated cesarean section	1.71	0.43	1.65	0.12
	Twin	2.08	0.22		
	Problem in Placenta	1.88	0.33		
	Non- dilation of the cervix	1.90	0.45		
	Fetal presentation	1.93	0.30		
	Uterus abnormality	1.90	.		
	Hypertensive disorders of pregnancy	2.01	0.21		
	Maternal choice	1.99	0.34		
	Other	1.78	0.20		
classification of surgery CS	Elective	1.84	0.37	18.59	0.01*
	Emergency	2.14	0.28		

The results show that there is a significant association ($p<0.05$) between Family income per month and preoperative anxiety levels. Moreover, the results reveal that there is a significant association between preoperative anxiety levels and previous miscarriage, current pregnancy complications, and classification of surgery

Discussion and Conclusion

Patients' anxiety levels vary depending on several circumstances, including cultural diversity, the type of surgery, prior anesthetic experience, and pre-operative information. Everyone experiences acute or chronic

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anxiety, which can affect perioperative anesthetic treatment and surgical results. These effects include higher anesthetic requirements, late awakening, hemodynamic abnormalities, postoperative discomfort, delayed wound healing, reduced immune system, and increased risk of infection (Abate et al., 2020; Maheshwari & Ismail, 2015). In the current study, the demographic data among women undergoing cesarean sections. Most sample ages are between (23 – 30 years). This result corresponds with many previous studies (Abo-khuwait & Meran, 2021; Seksio et al., 2022; Tawfeeq et al., 2023). The results of the current study show that the majority of the sample lives in cities. The hospitals covered by the study were in urban regions, thus the women lived there. In addition, urban inhabitants were four times more likely to give birth via cesarean section than those who originated from rural residents; this conclusion is consistent with the results of earlier studies undertaken (Abo-khuwait & Meran, 2021; Ali, 2022; Faris & Hussein, 2022) both studies reveal that the majority of their samples were from urban.

Regarding their educational level, most of the participants are reading and writing; This is due to the country's economic situation, wars, and siege, as well as the widespread custom of early marriage, which has caused females to leave out of school to marry, increasing illiteracy rates. This outcome is reinforced by a study conducted in Iraq/ Baghdad by (Al-kubaisy et al., 2014; Hassan et al., 2023) a higher percentage of the sample was reading and writing . According to the current study, housewives account for 75% of the sample population. This could be because most women are unable to finish their education due to a variety of issues hurting their health and diminishing their physical efforts, including the economic environment and wars. This finding is consistent with many earlier investigations (Khshain & Abdulwahid, 2023; Reza Omani-Samani & S, 2017; Seksio et al., 2022) as they found most of the participants were housewives.

The results of the present study show (51.9%) of participants' family income per month is sufficient to some extent, this is for several reasons related to the husband's monthly income. This result was in agreement with another study in Iran (Abdul et al., 2022; Khshain & Abdulwahid, 2023; Wulandari et al., 2023) which found with sufficient to some extent. In the current study (62%) of women undergoing cesarean section have an overweight level of BMI. World Health Organization WHO classified BMI into four levels and calculated it according to the weight and height formula. This result was supported by (Abo-khuwait & Meran, 2021; Lana et al., 2020; Shahzad et al., 2017) Who found that half of their sample of women had an overweight BMI.

In terms of reproductive data, this result shows that more than half of women are those of gestational age at term, this result agrees with a study conducted in Baghdad (Abdulla & Ghafel, 2021). Another study conducted in Erbil (Rbhass et al., 2017) found (41%) of the study participants had gestational ages at term (37-40 weeks). The current study shows (that 66.9%) of women undergoing cesarean section have multiple; This is because most women were married at an early age, in addition to the culture of the society. This result was supported by (Abdul et al., 2022; Al-baaj, 2022; Lana et al., 2020; Mohammed, 2020) found that the study participants were multiparous. In regards to previous miscarriages, the current study results show (68.8%) of the sample are not previous miscarriages. This result is consistent with a study conducted in Egypt by (Khamis et al., 2023) which found that had no previous abortion also in Iraq (Majeed et al., 2020). This abnormal implantation of the placenta can lead to the development of complications and morbidities in both the mother and the fetus.

The current study's results suggest that the majority of the sample had current pregnancy problems. The majority of women who receive maternal health interventions in developing countries are those who may encounter pregnancy-related complications or have other serious issues, such as living distant from medical resources. Nonetheless, studies show that maternal mortality occurs in women who do not have health issues. The World Health Organization (WHO) recommends evidence-based, high-quality intrapartum care for all women, regardless of their surroundings or treatment quality. It is critical to implement applicable national and local health policies and clinical recommendations in this regard (Asali et al., 2023; Worku et al., 2023) they found 69.3%. Concerning previous cesarean sections, the present study reveals more than half of the sample undergoing cesarean section had no Previous cesarean section. This result is consistent with a previous study carried out by (Alsufyani et al., 2024). Although CS is thought to be a safe surgery, it can cause

urinary tract injury, bladder or uterine infection, significant blood loss, uterine sores, infection, placenta previa, hysterectomy, placenta accrete, and other complications. In terms of previous surgical complications, the current study found that 84.4 percent of the group had never had one. This observation is consistent with the results of earlier investigations conducted in Southern Ethiopia (Dibabu et al., 2023; Khamis et al., 2023). This is due to the health services provided at health facilities throughout the cesarean delivery time, in addition to the mother's awareness of self-care during the following period.

