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Original Article

Frequency of Anxiety in Patients Having Cesarean Section Under Regional Anesthesia

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ABSTRACT

Preoperative anxiety is common among women undergoing cesarean section and may affect perioperative outcomes and maternal satisfaction. It is important to identify associated factors in order to enhance patient-centred care. **Objective:** To determine the frequency of anxiety and its associated factors among women undergoing cesarean section under regional anesthesia. **Methods:** This was a cross-sectional analytical study that involved 103 women who underwent elective and emergency cesarean section under spinal or epidural anesthesia between November 2024 and April 2025. A non-probability consecutive sampling procedure was used in recruiting participants. The Hamilton Anxiety Rating Scale (HAM-A) was used to measure anxiety. The associations were examined with Pearson's chi-square test or Fisher's exact test, and the effect size was measured with Cramer's V. The level of significance (p-value) was set at ≤ 0.05. **Results:** The median age was 27.1 years (IQR: 8.4). Anxiety was present in 68.0% of participants (95% CI: 58.4%–76.2%), with moderate anxiety being the most frequent category among affected women. Fear of surgery (68.9%) and anesthesia (57.3%) were common. Anxiety was significantly higher among women without family support (80.0% vs. 60.3%; p=0.037; Cramer's V = 0.206). Counseling and other evaluated factors showed no significant associations. **Conclusion:** Preoperative anxiety was common, with lack of family support showing a significant unadjusted association.

INTRODUCTION

C-section is one of the most frequent obstetric procedures in the world. Modern surgical and an aesthetic treatment have not completely eliminated preoperative anxiety, which is especially relevant for women who have concerns about surgery, an aesthetic, pain, and safety for both the mother and newborn [1-3]. Cesarean delivery is often performed under regional anesthesia, which prevents several complications that can occur with general anesthesia and enables the mother to feel the birth of her child without being unconscious. However, the uncertainty of the effects of an anesthetic and the risk of complications, as well as awareness during surgery, can cause psychological distress [4]. The prevalence of preoperative anxiety has been reported differently in past studies, which may be due to varying clinical situations, past experiences, understanding of the procedure, and family support [5]. Previous studies have reported substantial variation in the frequency of preoperative anxiety among women undergoing cesarean section, reflecting differences in study populations, assessment tools, clinical settings, and definitions of anxiety [6, 7]. Potentially relevant factors include fear of surgery or anesthesia, previous surgical experiences, knowledge regarding the planned procedure, preoperative preparation, and availability of social or family support. However, the presence of these factors does not necessarily mean that each is independently associated with anxiety, and their relationships may vary across populations and healthcare settings. Preoperative anxiety is clinically relevant because it may influence the overall

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perioperative experience and has been associated in previous studies with changes in physiological responses, postoperative pain, recovery, and patient satisfaction [8]. It may also affect how women perceive communication, anesthesia, and the birth experience itself. Recognition of anxiety before surgery may therefore help clinicians identify women who require additional psychological support, clearer communication, or individualized preparation.

Nevertheless, data on anxiety and its demographic, obstetric, anesthetic, and psychosocial risk factors are still scarce in Pakistan. In particular, the relationships of family support, procedural knowledge, preoperative counseling, and fear-related factors with anxiety require further local evaluation. Therefore, this study aimed to determine the frequency of preoperative anxiety and its associated factors among women undergoing cesarean section under regional anesthesia.

