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Knowledge, fear and acceptance rate of spinal anesthesia among pregnant women scheduled for cesarean section: a cross-sectional study from a tertiary care hospital in Karachi

Nida Shahid^{1*} and Asim Masroor Rashid¹

Abstract

Background Worldwide, the cesarean section (c-section) rate is rising. Globally, regional anesthesia in the form of spinal anesthesia (SA) is considered the first choice in uncomplicated c-section cases for safe maternal and neonatal outcomes. This study aimed to ascertain knowledge, acceptance, and fears of SA among patients scheduled for c-section in a tertiary care hospital.

Methods This cross-sectional study was performed in the Anesthesia Department, Hamdard University Hospital, Karachi, from April to September 2023. Knowledge was assessed using a self-designed questionnaire with a total of 7 questions. Data was entered in SPSS version 26 to perform statistical analysis.

Results A total of 303 females were enrolled, with a mean age of 26.5 ± 4.5 years and a median gestational age of 37 (IQR = 36–37) weeks. 93.7% of women agreed to receive SA. 63% heard the term regional anesthesia before, 12.2% heard about general anesthesia, and 17.5% heard about SA. 23.4% of participants scored 7 out of 7, 39.9% had a score of 6 out of 7, and 36.6% had a score of ≤ 5 . Among 129 (42.6%) females having fear, the commonest fear was limiting lower limb functions post-surgery (93.8%), followed by post-operative vaginal pain (91.5%), intra-operative pain (80.6%), post-operative backache (76.7%), having visuals of surgery (72.9%), back injury (56.6%), headache (46.5%), nausea/vomiting (31%), and being nude (24%).

Conclusion The present study analyzed that although the majority of female agreed to receive spinal anesthesia, they had a fear of it. Knowledge of spinal anesthesia was not remarkable among the study population. Proper education regarding anesthesia should be given to patients to overcome fears related to spinal anesthesia.

Clinical trial number Not applicable.

Keywords Regional anesthesia, Spinal anesthesia, Cesarean section, Pregnancy, Gestational age

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Introduction

Cesarean delivery (c-section) may be performed as an elective or emergency procedure, depending on the patient's condition. Globally, regional anesthesia (RA) in the form of spinal anesthesia (SA) is considered the first choice of anesthesia in uncomplicated c-section cases for safe maternal and neonatal outcomes. SA is the first choice because there are fewer associated risks than general anesthesia (GA) and it is simpler to perform [1, 2].

The c-section rate is globally rising, with a rate of 13–39% [3]. In Pakistan, the c-section rate was 3.2% in 1990, which progressed to 19.6% in 2018 [4]. As per standard operating practices, patients are informed about the anesthesia process, possible side effects, and expected complications during the pre-operative anesthetic evaluation. After that, consent is sought for the impending anesthetic operation. This education is necessary for improving their knowledge, achieving maternal satisfaction, managing legal requirements, and making decisions. Having adequate knowledge and a positive attitude towards anesthesia have positive impacts on the patients' outcomes and satisfaction level [5, 6].

Anesthesia is considered an essential component of cesarean sections in modern obstetrics since it helps to completely eliminate pain and discomfort while also promoting a certain level of calm [7]. Anesthesiologists and other perioperative care providers need to address the significant health issue of anesthetic fear. According to earlier research, most patients experience worry and anxiety from the time a surgical intervention is decided upon until they are admitted to the operating room [8]. Previous studies also showed that paresthesia, intraoperative hypotension, multiple pricks, inadequate analgesia, vomiting, and headaches are the fears of pregnant women in cases of anesthesia [9–11].

Having the proper knowledge of the procedure and the conditions aggravating adverse events may correct misbeliefs and associated fears related to SA. Many of the studies conducted in different parts of the world investigated the knowledge, attitude, and fear related to anesthesia among pregnant women [6, 11]. Some of the studies conducted in Pakistan determined the knowledge and attitudes of Pakistani women towards different anesthesia techniques for c-section. However, most of these studies were quite older and were conducted in the previous decade, during 2011–2012 [12–14]. Since patients may oppose the most easily performed SA because of a lack of adequate knowledge and fears. Therefore, keeping in view the importance of knowledge and associated fears, this study has been planned to ascertain knowledge, acceptance, and fears of SA among patients scheduled for c-section delivery in a tertiary care hospital in Karachi, Pakistan.

