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Evaluating Patients' Choice of General and Spinal Anesthesia for Elective Cesarean Sections and Related Factors

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ABSTRACT

Background: Cesarean delivery rates are rising globally, and anesthesia selection is a key determinant of maternal comfort, safety, and neonatal outcomes. In elective cesarean delivery, patient preference may influence the choice between general and spinal anesthesia and may reflect fear-driven misconceptions. Objective: To evaluate women's preferences for general versus spinal anesthesia for elective cesarean delivery and assess socio-demographic associations with anesthesia choice. Methods: A cross-sectional observational study was conducted at Women's Christian Hospital, Multan, Pakistan, from May to August 2025. Women admitted for elective cesarean delivery were recruited using non-probability purposive sampling. A structured questionnaire assessed anesthesia preference and belief-based factors. Data were analyzed using SPSS version 30.0 with descriptive statistics and chi-square testing. Results: Among 117 participants, 104 (88.9%) preferred spinal anesthesia and 13 (11.1%) preferred general anesthesia. In the general-anesthesia group, fear of back pain (100%) and fear of needles in the back (76.9%) were most common. Among women preferring spinal anesthesia, fear of postoperative pain (92.3%), nausea/vomiting (87.5%), and not waking up (85.6%) were frequently endorsed. No significant associations were observed between anesthesia preference and residence (p=0.922), education (p=0.339), or occupation (p=0.107). Conclusion: Spinal anesthesia was strongly preferred for elective cesarean delivery, and preference patterns were largely fear-driven, supporting the need for structured counseling to address misconceptions and optimize informed decision-making.

Keywords
Elective cesarean section; General anesthesia; Spinal anesthesia; Patient preference; Counseling.

INTRODUCTION

Cesarean delivery (CD) rates have increased substantially worldwide, with an estimated 18.6% of all births occurring by cesarean section across 150 countries (1). This rise has heightened the importance of optimizing perioperative maternal–fetal care, particularly anesthesia selection, which is a central determinant of maternal safety, neonatal outcomes, and patient satisfaction. Considerable international variation exists in anesthesia practices for elective cesarean delivery. For example, elective CD under general anesthesia has been reported at approximately 10% in Germany, 30% in Spain, and 34% in the Czech Republic (2). In Turkey, cesarean section accounted for 62.8% of births in 2022, with the proportion conducted under general anesthesia believed to remain substantial despite limited national reporting (3). In Pakistan, cesarean deliveries increased from 3.2% in 1990 to 19.6% in 2018, reflecting a rapidly changing obstetric landscape with growing demand for safe anesthetic services (4).

Modern obstetric practice recognizes anesthesia as essential to minimizing pain, discomfort, and perioperative physiological stress, while supporting procedural safety and maternal comfort (5). Contemporary clinical guidance recommends neuraxial techniques (spinal or epidural anesthesia) as the preferred method for cesarean delivery unless contraindicated, reserving general anesthesia for selected situations such as failed neuraxial block, severe fetal compromise requiring urgent delivery, major hemorrhage, uterine rupture, or placental abruption (6). Neuraxial anesthesia is generally associated with reduced airway-related risk, lower neonatal drug exposure, and favorable maternal recovery profiles, and has been linked with improved maternal and neonatal outcomes compared with general anesthesia in clinical and observational studies (7,8). However, anesthesia choice in cesarean delivery is not determined solely by clinical indications. In elective cases, anesthesiologist recommendations often integrate patient preference, which may reflect prior experiences, beliefs, and anxieties rather than clinical risk profiles (9,10).

Patient decision-making regarding anesthesia is influenced by both informational factors and psychological variables. Recent evidence suggests that personality traits and preoperative anxiety can influence anesthesia preferences for cesarean delivery, although findings remain inconsistent and context-dependent (11). Patient satisfaction has frequently been reported to be higher with neuraxial anesthesia, particularly when patients are counseled effectively and postoperative analgesia is optimized, including the use of neuraxial adjuncts (12,13). Conversely, persistent misconceptions and fear-based beliefs remain common in many settings. Studies from Pakistan and comparable contexts indicate that while most women accept spinal anesthesia when offered, many report inadequate knowledge, fear of complications, and uncertainty regarding intraoperative experience and postoperative outcomes, which may lead some to prefer general anesthesia or remain undecided (14). Large international analyses have also highlighted systematic differences in anesthesia technique use between higher-resource and lower-resource environments, shaped by

both service capacity and patient-level concerns (15). Moreover, Pakistani evidence indicates that prior exposure to anesthesia and the quality of preoperative counseling are major determinants of informed preference formation in elective cesarean delivery (16).