Results from a sample of the current study indicate that half of the participants had no complications from prior anesthesia. This outcome was reinforced (Fentie et al., 2022); Medical professionals and hospitals in developing nations must provide safe obstetric care services to reduce maternal deaths caused by hazards connected with pregnancy and delivery (Dibabu et al., 2023) found (74%) are not Complications in previous anesthesia. The current study indicated that most of the percentage of those who have a General Choice of anesthesia technique in current CS (59.4%). The outcome is consistent with another studies done in Turkey (Celik & Edipoglu, 2018; Wali et al., 2020) which found General Choice of anesthesia technique was diagnosed cases and another previous result done in Iraq (Abdulkader et al., 2017) found Many factors determine the type of anesthesia utilized during a cesarean section. In the Kurdistan region, anesthesiologist experience, the type of anesthetic available, and maternal preference (to some extent) are the most important factors in determining the type of anesthesia for cesarean section, along with other basics such as the indication of the operation, any coexisting medical problems, and the urgency of the surgery.

According to reveals majority of women choose the technique of anesthesia in the last CS No previous surgery is (45%) of the total sample. This result was in agreement with a previous study in Ethiopia (Dibabu et al., 2023). However, another previous study (Bang et al., 2023) detected no prior surgical history < 21.2% this is because a variety of factors, including economic, environmental, health, and many more, were pushing most women toward natural childbirth. The results indicate that 81.3% of Governmental Hospitals performed the surgery; this percentage is consistent with research findings carried out in Iraq (Al-obaidi et al., 2021; Binte et al., 2020; Worku et al., 2023). A considerable number of women conducted surgery in a government hospital. The results show that the indication to have a cesarean section includes maternal choice, as the Caesarean section has begun to be safer at present due to the development of anesthesia, blood transfusion, antibiotic use, and the technical development of surgery and advanced devices in the field of obstetrics and gynecology. Many earlier studies supported this result (Al-rifai & Aziz, 2018; Majeed, 2010) Furthermore, a multi-country facility-based survey of 286,565 delivery discovered that 1.0% of CS deliveries were conducted at the mother's desire or without medical justifications.

The present study results show most of the sample Classification CS surgery shows elective CS (79.4%). This result comes in agreement with another study from Iran (Ashraf et al., 2023; Gedefaw et al., 2018) a significant number of surgeries have lately been performed to satisfy women's requests; hence, mothers' requests for cesarean births have been included on the list of acknowledged frequent CS indications (Ali, 2022).

The study's findings show that women with moderate preoperative anxiety (63.8%). This could be due to an increased risk of perioperative complications such as difficult-to-manage postoperative pain, increased hemodynamic disturbance (hypertension, elevated heart rate, nausea, and vomiting), delayed recovery, longer hospital stays, an increased risk of infection, and an increase in women with undiagnosed and untreated preoperative anxiety. Furthermore, frightened women become dissatisfied with the treatment they get, losing faith in medical professionals. Their parents also spend extra for unexpectedly long hospital stays and medical treatment. Anxiety before surgery during pregnancy increases the likelihood of poor delivery outcomes, such as delayed breastfeeding and brain and neurological abnormalities in the newborn, and it also has an influence on mental health challenges in children (Dibabu et al., 2023). Also another study in contrast, the magnitude of preoperative anxiety in this study was lower than fining from India at 63.54% (Harsha & Kirubamani, 2019) and Gondar at 63% (Admasu et al., 2022). Variations in the instrument utilized, the period of data collection, and socioeconomic position might all be contributing factors to this. For instance, women who

underwent emergency section (CS) and experienced greater worry than those who received scheduled surgery may be the cause of the increased anxiety in Gander. Indian research provided evidence in favor of this (Bansal & Joon, 2017). It is often known that due to insufficient anesthetic check-ups, acute operations make patients more anxious. This was supported by a study conducted in Jima, which found that while providing adequate information before surgery was one way to lessen anxiety, this could not be accomplished during emergency surgery (Nigussie et al., 2014).

The results of the statistical analysis indicate that there is a noteworthy correlation between the Preoperative Anxiety Levels of women undergoing Caesarean Section and their monthly family income (Table 4). This suggests that the influence of monthly family income on Preoperative Anxiety Levels is important. A study found that patients who had low incomes tended to be more nervous. In the preoperative period, patients with little and no income were three times more likely to experience anxiety than those with a decent income (Yophtahe Woldegerima Berhe, 2017). Another earlier research was carried out in Ethiopia (Nigussie et al., 2014). These studies found there is a high-significant relationship between Preoperative Anxiety Levels and their family income per month.

