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Knowledge and Perception about Anaesthesia among Patients Undergoing Caesarean Section in a Tertiary Care Hospital in Western Uttar Pradesh: A Questionnaire-Based Prospective Study

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ABSTRACT

Background and Aims: The rate of caesarean sections has risen from 17.2% to 21.5% between 2016 and 2021. Still, the knowledge and perception about anaesthetic modalities remain poorly studied in the setting of western Uttar Pradesh. Objectives of the study included to study the baseline knowledge and perception about anesthesia for caesarean section (CS) among primigravida patients scheduled for elective CS. We also evaluated the impact of structured pre-operative anaesthesia education on patient preferences.
Methods: A prospective questionnaire-based study was conducted at GIMS, Greater Noida, over two months (January–February 2025). Seventy primigravida women scheduled for elective CS under spinal anaesthesia were enrolled in the study. A pre-validated questionnaire (adapted from Bacha et al., 2019) was administered pre- and post-operatively to these patients. Chi-square and McNemar tests were applied for statistical analysis.
Results: Mean age of the participants of the study was 24.2 ± 3.1 years; 68.6% had matriculation-level or lower education while 77.1% were homemakers. While only 37.1% only reported to have a prior knowledge of anaesthesia; friends/relatives were the most common source of information (38.5%). Knowledge of spinal anaesthesia (SA) advantages over GA was reported only by 25.7% participants. 40% of the participants preferred to leave the decision of anesthesia type to the doctor preoperatively, while 40.0% wanted to avoid SA. Most commonly, the participants reported the fear of backache (42.9%). Post-operatively, however, only 14.3% still wished to avoid SA. This was a statistically significant reduction (McNemar test, $p < 0.001$). Anesthesia knowledge was found in 31.4% and this was seen mostly in patients with higher education ($p = 0.006$).
Conclusions: Knowledge of anesthesia among obstetric patients in western Uttar Pradesh is markedly deficient. Preoperative patient education by the anaesthesia team significantly reduces fears and improves acceptance of spinal anaesthesia. Structured counselling about anaesthesia is recommended to be integrated into routine antenatal care programmes.

Keywords: Anaesthesia awareness, caesarean section, knowledge, perception, primigravida, questionnaire, spinal anaesthesia, western Uttar Pradesh

INTRODUCTION

Cesarean section (CS) deliveries have shown a markedly increasing trend from 17.2% to 21.5% between the National Family Health Surveys NFHS-4 (2015–16) and NFHS-5 (2019–21).[1] There is growing recognition that the type of anaesthesia for CS affects the maternal and neonatal outcomes.[2] When CS is indicated medically, it significantly reduces the maternal and neonatal morbidity and mortality; however, the type of anaesthesia technique is also a critical determinant of safety.[3]

Spinal anaesthesia (SA) has been globally accepted as the preferred technique for elective CS. It has various advantages over general anesthesia (GA). These include simplicity of technique, rapid onset, lesser risk of aspiration and airway manipulation with neonates presenting with superior APGAR scores, improved umbilical arterial pH. With SA, the mother also has the unique benefit of remaining conscious and experiencing the child birth. [3,4] Regional anesthesia techniques have shown reduced maternal morbidity when compared with GA in elective CS. [4]

Despite these well-established benefits, many obstetric patients have a fear of anaesthesia, especially spinal anaesthesia. These patients may choose to resist the recommended technique. [5,6] Common fears include post-dural puncture backache, fear of needle, and anxiety about remaining awake

MATERIALS & METHODS

Study design and setting: This was a prospective questionnaire-based observational study conducted at a tertiary care hospital in western Uttar Pradesh over a period of two months.

Ethical approval: The study was approved by the GIMS Institutional Ethics Committee (Ref. GIMS/GSRC/2025/376). Written informed consent was obtained from all participants in their preferred language (Hindi or English). The study was conducted in accordance with the Declaration of Helsinki and ICMR guidelines for biomedical and health research involving human participants. CTRI registration was done prospectively (CTRI/2026/04/107662).

Inclusion criteria: All primigravida pregnant women aged ≥18 years, admitted for elective lower-segment caesarean section (LSCS) under spinal anaesthesia, who provided written informed consent.

Exclusion criteria: Patients with severe systemic illness, psychiatric illness, hearing or speech impairment, inability to understand the questionnaire in Hindi or English, or who refused to participate.