Despite the clinical importance of anesthesia choice, there remains limited evidence from South Punjab quantifying elective cesarean anesthesia preferences and identifying modifiable drivers of decision-making in real-world hospital settings. Understanding these patterns is essential to strengthen counseling protocols, address misconceptions, and optimize patient-centered anesthesia planning. Therefore, this study aimed to evaluate women's preferences for spinal versus general anesthesia for elective cesarean delivery and to assess the association of socio-demographic factors with anesthesia choice in a tertiary care setting in Multan, Pakistan (16).

MATERIALS AND METHODS

This cross-sectional observational study was conducted to evaluate women's preferences for spinal versus general anesthesia for elective cesarean delivery and to identify socio-demographic factors associated with anesthesia choice. The study was carried out at Women's Christian Hospital, Multan, Pakistan, a tertiary care facility providing obstetric services to both urban and rural populations across South Punjab. Data collection was performed over four months, from May to August 2025, following approval from the Departmental Research Committee, The University of Lahore, Lahore. Ethical approval was granted by the University of Lahore Ethics Committee, and all participants provided informed consent prior to study participation.

Women admitted for elective cesarean delivery during the study period were recruited using a non-probability purposive convenience sampling approach. Participants were approached in person in the obstetric admission area prior to surgery. A structured questionnaire was administered in an interview-assisted format to ensure comprehension among participants with limited literacy. The questionnaire was pre-tested on a small pilot sub-sample to ensure clarity and feasibility. It comprised two major components: (i) socio-demographic characteristics including age, education, occupation, and residence, and (ii) anesthesia preference (spinal or general) and belief-based factors contributing to that preference. Items assessing factors were collected in a binary format (Yes/No), and participants were allowed to endorse multiple items. The primary outcome was the type of anesthesia preferred for the upcoming elective cesarean delivery. Secondary outcomes included endorsement of specific belief-based factors and associations between socio-demographic variables and anesthesia preference.

A total of 130 women were approached. After exclusion of incomplete questionnaires, duplicated entries, and non-informative forms with uniform responses across items, the final analyzed sample included 117 participants. Data were coded, anonymized, and securely stored with access restricted to the research team.

Statistical analysis was performed using SPSS version 30.0. Descriptive statistics were reported as frequencies and percentages. Associations between anesthesia preference and categorical predictors (residence, education, occupation) were assessed using Pearson's chi-square test. Statistical significance was considered at $p < 0.05$. For key binary comparisons, odds ratios (OR) with 95% confidence intervals (CI) were derived to quantify the direction and magnitude of association. Data integrity checks included double-entry verification for categorical variables and cross-validation of totals across tables to ensure consistency.

RESULTS

A total of 117 women scheduled for elective cesarean delivery were included. Most participants were aged 26–35 years (52/117, 44.4%), followed by 36–45 years (44/117, 37.6%), while 7.7% (9/117) were aged 15–25 years and 10.3% (12/117) were older than 45 years. The sample was almost evenly distributed by residence, with 51.3% urban (60/117) and 48.7% rural (57/117). The majority of participants were housewives (92/117, 78.6%), and most were illiterate (77/117, 65.8%), indicating a predominantly low-formal-education obstetric population.

Table 1. Socio-demographic characteristics of participants (n = 117)

Characteristic	Category	n	%
Age (years)	15–25	9	7.7
	26–35	52	44.4
	36–45	44	37.6
	>45	12	10.3
Occupation	Government employee	18	15.4
	Housewife	92	78.6
	Self-employed	7	6.0
Education	Illiterate	77	65.8
	Bachelor's	14	12.0
	Diploma and above	23	19.7
	Post-graduation	3	2.6
Residence	Urban	60	51.3
	Rural	57	48.7

Table 2. Overall preference for anesthesia type (n = 117)

Preference	n	%
Spinal anesthesia	104	88.9
General anesthesia	13	11.1

Spinal anesthesia was the overwhelmingly preferred option, selected by 104 women (88.9%), whereas 13 women (11.1%) preferred general anesthesia, demonstrating a strong preference for neuraxial techniques in elective cesarean delivery within this setting.