METHODS

This cross-sectional analytical study was conducted to determine the frequency of anxiety and its associated factors among patients undergoing cesarean section under regional anesthesia. The study was carried out in the Department of Obstetrics and Gynecology in collaboration with the Department of Anesthesia Indus Hospital and Health Network, Karachi, Pakistan, from November 2024 to April 2025. Prior to commencement of the study, ethical approval was obtained from the Research Evaluation Unit (REU) of the College of Physicians and Surgeons Pakistan (CPSP). The study was approved under reference number CPSP/REU/ANS-2021-218-2505 18 dated October 2024. The study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants before enrollment, and confidentiality of participant information was maintained throughout the study. The sample size was determined using the WHO sample size formula for estimation of a population proportion: $n = Z^2 \times P(1-P)/d^2$, where Z = 1.96 at a 95% confidence level, P = 0.70 based on the expected prevalence of anxiety reported previously [2], and d = 0.09 as the margin of error. The calculated number of beneficiaries was around 100 women, and 103 women participated in the study. A margin of error of 9% was taken into account when interpreting the precision of the prevalence estimate, and a 95% confidence interval of the observed prevalence was subsequently reported. Consecutive sampling (non-probability) was employed to recruit pregnant women, aged 18-40 years, undergoing elective cesarean section as well as emergency cesarean section with spinal and epidural anesthesia who consented to participate in the study. Patients who refused to participate, planned general anesthesia, severe obstetric complications requiring urgent attention, psychiatric illness, or current use of anxiolytic or antidepressant drugs were excluded. A structured, pre-tested proforma was used to collect data on sociodemographic factors (age, residence, education and socioeconomic status), obstetric history (gravidity, parity, gestational age, cesarean type, previous cesarean section, and indication), and anesthesia-related factors (anesthesia type, counseling, previous exposure, surgical duration, and complications). Psychological factors consisted of surgical fear, anesthesia fear, prior bad experiences, family support, knowledge of the procedure, and maternal satisfaction. Heart rate, SBP, postoperative pain score, and 5-minute Apgar score were also noted. Preoperative anxiety was assessed using the Hamilton Anxiety Rating Scale (HAM-A), a 14-item clinician-administered scale in which each item is scored from 0 to 4, giving a total score ranging from 0 to 56. For categorical analysis, scores of 0–7 were classified as no/minimal anxiety, 8–14 as mild anxiety, 15–23 as moderate anxiety, and ≥24 as severe anxiety. Anxiety was considered present when the HAM-A score was ≥8. These severity thresholds are consistent with published HAM-A cutoff ranges [9]. The HAM-A was administered before surgery by a trained study assessor using the same standardized procedure for all participants. The assessor followed uniform instructions and scoring criteria to minimize variation in assessment. To ensure consistency of data collection, a standardized questionnaire was used, and the HAM-A was added. To ensure the proforma was suitable for the main study, it was pre-tested on a small number of patients before the main study began. All data collectors were trained prior to data collection, and data were scored in a consistent manner with supervision of senior clinicians. Clinical variables were measured with calibrated equipment and were standardized.

The SPSS software version 26.0 from IBM was used for data analysis. To determine normality, the Shapiro–Wilk test was used. The values of variables with normal distribution were presented as a mean ± standard deviation, and those with non-normal distribution were presented as a median and interquartile range (IQR). Frequencies and percentages were used to describe categorical variables, and the prevalence of anxiety was reported as a 95% confidence interval. Demographic, obstetric, anesthesia-related, psychological, and clinical variables were examined by Pearson's chi-square or Fisher's exact test for association with anxiety. Cramer's V was used to measure association strength. A p-value ≤0.05 was considered statistically significant. The results were interpreted without correction for multiple comparisons.

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RESULTS

The median age of the participants was 27.1 years (IQR: 8.4 years), with most participants in the 25–30-year age group (47.6%). The majority of participants were from urban areas (60.2%) and had secondary education (54.4%). More than half were from the middle socioeconomic background (52.4%)(Table 1).

Table 1: Demographic Characteristics of Participants (n=103)

Variables	Category	n (%)
Age (years)	Median (IQR)	27.1 (8.4)
	<25	28 (27.2%)
	25–30	49 (47.6%)
	>30	26 (25.2%)
Residence	Urban	62 (60.2%)
	Rural	41 (39.8%)
Education	Primary	21 (20.4%)
	Secondary	56 (54.4%)
	Higher	26 (25.2%)
Socioeconomic Status	Low	29 (28.2%)
	Middle	54 (52.4%)
	High	20 (19.4%)

Age was presented as median (IQR) because the Shapiro–Wilk test indicated deviation from normality (p=0.003)

The majority of patients were multigravida (63.1%) and multiparous (66.0%). The median gestational age was 38.8 weeks (IQR: 2.2 weeks), and the vast majority were at term (81.6%). Emergency cesarean section accounted for 62.1% of deliveries. Just over half of the patients had a previous cesarean section (50.5%), and fetal distress was the most frequent indication (30.1%)(Table 2).