Sample size: A total of 70 patients were enrolled consecutively during the two-month study period, who presented for elective cesarean section.

Questionnaire: Questionnaire adapted from Bacha et al. (2019) [6] was used after obtaining written permission from the original author. The questionnaire included the following details: (A) demographic details; (B) antenatal clinic (ANC) attendance; (C) prior knowledge about anaesthesia and source of their information; (D) knowledge of spinal anaesthesia; (E) pre-operative anaesthetic preference; and (F) reasons for avoidance of spinal anaesthesia. Post-operative set of questions reassessed the type of anaesthesia received, the decision maker, and whether they still desired to avoid SA. A pre-test was conducted in 10 patients before starting the study.

Procedure: The pre-operative questionnaire was administered by a trained doctor in the patient's preferred language on the day of surgery, before transfer to the operating theatre. Before anesthesia, the attending anesthesiologist provided structured education about anaesthesia types, risks, and benefits to each patient. A selected set of

post-operative questions was readministered after the surgery to assess the change in perception and acceptance.

Statistical Analysis: Data were entered and analysed using SPSS version 26.0 (IBM Corp., USA). Descriptive statistics (frequencies, proportions, mean ± SD) were used to summarise data. Chi-square tests assessed associations between categorical variables. The McNemar test compared pre-operative and post-operative avoidance of spinal anaesthesia. $p < 0.05$ was considered statistically significant.

RESULT

Seventy patients were enrolled consecutively. No participants were excluded after enrolment. All 70 completed both the pre-operative and post-operative sections of the questionnaire.

Demographic profile

The mean age of participants was 24.2 ± 3.1 years (range 18–32 years). The predominant age group was 23–27 years (34/70, 48.6%). Education up to matriculation or below was present in 68.6% (48/70), and the majority were homemakers (54/70, 77.1%). Regular ANC attendance was reported by 82.9% (58/70). The demographic profile is summarised in Table 1.

Table 1: Demographic profile of study participants (n = 70)

Variable	n	%
Age (Years)		
18–22 years	22	31.4
23–27 years	34	48.6
28–32 years	14	20.0
Mean ± SD: 24.2 ± 3.1 years (range 18–32)		
Educational Status		
Matric and below	48	68.6
Graduation and above	22	31.4
Occupation		
Homemaker	54	77.1
Working/employed	16	22.9
Regular ANC Attendance		
Yes	58	82.9
No	12	17.1

Knowledge about anaesthesia

Prior knowledge about anaesthesia was present in only 26/70 participants (37.1%).(Table 2)

Table 2: Knowledge about anaesthesia (n = 70)

Variable	n	%
Prior Knowledge About Anaesthesia		
Yes	26	37.1
No	44	62.9
Source of Knowledge (n = 26)		
Obstetrician	8	30.8

Variable	n	%
Friends/Relatives	10	38.5
Internet/Literature	5	19.2
Other patients/Others	3	11.5
Previous Exposure to Spinal Anaesthesia		
Yes	12	17.1
No	58	82.9
Experience With Previous Spinal (n = 12)		
Good	9	75.0
Bad/Unsatisfactory	3	25.0
Knowledge of SA Advantages Over GA		
Yes	18	25.7
No	52	74.3

Pre-operative preferences and concerns are shown in Table 3. Post-operative responses and change in perception have been summarised in Table 4 and table 5.

Table 3: Pre-operative anaesthetic preferences and concerns (n = 70)

Variable	n	%
Pre-Operative Choice of Anaesthesia		
General anaesthesia	9	12.9
Spinal anaesthesia	15	21.4
Unable to decide	18	25.7
Leave decision to doctor	28	40.0
Desire to Avoid Spinal Anaesthesia (Pre-op)		
Yes	28	40.0
No	42	60.0
Reason for Avoidance (n = 28)		
Fear of needle prick	10	35.7
Fear of backache	12	42.9
Not wanting to be awake during surgery	6	21.4

Table 4: Post-operative responses (n = 70)

Variable	n	%
Type of Anaesthesia Received		
Spinal anaesthesia	65	92.9
General anaesthesia	5	7.1
Decision-Maker for Anaesthesia		
Patient/family	8	11.4
Surgeon	28	40.0
Anesthesiologist	24	34.3

Variable	n	%
Other hospital staff	2	2.9
Joint decision with doctor	8	11.4
Still Wants to Avoid Spinal (Post-op)		
Yes	10	14.3
No	60	85.7

Table 5: Change in desire to avoid spinal anaesthesia before and after peri-operative counselling (McNemar test)

Variable	n	%	p-value
Wanted to avoid spinal — Pre-operatively	28	40.0	—
Wanted to avoid spinal — Post-operatively	10	14.3	—
Reduction in avoidance after counselling	18	25.7	<0.001*

McNemar test. p < 0.05 considered statistically significant.