Table 3. Concerns associated with choosing general anesthesia (among those preferring general anesthesia; n = 13)

Concern (General anesthesia chosen)	Yes n (%)	No n (%)
Fear of seeing/hearing in the operating room	5 (38.5)	8 (61.5)
Fear of spinal cord injury	7 (53.8)	6 (46.2)
Fear of back pain	13 (100.0)	0 (0.0)
Fear of paralysis	8 (61.5)	5 (38.5)
Fear of needles in the back	10 (76.9)	3 (23.1)
Fear of pain during surgery	4 (30.8)	9 (69.2)

Among women who preferred general anesthesia (n = 13), the most consistently endorsed concern was fear of back pain (13/13, 100%), followed by fear of needles in the back (10/13, 76.9%) and fear of paralysis (8/13, 61.5%). Over half of participants also endorsed fear of spinal cord injury (7/13, 53.8%), while fear of seeing/hearing in the operating room was reported by 38.5% (5/13). These responses indicate that general anesthesia preference was strongly linked to fears of neuraxial-procedure complications and intraoperative experience.

Table 4. Concerns associated with avoiding general anesthesia (among those preferring spinal anesthesia; n = 104)

Concern (Spinal chosen; concerns about general anesthesia)	Yes n (%)	No n (%)
Desire to be alert at baby's birth	62 (59.6)	42 (40.4)
Fear of not waking up	89 (85.6)	15 (14.4)
Fear of nausea/vomiting	91 (87.5)	13 (12.5)
Fear of pain after surgery	96 (92.3)	8 (7.7)
Fear of urinary retention	65 (63.1)	38 (36.9)
Fear of anorexia	25 (24.3)	78 (75.7)
Fear of headache	88 (84.6)	16 (15.4)
Fear of not being able to breastfeed	27 (26.0)	77 (74.0)

Among women preferring spinal anesthesia (n = 104), endorsement patterns reflected strong concerns regarding outcomes perceived to be related to general anesthesia. The most frequent concerns were fear of pain after surgery (96/104, 92.3%), fear of nausea/vomiting (91/104, 87.5%), and fear of not waking up (89/104, 85.6%), followed by fear of headache (88/104, 84.6%). In addition, 59.6% (62/104) valued being alert at the baby's birth. These findings demonstrate that spinal preference was primarily driven by fear-based perceptions of general anesthesia and a desire for conscious participation during childbirth.

Items such as urinary retention and headache are commonly recognized as neuraxial-related adverse effects; however, in this dataset they were endorsed within the spinal-preference group, indicating these represent belief-based concerns about general anesthesia or misperceptions, rather than clinically accurate complication attribution. The reporting here reflects participants' responses as captured.

Table 5. Association between residence and anesthesia preference (n = 117)

Residence	General n (%)	Spinal n (%)	Total	OR (Spinal preference)	95% CI	p-value
Rural	7 (12.3)	50 (87.7)	57	0.79	0.25–2.52	0.922
Urban	6 (10.0)	54 (90.0)	60	Reference	—	—

Spinal anesthesia was preferred by 87.7% of rural women (50/57) and 90.0% of urban women (54/60). The difference was not statistically significant (p = 0.922), and residence showed no meaningful association with spinal preference (OR = 0.79, 95% CI 0.25–2.52). Pearson chi-square = 0.010, df = 1.

Table 6. Association between education level and anesthesia preference (n = 117)

Education level	General n (%)	Spinal n (%)	Total	p-value
Illiterate	9 (11.7)	68 (88.3)	77	
Bachelor's	0 (0.0)	14 (100.0)	14	
Diploma and above	3 (13.0)	20 (87.0)	23	
Post-graduation	1 (33.3)	2 (66.7)	3	0.339

Across all education levels, spinal anesthesia was consistently preferred, ranging from 66.7% (2/3) among post-graduates to 100% (14/14) among those with bachelor's degrees. The association between education level and anesthesia preference was not statistically significant (p = 0.339), although the pattern suggested a lower proportion of general anesthesia preference among women with higher formal education. Pearson chi-square = 3.363, df = 3; Cramer's V = 0.170.