Table 2: Obstetric and Clinical Characteristics (n=103)

Variables	Category	n (%)
Gravidity	Primigravida	38 (36.9%)
	Multigravida	65 (63.1%)
Parity	Nulliparous	35 (34.0%)
	Multiparous	68 (66.0%)
Gestational Age	Median (IQR)	38.8 (2.2) weeks
	<37 Weeks	19 (18.4%)
	≥37 Weeks	84 (81.6%)
Type of Cesarean	Elective	39 (37.9%)
	Emergency	64 (62.1%)
Previous C-Section	Yes	52 (50.5%)
	No	51 (49.5%)
Indication of Cesarean	Fetal Distress	31 (30.1%)
	Previous Scar	27 (26.2%)
	Failure to Progress	22 (21.4%)
	Others	23 (22.3%)

Gestational age was summarized as median (IQR) because its distribution was non-normal on Shapiro–Wilk testing (p<0.001)

Spinal anesthesia was administered to most patients (88.3%). The majority had not received preoperative counseling (64.1%), and 57.3% had no previous anesthesia exposure. The median duration of surgery was 63.0 minutes (IQR: 29.0 minutes). Intraoperative complications were documented in 18 patients (17.5%), whereas 85 patients (82.5%) had no recorded intraoperative complications (Table 3).

Table 3: Anesthesia-Related Characteristics (n=103)

Variables	Category	n (%)
Type of Anesthesia	Spinal	91 (88.3%)
	Epidural	12 (11.7%)
Preoperative Counseling	Yes	37 (35.9%)
	No	66 (64.1%)
Previous Anesthesia Exposure	Yes	44 (42.7%)
	No	59 (57.3%)
	Median (IQR)	63.0 (29.0) minutes
Duration of Surgery	<60 Minutes	48 (46.6%)
	≥60 Minutes	55 (53.4%)
Intraoperative Complications	Yes	18 (17.5%)
	No	85 (82.5%)

Duration of surgery was reported as median (IQR) because the Shapiro–Wilk test indicated non-normality (p=0.004)

Anxiety was present in 70 of 103 patients (68.0%; 95% CI: 58.4%–76.2%). Moderate anxiety was observed in 30.1% of the total sample, mild anxiety in 20.4%, and severe anxiety in 17.5%. Among participants who had anxiety, moderate anxiety constituted the largest severity category. Fear of surgery was reported by 68.9% and fear of anesthesia by 57.3%. Family support was present in 61.2%, while 65.0% had inadequate knowledge about the procedure. A majority (61.2%) of patients were dissatisfied. The median HAM-A score was 15.7 (IQR: 16.9)(Table 4).

Table 4: Anxiety, Psychological, and Clinical Characteristics (n=103)

Variables	Category	n (%)
Anxiety Status	Present	70 (68.0%; 95% CI: 58.4% –76.2%)
	Absent	33 (32.0%)
Anxiety Severity	No Anxiety	33 (32.0%)
	Mild	21 (20.4%)
	Moderate	31 (30.1%)
	Severe	18 (17.5%)
HAM-A Score	Median (IQR)	15.7 (16.9)
Fear of Surgery	Yes	71 (68.9%)
	No	32 (31.1%)
Fear of Anesthesia	Yes	59 (57.3%)
	No	44 (42.7%)
Previous Bad Experience	Yes	26 (25.2%)
	No	77 (74.8%)
Family Support	Present	63 (61.2%)
	Absent	40 (38.8%)
Knowledge About Procedure	Adequate	36 (35.0%)
	Inadequate	67 (65.0%)

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Maternal Satisfaction	Satisfied	40 (38.8%)
	Not satisfied	63 (61.2%)
Heart Rate (bpm)	Mean ± SD	96.5 ± 11.2
Systolic BP (mmHg)	Mean ± SD	130.7 ± 10.6
Postoperative Pain Score	Mean ± SD	6.3 ± 1.9
Apgar Score at 5 Min	Mean ± SD	7.6 ± 1.0

The HAM-A score was reported as median (IQR) because it was non-normally distributed (Shapiro–Wilk $p < 0.001$). Heart rate, systolic blood pressure, postoperative pain score, and 5-minute Apgar score did not significantly deviate from normality and were therefore retained as mean ± SD.

The expanded analysis of factors associated with anxiety included demographic, obstetric, anesthesia-related, psychological, and clinical variables. Family support was the only factor showing a statistically significant unadjusted association with anxiety. Anxiety was present in 32 of 40 patients without family support (80.0%) compared with 38 of 63 patients with family support (60.3%) ($\chi^2 = 4.353$, p=0.037; Cramer's V = 0.206). The expected cell counts were adequate for this analysis. Fear of surgery, previous adverse experiences, procedural knowledge, and other demographic, obstetric, and anesthesia-related factors showed no significant association with anxiety ($p>0.05$). Anesthesia type was also nonsignificant (Fisher's exact test, p=0.515). Similarly, anxiety was reported in 70.3% of counseled and 66.7% of non-counseled patients (p=0.707), indicating no significant association between preoperative counseling and anxiety (Table 5).