Overall anaesthesia awareness

A composite awareness score (0–3) was calculated based on three domains: prior knowledge about anaesthesia (1 point), knowledge of SA advantages over GA (1 point), and pre-operative preference for SA (1 point). A score of ≥2 was classified as 'good awareness'. Using this scoring, 22 patients (31.4%) had good awareness, and 48 (68.6%) had poor awareness (Table 6). Good awareness was significantly associated with graduation-level education ($p = 0.006$, Chi-square test) and regular ANC attendance ($p = 0.015$).

Table 6: Overall anaesthesia awareness category (n = 70)

Awareness Category	n	%
Good awareness (composite score ≥2/3)	22	31.4
Poor awareness (composite score <2/3)	48	68.6

DISCUSSION

This study assessed knowledge and perception about anaesthesia among primigravida women undergoing elective CS in a tertiary care hospital in western Uttar Pradesh. The key findings were: (i) low baseline anaesthesia knowledge (37.1%); (ii) minimal knowledge of SA advantages over GA (25.7%); (iii) high pre-operative desire to avoid SA (40%), mostly because of fear of backache and the fear of needle; (iv) predominance of medical team in anaesthesia decision-making (84.3%); and (v) a significant post-counselling reduction in SA avoidance (40.0% to 14.3%, $p < 0.001$).

The finding of low awareness of 37.1% in our cohort is consistent with the previous Indian and South Asian studies. Bacha et al. [6] used this same questionnaire in northern India and reported similar findings of low levels of anaesthesia awareness and the predominant information sources were friends and relatives. Another study from northern India (Ballabgarh, Haryana) similarly demonstrated that level of awareness about anaesthesia and the anesthesiologist's role was low in the rural population, and their commonest source of information was surgeon (64.32). Almost half (47.17%) of the participants in this study could not tell the type of anesthesia they had received due to lack of proper preoperative counselling.

Mathur et al. [10] from Banaras Hindu University (Varanasi, adjacent to our study region) reported that 100% of illiterate individuals and 55.86% with education up

to matriculation level were not aware that anesthesiologists are doctors, strongly similar to our findings within the North Indian population. None of the participants in their study knew about the advantages of regional anaesthesia over General anesthesia. This becomes an important factor when specifically obstetric population is concerned.

Internationally, Endalew et al. [7] from Ethiopia found that almost half (56.5% (95% CI: 51.4%, 61.9%) of the participants had good knowledge of anesthesia for CS. However, 63.3% of their participants were multigravida, with 24.4% having had experience of CS in previous deliveries. Participants with history of previous surgeries and access to health information were more likely to have a good knowledge of anaesthesia and exhibited a more positive attitude towards anesthesia.[7]

Shahid and Rashid [13] from Karachi (Pakistan) reported that only 17.5% of the participants in their study were familiar with spinal anaesthesia terminology specifically. Though the majority (93.7%) of the enrolled participants agreed to receive SA for their CS, only 23.4% answered all the questions correctly.

Ahmad I et al. [14] found that 82.4% of Pakistani women were aware of the existence of anaesthesia techniques for CS but specific knowledge of SA risks and benefits was limited, mirroring our finding that awareness of SA advantages is present in only 25.7% despite high general agreement to its use.

An association has been noted in the Indian literature between the education level of the population and anesthesia awareness (p=.006). Gurunathan and Jacob [11] reported that perception about the anesthesiologist as a doctor was only 19.5% in illiterate populations, while it was 87.9% in postgraduate-level educated individuals. Naithani et al. [12] in a nationwide survey reported that though a majority (92.67%) of patients appreciated the importance of anesthesia for surgery, only 42.67% knew that it was delivered by an anesthesiologist. Patients were largely very poorly aware of the other roles of anesthesiologists, such as, intraoperative monitoring (27.3%), critical care (7.33%) and pain management (4.67%). They confirmed low public awareness about anaesthesia, emphasizing the need for targeted community-based initiatives. The significantly better knowledge among regular ANC patients (p = 0.015) in our study highlights an important point that this point of contact can be used a critical interventional point for community dissemination.