Table 7. Association between occupation and anesthesia preference (n = 117)

Occupation	General n (%)	Spinal n (%)	Total	p-value
Government employee	0 (0.0)	18 (100.0)	18	
Housewife	11 (12.0)	81 (88.0)	92	
Self-employed	2 (28.6)	5 (71.4)	7	0.107

Spinal anesthesia was preferred by 100% of government employees (18/18) and 88.0% of housewives (81/92), while 71.4% of self-employed women (5/7) preferred spinal anesthesia. Although the distribution suggested greater general anesthesia preference among self-employed women

(28.6%), the association between occupation and anesthesia choice was not statistically significant (p = 0.107). Pearson chi-square = 4.477, df = 2; Cramer's V = 0.196.

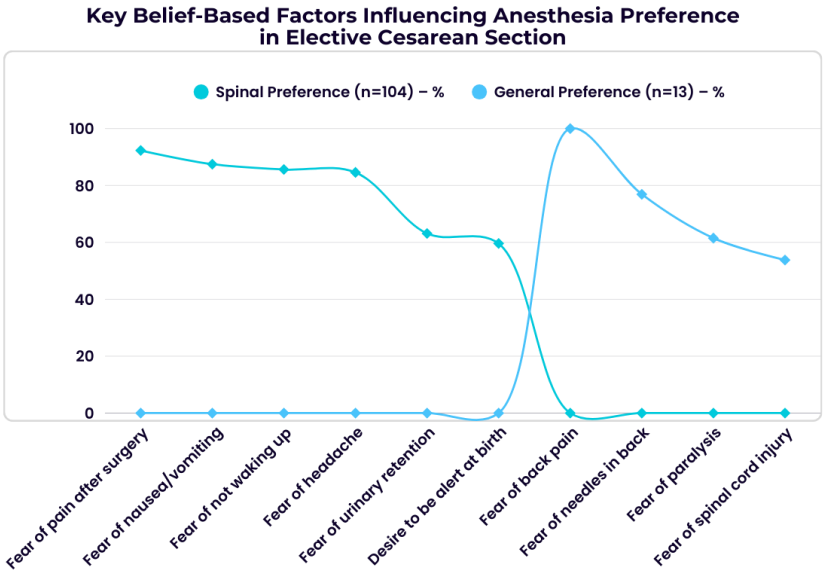

Figure 1 The figure illustrates distinct belief-based patterns underlying anesthesia preference for elective cesarean delivery. Among women preferring spinal anesthesia (n=104), concerns attributed to general anesthesia were highly prevalent, particularly fear of postoperative pain (92.3%), nausea/vomiting (87.5%), not waking up (85.6%), and headache (84.6%), with 59.6% also reporting a desire to remain alert at childbirth. In contrast, women preferring general anesthesia (n=13) predominantly expressed fears related to neuraxial techniques, including fear of back pain (100%), fear of needles in the back (76.9%), fear of paralysis (61.5%), and fear of spinal cord injury (53.8%), highlighting that spinal preference was largely driven by avoidance of perceived general-anesthesia risks, whereas general preference was driven by apprehension regarding spinal procedures.

DISCUSSION

Anesthesia selection is a critical component of cesarean delivery because it directly influences intraoperative safety, postoperative recovery, and maternal–neonatal outcomes, while also shaping patient satisfaction and psychological comfort during the surgical experience (17,18). In elective cesarean delivery, clinical decision-making is frequently guided by maternal–fetal condition and institutional practice; however, patient preference remains particularly relevant when both general and neuraxial techniques are clinically appropriate, making informed counseling a key determinant of safe, patient-centered care (19,20). In the present study, the preference for spinal anesthesia was markedly high (88.9%), with only 11.1% of women selecting general anesthesia. This pattern aligns with contemporary obstetric anesthesia recommendations and international trends favoring neuraxial anesthesia, largely attributable to its favorable safety profile, reduced airway-related risks, and reduced neonatal exposure to anesthetic agents (21,22). While these findings reflect increasing acceptability of spinal anesthesia in Pakistan, they also highlight the persistence of fear-driven decision-making, indicating a need for structured counseling to address misconceptions and optimize informed choice.