Material & methods

Study design, center and setting

This cross-sectional study was performed in the Department of Anesthesia, Hamdard University Hospital, Karachi, from April to September 2023, after acquiring ethical permission (IRB#: HCM&D/012/2022).

Inclusion & exclusion criteria

Pregnant women aged 18–49 scheduled for c-section delivery with an uncomplicated pregnancy were enrolled in the study. All females working in hospital either in clinical or administrative departments were excluded. Females with psychiatric illness were also excluded.

Sample size estimation

A previously conducted study reported that 73% of women preferred RA over GA [7]. Using a 95% confidence interval and 5% precision, a sample of the total 303 targeted population is required. Sample size calculation was performed on the online available sample size calculator, Open-Epi.

Study questionnaire

A self-designed questionnaire was developed after a thorough literature search. The first part of the proforma recorded socio-demographic features; the second part inquired about clinical history. The third part evaluated knowledge related to SA. This part contained a total 7 questions with multiple-choice questions and one correct answer. Thus, the score for the knowledge part ranged from 0 to 7. The fourth part assessed fears related to SA. We have attached a study questionnaire as a supplementary file. The content of questionnaire was validated by other two field experts who were not part of this study. Moreover, Cronbach's alpha was also computed using data gathered in a pilot study. Pilot was run on 30 patients. Cronbach's alpha came out to be >0.7.

Statistical analysis

Data was entered in SPSS version 26 to perform statistical analysis. Frequencies and percentages were computed for categorical variables. Numerical variables were expressed as mean \pm standard deviation when normally distributed, otherwise expressed as median with inter-quartile range (IQR). The normality assumption was evaluated using the Shapiro-Wilk test. A chi-square or Fisher-exact test was applied to compare patients' features among those with and without fear of SA. A p-value less than or equal to 0.05 was taken as statistically significant.

Table 1 Summary of socio-demographic profile of study participants

Variables	Frequency	Percentage
Age groups		
≤ 25 years	135	44.6
> 25 years	168	55.4
Occupation		
Homemaker	262	86.5
Working woman	41	13.5
Education		
Illiterate	11	3.6
Primary	1	0.3
Secondary	12	4
Matriculation	25	8.3
Intermediate	113	37.3
Graduation and above	141	46.5
Residence		
Rural	45	14.9
Urban	258	85.1
Husband is guiding you take decision regarding anesthesia approach?		
Yes	294	97
No	9	3
In laws and your family is guiding you take decision regarding anesthesia approach?		
Yes	289	95.4
No	14	4.6
Type of case		
Booked	292	96.4
Non-booked	11	3.6

Results

Summary of socio-demographic features of study participants

A total of 303 participants were enrolled, with a mean age of 26.5 ± 4.5 years. The age range was 19–40 years. Table 1 displays a summary of the socio-demographic features of the study participants.

Summary of obstetric and other surgical history of study participants

Median parity and gravida were 1 (IQR=1–2) and 2 (IQR=2–3), respectively. The median gestational age when attending the first antenatal visit and at the time of study enrollment was 8 (IQR=6–12) weeks and 37 (IQR=36–37) weeks, respectively. Table 2 shows a summary of obstetric history and surgical history other than c-sections.

Acceptance for spinal anesthesia and knowledge of spinal anesthesia

The majority of women agreed to receive SA (93.7%). The majority heard the term RA before (63%), while some also heard about GA (12.2%) and SA (17.5%), and few did not