Table 5: Factors Associated with Anxiety (n=103)

Variables	Category	Anxiety Present, n (%)	Anxiety Absent, n (%)	p-value	Cramer's V
Age Group	<25	19 (67.9%)	9 (32.1%)	0.986	0.016
	25–30	33 (67.3%)	16 (32.7%)		
	>30	18 (69.2%)	8 (30.8%)		
Residence	Rural	26 (63.4%)	15 (36.6%)	0.421	0.079
	Urban	44 (71.0%)	18 (29.0%)		
Socioeconomic Status	Low	18 (62.1%)	11 (37.9%)	0.630	0.095
	Middle	37 (68.5%)	17 (31.5%)		
	High	15 (75.0%)	5 (25.0%)		
Gravidity	Primigravida	27 (71.1%)	11 (28.9%)	0.607	0.051
	Multigravida	43 (66.2%)	22 (33.8%)		
Parity	Nulliparous	22 (62.9%)	13 (37.1%)	0.426	0.078
	Multiparous	48 (70.6%)	20 (29.4%)		
Gestational-Age Group	<37 Weeks	13 (68.4%)	6 (31.6%)	0.962	0.005
	≥37 Weeks	57 (67.9%)	27 (32.1%)		
Type of Cesarean	Elective	29 (74.4%)	10 (25.6%)	0.277	0.107
	Emergency	41 (64.1%)	23 (35.9%)		
Previous C-Section	Yes	33 (63.5%)	19 (36.5%)	0.323	0.097
	No	37 (72.5%)	14 (27.5%)		
Education	Primary	13 (61.9%)	8 (38.1%)	0.800	0.066
	Secondary	39 (69.6%)	17 (30.4%)		
	Higher	18 (69.2%)	8 (30.8%)		
Indication of Cesarean	Failure To Progress	14 (63.6%)	8 (36.4%)	0.488	0.154
	Fetal Distress	24 (77.4%)	7 (22.6%)		
	Previous Scar	16 (59.3%)	11 (40.7%)		
	Others	16 (69.6%)	7 (30.4%)		
Anesthesia Type	Epidural	7 (58.3%)	5 (41.7%)	0.515†	0.075
	Spinal	63 (69.2%)	28 (30.8%)		
Preoperative Counseling	Yes	26 (70.3%)	11 (29.7%)	0.707	0.037
	No	44 (66.7%)	22 (33.3%)		
Previous Anesthesia Exposure	Yes	30 (68.2%)	14 (31.8%)	0.967	0.004
	No	40 (67.8%)	19 (32.2%)		
Duration of Surgery	<60 Minutes	30 (62.5%)	18 (37.5%)	0.267	0.109
	≥60 Minutes	40 (72.7%)	15 (27.3%)		
Intraoperative Complications	Yes	14 (77.8%)	4 (22.2%)	0.326	0.097
	No	56 (65.9%)	29 (34.1%)		

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Fear of Surgery	Yes	50 (70.4%)	21 (29.6%)	0.425	0.079
	No	20 (62.5%)	12 (37.5%)		
Fear of Anesthesia	Yes	38 (64.4%)	21 (35.6%)	0.371	0.088
	No	32 (72.7%)	12 (27.3%)		
Previous Bad Experience	Yes	17 (65.4%)	9 (34.6%)	0.745	0.032
	No	53 (68.8%)	24 (31.2%)		
Family Support	Absent	32 (80.0%)	8 (20.0%)	0.037	0.206
	Present	38 (60.3%)	25 (39.7%)		
Knowledge About Procedure	Adequate	22 (61.1%)	14 (38.9%)	0.275	0.108
	Inadequate	48 (71.6%)	19 (28.4%)		
Maternal Satisfaction	Satisfied	28 (70.0%)	12 (30.0%)	0.724	0.035
	Not Satisfied	42 (66.7%)	21 (33.3%)		

Pearson chi-square test was used unless otherwise indicated. Cramer's V was used to quantify effect size. A p-value ≤0.05 was considered statistically significant. †Fisher's exact test was reported for anesthesia type because 25% of cells had an expected count below 5. The analyses were unadjusted for multiple comparisons; therefore, the statistically significant association observed for family support should be interpreted cautiously

The study shows the distribution of anxiety severity among the participants. No anxiety was observed in 32.0% of participants, while moderate, mild, and severe anxiety were observed in 30.1%, 20.4%, and 17.5%, respectively. Among patients with anxiety, moderate anxiety was the most frequent severity category (Figure 1).