The overall preference distribution observed in this study is consistent with regional and international studies showing a progressive shift toward neuraxial techniques for cesarean delivery, particularly in elective settings (11,14). In contrast, earlier studies from certain regions—particularly older Iranian reports—documented substantially higher use or preference for general anesthesia (23–25). Such differences are plausibly explained by evolving anesthesia infrastructure, increased availability of trained anesthetists, improved monitoring standards, and changes in counseling practices over time, as well as cultural variability in fear perception and trust in medical interventions. In addition, more recent evidence suggests that individual psychological factors and preoperative anxiety may influence preference toward general anesthesia in some women, reinforcing that preference is not purely clinical but also cognitive and emotional (11,26).

Importantly, the present study demonstrates that women selecting general anesthesia frequently endorsed concerns strongly linked to neuraxial techniques—particularly fear of back pain (100%), fear of needles in the back (76.9%), fear of paralysis (61.5%), and fear of spinal cord injury (53.8%). Similar fear patterns have been reported in antenatal populations in Nigeria and other settings, where apprehension regarding neuraxial complications emerged as a dominant driver of general anesthesia preference (27,28). This supports the interpretation that fear of neuraxial injury and procedural discomfort remains a significant barrier, even in elective contexts where spinal anesthesia is the clinical standard. These concerns are often non-scientific or exaggerated and may be reduced through structured preoperative education, reassurance regarding safety, and communication of realistic risk estimates (29). By comparison, the spinal anesthesia preference group commonly endorsed concerns attributed to general anesthesia, particularly fear of pain after surgery (92.3%), nausea/vomiting (87.5%), and not waking up (85.6%), as well as valuing conscious participation in childbirth (59.6%). These findings are consistent with patient-centered literature emphasizing maternal desire to remain awake during delivery and avoid perceived risks of general anesthesia, including delayed bonding and anxiety about intraoperative awareness or loss of control (30,31). Moreover, controlled and observational studies show that patient satisfaction is generally higher with neuraxial anesthesia when perioperative analgesia and expectations are managed appropriately (22,32).

In the current analysis, residence, education, and occupation were not statistically associated with anesthesia preference. Although some studies suggest that education level and counseling exposure may influence anesthesia decisions, such relationships are inconsistent across contexts and likely depend on how counseling is delivered, the timing of preference assessment, and the presence of prior anesthesia experience (16,29). Given that the present study did not include a multivariable model or detailed measures of counseling quality, these findings should be interpreted cautiously as primarily descriptive of this hospital population. Nonetheless, the high overall preference for spinal anesthesia indicates that, in this

setting, acceptance of neuraxial anesthesia is widespread, while the remaining preference for general anesthesia appears predominantly driven by specific fears regarding neuraxial safety and intraoperative experience. This suggests that targeted counseling focusing on clarifying misconceptions about spinal complications and explaining perioperative expectations may further reduce anxiety-driven avoidance of neuraxial anesthesia and strengthen informed decision-making.

This study has limitations that should be considered when interpreting the results. The study used non-probability purposive sampling in a single tertiary care hospital, which may limit generalizability to other regions or facility types. The questionnaire used binary "Yes/No" responses, which may not capture the intensity of fears or nuanced beliefs and may also be subject to social desirability bias. In addition, the study did not include formal assessment of preoperative counseling exposure, prior anesthesia experiences, or multivariable adjustment for confounders. Future research should incorporate validated anxiety scales, structured counseling documentation, and multivariable modeling to better characterize independent predictors of anesthesia preference and to evaluate the impact of targeted educational interventions on preference formation and satisfaction outcomes.

CONCLUSION

In this study of women undergoing elective cesarean delivery, spinal anesthesia was strongly preferred over general anesthesia, with preference patterns primarily reflecting fear-based concerns rather than clinically grounded risk assessment; women selecting general anesthesia most frequently endorsed fears related to neuraxial injury and procedural discomfort, whereas women selecting spinal anesthesia commonly expressed concerns attributed to general anesthesia and valued being alert at childbirth, underscoring the need for standardized, culturally appropriate counseling that addresses misconceptions, clarifies expected perioperative experiences, and supports informed, patient-centered anesthesia decision-making.

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