Table 2 Summary of obstetric and other surgical history of study participants

Variables	Frequency	Percentage
Parity		
Nulliparous	60	19.8
Primiparous	98	32.3
Multiparous	145	47.9
Gravida		
Single	66	21.8
Multiple	237	78.2
History of cesarean delivery	226	74.6
Underwent spinal anesthesia in previous cesarean delivery	216	95.6
Type of hospital where did you receive the anesthesia previously?		
Tertiary	85	37.6
Secondary	141	62.4
Post-operative complication of anesthesia after delivery	39	17.3
If, yes which complication did you develop?		
Headache	9	23.1
backache	25	64.1
Numbness	5	12.8
In your opinion, these complications were minor or major?		
Minor	12	30.8
Major	27	69.2
Any other surgical history other than cesarean delivery	61	20.1
If, yes which type of anesthesia did you receive for that procedure?		
General	34	55.7
Regional	27	44.3
If, yes which complication did you develop?		
None	27	8.9
Post-operative nausea vomiting	12	19.7
Headache	13	21.3
Backache	8	13.1
Cough	1	1.6
In your opinion, these complications were minor or major?		
Minor	16	47.1
Major	18	52.9

hear before about any type of anesthesia (8.9%). Table 3 displays the response distribution for knowledge items. The overall median knowledge score was 6 (IQR=5–6). Nearly a quarter of participants scored 7 out of 7 (23.4%). 39.9% had a score of 6 out of 7, and 36.6% had a score of 5 or below. Sources of knowledge are depicted in Fig. 1.

Fears of spinal anesthesia

Fear related to SA was seen in 42.6% of females. Among 129 (42.6%) females having fear, the commonest fear

Table 3 Response distribution of study participants for knowledge items

Items	Frequency	Percentage
What is the purpose of anesthesia?		
to prevent patients' sense of feeling pain during surgery	222	73.3
to give sleeping injections so patient should not be awaked	44	14.5
Both	37	12.2
What is route and site of regional anesthesia in caesarian section?		
Injection is administered in spine	277	91.4
Injection is given on the abdomen	26	8.6
In which position regional anesthesia is given in caesarian section?		
In supine position	67	22.1
In sitting position	236	77.9
Does patient need to go for NPO before spinal anesthesia?		
Yes	275	90.8
No	28	9.2
How regional anesthesia is different from general anesthesia?		
Not technical difference	49	16.2
Anesthetize lower body	254	83.8
How long the regional anesthesia work in caesarian section cases?		
2–3 h	148	48.8
6 h	155	51.2
When do patient mobilize after spinal anesthesia?		
6–12 h	273	90.1
3 to 5 days	30	9.9

NPO Nothing by mouth

was limiting lower limb functions post-surgery (93.8%), followed by post-operative vaginal pain (91.5%), intra-operative pain (80.6%), post-operative backache (76.7%), having visuals of surgery (72.9%), back injury (56.6%),

headache (46.5%), nausea/vomiting (31%), and being nude (24%).

Table 4 compares patients' features and sources of knowledge among those who reported fear and did not have fear of SA. The frequency of fear was significantly higher among younger females ($p < 0.001$), among nulliparous ($p < 0.001$), among those with single gravida ($p < 0.001$), among those who had no history of c-section ($p < 0.001$), and among patients with a knowledge score ≤ 5 ($p < 0.007$).

Discussion

Interestingly, in the present study, the majority of the women agreed to receive SA (93.7%). Similar results were reported from a Pakistani survey that aimed to determine the preferred anesthetic technique for both elective and emergency cases, and it was reported that 94.1% received SA, whereas GA was given to 5.4% and 0.6% of females received epidural [15]. Another similar survey from Pakistan found that RA was chosen by the majority of patients (71.7%), and only 28.3% wished to undergo GA [16]. Another comparable study from Saudi Arabia reported that most patients favored SA (54%), 22% chose GA, and 24% had not opted for either option [17]. An Iranian survey reported that 54% decided to undergo SA for c-section, whereas 46% preferred GA [18]. A study from Turkey indicated that 64.2% of pregnant females expressed preference for GA, while 35.8% of them opted for RA methods [19].

In this study, nearly two-thirds of females had heard previously about RA (63%), whereas only 12.2% and 17.5% heard about GA and SA. Raibu et al. [7] also demonstrated in a similar Nigerian study that 68.8% had correct knowledge of anesthesia technique in surgical procedures and 65.5% knew the anesthetic technique for c-section. Another study from Nigeria found that 78% of pregnant females were familiar with anesthetic