Our study findings suggest that only 30.8% of women with prior knowledge received the information from their obstetrician, while friends and relatives (38.5%) remained the primary source — highlighting a gap that needs to be filled in the educational contact during routine ANCs. Bheemanna et al. [8], in their study conducted in a tertiary care hospital in south India, explored the fears and perceptions associated with regional anesthesia and found that mis-information from non-professionals like friends and family was a predominant cause contributing to anaesthesia-related anxiety, a finding strongly mirrored in our study. This highlights the need for education of our patients by the obstetrician–and anesthesiologist team to systematically incorporate anaesthesia counselling into ANC protocols.

The most common reason reported in our study was the fear of backache (42.9%) for avoidance of spinal anesthesia. These findings were consistent with the findings reported by Bacha et al. [6] and Shahid et al. [13] The association between SA and backache are mostly not supported with any clinical evidence. The existing literature suggests that postoperative low backache is mostly due to ligamentous laxity, hormonal changes, and musculoskeletal strain during pregnancy and labour rather than due to the anaesthetic technique.[15]

Another fear reported in the study was that of needle prick (35.7%). Ghaffar and Minai [15] similarly reported that 20% of the

pregnant patients in their study refused SA due to anticipated needle pain. However, the actual pain experienced during needle insertion for SA was found to be significantly lower than the anticipation. This finding suggests that preprocedural structured counselling by a trained professional can make substantial difference in this regard. The fear of staying awake during surgery (21.4%) has also been reported internationally in previous studies [16] and may be addressed by explaining the presence of an anesthesiologist during the surgery and the possible use of anxiolytic medications and sedation as per requirement.

A very clinically significant finding of the present study is the significant reduction in avoidance of SA — from 40.0% to 14.3% — after a single preoperative education session and SA (McNemar χ^2 = 12.76, p <0.001). This is consistent with the study findings reported by Endalew et al.[7] Also, the existing literature on general anaesthesia shows that a brief structured counselling notably improves the patient understanding by reducing anxiety and increasing acceptance of regional anesthetic techniques.[8,9] Yeoh et al [16] reported in their study that with the evolving perspective on anaesthesia for LSCS, there is an increasing tendency among the patients to prefer SA once adequately informed.

The predominance of illiteracy in the female obstetric patient and time constraint seem to be the predominant reasons behind the medical team-based decision-making (84.3%). This aligns with findings from Bacha et al. [6], who similarly found in their study that most of the patients the decision making entirely to the surgeon or anesthesiologist. However, the patient autonomy is compromised in such case. A truly informed consent means that the patient understands all the benefits and harms implied in both anaesthesia and surgery, and this warrants structured efforts for the empowerment of our obstetric population through informed choice.

The study has several limitations. The sample of 70 patients represents a two-month convenience cohort from a single tertiary centre, which limits the generalisability of the findings of this study. Social desirability bias may have influenced post-operative responses. A formal psychometric re-validation of the questionnaire was not done for the Hindi language; the translation was carried out by the doctor delivering the questionnaire, though a 10-patient pre-test was performed.

CONCLUSION

Knowledge and awareness about anaesthesia for caesarean section was found to be markedly deficient among primigravida women presenting for CS in the tertiary care hospital in western Uttar Pradesh, particularly in those who had lower educational levels; however, due to being a short-term student project, more participants could not be recruited. The most common barriers to spinal anaesthesia, as per this study remain as the fear of backache and needle phobia. A single pre-operative education session by the anaesthesia team significantly reduced fear and improved acceptance of spinal anaesthesia. The findings of this study suggest that it's time for a structured, language-appropriate anaesthesia counselling to be incorporated into routine antenatal care programmes in this region, and highlight the need for broader public anaesthesia awareness programs in North India. The authors recommend larger studies should be carried out covering more antenatal population of the northern region to explore the entire picture of this problem.

Declaration by Authors

Ethical Approval: Approved

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Conflict of Interest: The authors declare no conflict of interest.

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