According to the current study's results (Table 5), preoperative anxiety levels and the patient's prior miscarriage are significantly correlated. This is because of concern about potential fetal loss and difficulties during the surgical delivery. These results are consistent with prior research (Ashraf et al., 2023) which found one of the most prevalent psychological problems that may occur during pregnancy is anxiety, which can have a severe impact on both the mother's health and the health of the newborn. Another study (Asali et al., 2023) found According to a recent meta-analysis on mental health, preoperative anxiety affects around 50% of surgical patients, with a greater frequency of cases in females than in males. This worry is most often caused by a fear of dying, a fear of the surgery or anesthetic failing, or a fear of not making a full recovery. demonstrates a strong correlation between preoperative anxiety levels and the problems of the present pregnancy. This outcome is consistent with research conducted in North Central Ethiopia (Asali et al., 2023; Fentie et al., 2022) observed There was a strong correlation between preoperative anxiety and outcomes associated with cesarean delivery, namely concern about difficulties from the present pregnancy. Preoperative anxiety is a frequent and serious problem that has to be addressed by a doctor for women having cesarean sections (Perumal et al., 2023).

The present study results reveal that there is a significant association between preoperative anxiety levels and classification of CS association (P>0.05) among women Undergoing Caesarean Section. This study was in agreement with other studies (Admasu et al., 2022; Ashraf et al., 2023). Preoperative anxiety was found in patients undergoing a variety of surgeries in multiple studies, with prevalence rates ranging from 60% to 90%. For this reason, medical professionals need to assess and comprehend the mental health of surgical patients. It frequently comes with symptoms like anxiety, tenseness in the muscles, weariness, and restlessness. Previous studies' findings indicated that around 55% of individuals undergoing cesarean sections had symptoms of anxiety.

The use of a non-probability (purposive) sampling method may have introduced sampling bias, limiting the generalizability of the findings. The sample was drawn from four hospitals in one geographical area, which may not be representative of the broader population of women undergoing cesarean sections. The reliance on self-reported data is a limitation due to potential response bias. Participants may have underreported or overreported their anxiety levels due to social desirability or recall biases. Although the questionnaire was developed with expert input, self-reported measures are inherently subjective and may not fully capture the complexity of anxiety experienced by the participants. There may be other unmeasured confounding variables that could influence preoperative anxiety levels, such as support from partners, previous experiences with surgery, or cultural beliefs about cesarean delivery. These factors could have affected the results and should be considered in future research. The cross-sectional nature of the study limits the ability to infer causality. While associations between factors and anxiety levels were found, we cannot determine the direction of these relationships or whether the anxiety levels changed over time.

Future research should employ longitudinal designs to track changes in anxiety levels over time, from pregnancy through the postpartum period. This

approach would help elucidate how preoperative anxiety evolves and identify critical periods for intervention. There is a need for studies to assess the effectiveness of interventions aimed at reducing preoperative anxiety. For instance, randomized controlled trials (RCTs) could be conducted to evaluate the impact of different psychological interventions, such as mindfulness training, cognitive-behavioral therapy (CBT), or preoperative counseling, on anxiety reduction. Future research should also explore the impact of broader contextual factors, such as cultural attitudes towards cesarean sections and the role of social support networks. Investigating how cultural differences influence anxiety levels could help tailor interventions to the needs of specific populations. Incorporating objective measures, such as physiological markers (e.g., cortisol levels), alongside self-reported questionnaires, could provide a more comprehensive understanding of preoperative anxiety. These measures would help validate self-reported data and offer a more complete picture of the anxiety experienced by patients. Given the associations found between anxiety levels and factors such as family income and history of miscarriage, future studies could focus on interventions targeting these specific groups. Understanding the differential needs of vulnerable populations would help in designing more effective, tailored interventions to reduce preoperative anxiety.

The findings of this study concluded that preoperative anxiety levels were moderate for the majority of women undergoing cesarean sections. The factors significantly associated with increased anxiety included family income, previous miscarriage, current pregnancy complications, and the classification of cesarean section (elective vs. emergency). These findings highlight the multifaceted nature of anxiety experienced by expectant mothers facing cesarean deliveries. Healthcare facilities should integrate preoperative counseling into standard care for all women undergoing cesarean sections, particularly for those identified as having higher risk factors such as low income, history of miscarriage, or emergency procedures.

Preoperative counseling could help reduce anxiety by providing expectant mothers with detailed information about the procedure, addressing their specific concerns, and offering reassurance. Specialized support programs should be developed for women identified as having high anxiety risk. For instance, women with a history of miscarriage or current pregnancy complications may benefit from one-on-one psychological counseling or group support sessions. These interventions can offer emotional support and a platform for sharing experiences, thereby reducing feelings of isolation. Training for healthcare providers should include components on recognizing and managing preoperative anxiety. Providers should be trained to identify signs of heightened anxiety and engage in empathetic communication. This could involve using standardized assessment tools to evaluate anxiety levels during routine preoperative consultations.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this study.

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