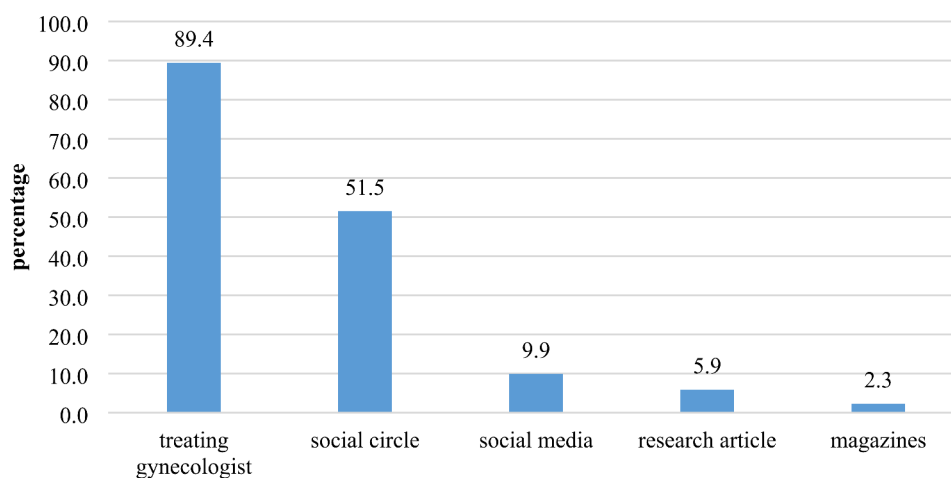
**Fig. 1** Frequency of sources of knowledge among study subjects

Table 4 Comparison of patients' features and sources of knowledge among those reported fear and did not have fear to spinal anesthesia

Variables	Are there any fears of regional anesthesia		p-value
	Yes n(%)	No n(%)	
Age groups			
≤ 25 years	73(54.1)	62(45.9)	**<0.001
> 25 years	56(33.3)	112(66.7)	
Occupation			
Homemaker	111(42.4)	151(57.6)	0.853
Working woman	18(43.9)	23(56.1)	
Education			
Illiterate	3(27.3)	8(72.7)	0.436
Primary to matric	15(39.5)	23(60.5)	
Intermediate	54(47.8)	59(52.2)	
Graduation and above	57(40.4)	84(59.6)	
Residence			
Rural	18(40)	27(60)	0.705
Urban	111(43)	147(57)	
Parity			
Nulliparous	52(86.7)	8(13.3)	**<0.001
Primiparous	27(27.6)	71(72.4)	
Multiparous	50(34.5)	95(65.5)	
Gravida			
Single	54(81.8)	12(18.2)	**<0.001
Multiple	75(31.6)	162(68.4)	
History of cesarean delivery			
Yes	68(30.1)	158(69.9)	**<0.001
No	61(79.2)	16(20.8)	
Any other surgical history other than cesarean delivery			
Yes	27(44.3)	34(55.7)	0.765
No	102(42.1)	140(57.9)	
Knowledge score			
7	23(32.4)	48(67.6)	**0.007
6	46(38)	75(62)	
≤ 5	60(54.1)	51(45.9)	
Knowledge sources			
Doctor	113(41.7)	158(58.3)	0.369
Social circle	57(36.5)	99(63.5)	*0.029
Social media	13(43.3)	17(56.7)	0.929
Research articles	11(61.1)	7(38.9)	0.101
Magazines	3(42.9)	4(57.1)	1.000

*Significant at $p < 0.05$, **Significant at $p < 0.01$

techniques for c-section, but 37% were adequately informed about the techniques [20]. As compared to our study, high awareness of different anesthetic modalities was reported in an Indian study, according to which 89.5% of pregnant females from rural areas had awareness related to various anesthetic techniques utilized in c-Sect. [21]. An alarming fact of the current study is that about 80% of females were either primiparous or multiparous, and only 17.5% said they had heard the term

SA before. Ideally, 80% of females should have heard SA or RA before they had given birth. Unfamiliarity of the term regarding SA or RA among females who have experienced childbirth is a serious concern for individuals and practitioners too, as it indicates that either individuals are not focused on learning about medical procedures and treatment they receive for their medical condition or the treating doctors are not adequately educating their patients. But this scenario simply portrays the negligent behavior of individuals in gaining knowledge related to their medical conditions.