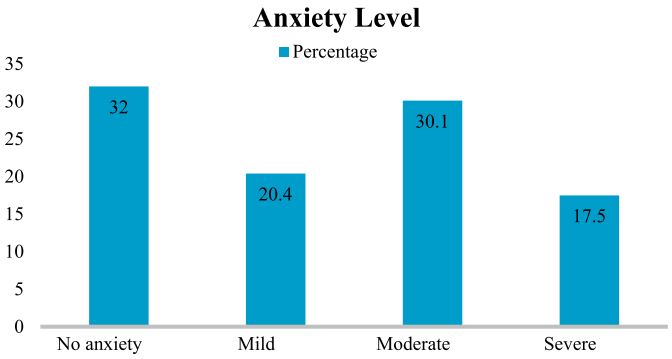


Figure 1: Distribution of Anxiety Severity among Patients Undergoing Cesarean Section Under Regional Anesthesia

DISCUSSION

The present study found preoperative anxiety in 68.0% of women undergoing cesarean section under regional anesthesia, with moderate anxiety being the most frequent category among affected patients. This finding is consistent with studies by Ferede *et al.* and Fentie *et al.* which reported a substantial burden of anxiety among obstetric surgical patients [1, 10]. Previous evidence also indicates considerable variation in anxiety prevalence across different clinical settings [1]. The relatively wide 95% confidence interval around the prevalence estimate in the present study should, however, be considered when comparing the magnitude of anxiety with other populations. Fears of surgery (68.9%) and anesthesia (57.3%) were also frequently reported but were not statistically significantly associated with anxiety. Anesthetic-related concerns were previously shown to be contributing factors for maternal psychological distress [11]. Jeevan *et al.* also reported that there was an association between the levels of anxiety before the surgery and shivering after spinal anesthesia during caesarean delivery, which highlights the clinical implications of this phenomenon [12]. These findings support the clinical importance of identifying anxiety even when routine hemodynamic measurements remain relatively stable. Inadequate procedural knowledge was reported by 65.0% of participants but was not significantly associated with anxiety. Likewise, anxiety was seen in 70.3% of the counseled women, and 66.7% of the non-counseled women (p=0.707). These results are inconsistent with evidence that indicates that educational interventions can decrease preoperative anxiety levels [13-15]. Singh and Heralal also found that perioperative video education was beneficial in reducing anxiety and improving maternal satisfaction [16]. Differences in counseling content, timing, and delivery may explain these variations. Unadjusted association with anxiety was only statistically significant with family support. Women with no family support were more likely to be affected by anxiety (80.0%) than women with family support (60.3%) (p=0.037; Cramer's V = 0.206). This result is similar to that found in other studies that have reported a correlation between increased social support and reduced preoperative anxiety [17]. The association, however, should be interpreted with caution as multiple comparisons were carried out unadjusted. Other demographic, obstetric, and anesthesia factors were not significantly associated [17-19]. Maternal dissatisfaction was reported by 61.2% of participants but was not significantly associated with anxiety. In a previous study, it was found that psychological distress is likely to hurt recovery after cesarean delivery [20]. The study was constrained by the fact that it was a single-center, cross-sectional, non-probability sampling study with a relatively small sample size, a wide prevalence-estimation margin of error, and by the study's cross-sectional design. There was also a restriction in interpretation of the factors associated

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with the multiple unadjusted comparisons. Multicentre prospective studies, preferably larger, are recommended to find independent predictors and test the efficiency of structured psychological interventions.

Several limitations should be acknowledged, including the single-center cross-sectional design, small sample size, 9% margin of error, and non-probability sampling, which limit generalizability and causal inference. Exclusion of patients with psychiatric illness or severe obstetric complications may have introduced selection bias. Furthermore, multiple unadjusted comparisons and limited assessment of counseling quality and intraoperative complications may have influenced the findings. Future multicenter prospective studies with larger samples and multivariable analyses are recommended to identify independent predictors of anxiety and evaluate structured psychological interventions.

CONCLUSIONS

Preoperative anxiety affected 68.0% of women undergoing cesarean section under regional anesthesia. Lack of family support was the only factor significantly associated with anxiety in unadjusted analysis, while counseling, psychological, demographic, and obstetric factors showed no significant associations. These findings warrant cautious interpretation due to the cross-sectional design and multiple comparisons.

Authors' Contribution

Conceptualization: HMFI
Methodology: HMFI, SS, SH, NA
Formal analysis: HMFI
Writing and Drafting: HMFI, SS, SH, NA
Review and Editing: HMFI, SS, SH, NA

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflict of Interest

All the authors declare no conflict of interest.

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