In this study, the frequency of correct knowledge on separate items was more than 70%, except for the item that assessed knowledge of the duration of RA, to which 48.8% of females correctly responded. On the other hand, when looking at knowledge in terms of score range, only a quarter of females scored 100%, whereas 39.9% had a score of 6 out of 7 and 36.6% had a score of 5 or below. A similar study was conducted by Möller C et al. [22] in South Africa, in which a self-designed questionnaire was used for knowledge assessment related to SA in primiparous women. In contrast to our study, Möller C et al. [22] demonstrated better knowledge of SA, as 86.7% scored 13 out of 15. Endalew M et al. [6] demonstrated that the overall proportion of good knowledge related to anesthesia for c-section was 56.5%. Knowledge levels may differ among different populations because of different socio-demographic features, societal culture, and approaches to seeking knowledge.

The majority of our patients were receiving information related to SA from their treating consultant (89.4%), whereas half of the patients were gathering information from their social circle, such as friends or family (51.5%). Mediums of social media (9.9%), research publications (5.9%), and magazines (2.3%) for gathering relevant information were chosen by a few patients. It is upsetting to report that, despite having only 19.8% of nulliparous females in this study, none of them reported that their knowledge source was their previous exposure. In contrast to this, the knowledge source of previous exposure (40.4%) ranked first among all knowledge sources in a study by Endalew et al. [6]. Raibu et al. [7] also reported that 41.1% had knowledge because of previous pregnancy experience. In an Indian study, 82.4% were receiving knowledge from either an obstetrician or anesthetist, and a few gained knowledge from their friends and family (10.3%) [21]. Raibuet al. [7] reported that family and friends were the only knowledge sources among 11.6% of patients.

In this study, it is quite surprising to find out that the majority of women agreed to undergo SA (93.7%), but still 42.6% had a fear of SA. The frequency of fear of SA was 75.3% in an Indian study [23]. However, the frequency of fear is lower in our study, but the question

arises here: why did women agree to undergo SA if they had a fear of it? In our opinion, the most likely reason might be a financial one, because if they refused to undergo SA, they would have to receive GA, which would increase the treatment cost. Thus, it might be the possibility that family or spouse made them agree to undergo SA because of financial burden. The second reason for fear might be a non-technical source of information. Around half of females (51.5%) reported that they gained information from their social circle. Learning from the experiences of family and friends is an unsafe approach, as everyone has different clinical conditions and self-practices. Thus, knowing about their unfavorable events could easily spread the wrong information and raise fears of anesthesia side effects.

This study found that the commonest fear was limiting lower limb functions post-surgery (93.8%), followed by post-operative vaginal pain (91.5%), intra-operative pain (80.6%), post-operative backache (76.7%), having visuals of surgery (72.9%), back injury (56.6%), headache (46.5%), nausea/vomiting (31%), and being nude (24%). All these fears have been reported in previously existing studies with variable frequencies [17, 23, 24]. The variability in frequency is obvious because of different populations from different parts of the world. Another important study finding was that the frequency of fear was significantly higher among females of up to 25 years of age, those who were nulliparous, had a single gravida, had no history of c-section, and had lower knowledge levels. Higher fear among all these features makes sense, but it can be minimized with proper counseling and delivering timely education to patients.

This study was performed in a single center of Karachi with limited sample size. A self-designed questionnaire was used to explore knowledge of SA and its associated fears. The findings of the present study should be validated in a larger multi-center study.

Abbreviations

C-section	Cesarean section
IQR	Inter-quartile range
GA	General anesthesia
RA	Regional anesthesia
SA	Spinal anesthesia

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12871-024-02736-x>.

Supplementary Material 1

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None.

Author contributions

NS proposed the study concept and prepared study protocol, performed data collection and analysis and critically revised initial study draft. AMR prepared initial manuscript draft, protocol designing. All authors read and approved the study manuscript. NS is responsible and accountable for the accuracy of the work.

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Data availability

The dataset used in this study will be available from corresponding author upon a reasonable request.

Declarations

Ethics approval and consent to participate

The study was commenced after taking ethical permission (IRB#: HCM&D/012/2022) from hospital ethics committee. A written informed consent was taken from all patients to enlist them into the study. The study was performed following the guidelines of Declaration of Helsinki (2013).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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