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Original Article

Anaesthesia Section

Effect of Preoperative Education about Spinal Anaesthesia on Anxiety and Postoperative Outcomes in Parturients undergoing Elective Caesarean Section: An Interventional Study

NAMITHA ARUN[1], VEENA NADARAJAN[2], VIMAL PRADEEP[3]

ABSTRACT

Introduction: Pregnant women often experience anxiety due to myths and worries about surgery, particularly caesarean section, which are common during childbirth. Their anxiety can impact overall satisfaction, recovery, and mental health. Addressing these issues is crucial for improving both surgical outcomes and the childbirth experience.

Aim: To assess the effectiveness of a preoperative education program utilising materials and videos on spinal anaesthesia in reducing anxiety and enhancing postoperative outcomes for patients undergoing caesarean section.

Materials and Methods: An interventional study was conducted with 64 consecutive parturients who were divided into two equal groups, the study group (group A) and the control group (group B) at Government TD Medical College Alappuzha, Kerala, India. Group A received structured education on spinal anaesthesia, with individual questions and concerns addressed using the video and handbook. Group B received routine preoperative information. Preoperative anxiety was measured using Amsterdam Preoperative Anxiety and Information Scale (APAIS), while postoperative pain was assessed using Visual Analogue Scale (VAS) at 4, 12, and 24 hours after surgery. Data analysis was performed using Statistical Package for the Social Sciences (SPSS). Results were presented as frequencies for qualitative variables and as mean with standard deviation for quantitative variables. Statistical tests included Student's t-test, Chi-square test, Fisher's exact test, and paired t-test. Statistical significance was set at p-value<0.05.

Results: Preoperative education led to statistically significant reductions in anxiety levels for each individual, pre-educational and post-educational mean APAIS scores were 18.06 and 13.66, respectively, which was statistically significant (p-value<0.001). The post-educational APAIS score (13.66) was lower than the mean APAIS score in the control group (20.31), which was statistically significant (p-value<0.001). Postoperative pain at 12 hours was significantly lower in the group that received the educational session compared to controls (p-value<0.04).

Conclusion: Preoperative education on spinal anaesthesia significantly reduced anxiety and improved postoperative outcomes for parturients undergoing caesarean section. These findings highlight how well-planned education can enhance care for expectant mothers during childbirth.

Keywords: Amsterdam preoperative anxiety and information scale, Postoperative pain section, Preoperative education, Visual analogue scale

INTRODUCTION

Surgery is a stressful procedure that typically induces anxiety in patients, particularly those undergoing elective caesarean section performed under spinal anaesthesia (a common practice in many medical institutions) [1]. Pregnant women preparing for caesarean section often struggle with preoperative anxiety, which can impact various aspects of the procedure and the subsequent recovery period [1,2]. Psychosocial factors, such as lack of awareness or understanding of the impending surgery, have a significant impact on anxiety. This underscores the importance of implementing targeted measures to address these factors to reduce patient distress and improve overall surgical outcomes [2,3].

The significant impact of preoperative anxiety on surgical outcomes, including the need for postoperative analgesics, healing processes, the risk of complications, maternal satisfaction, and even the health of the newborn, has long been recognised by researchers and physicians [1,2]. The cornerstone of comprehensive patient care strategies is preoperative education, which helps patient recover quickly to the best possible degree of functional independence after surgery and prepares them to cope with the stress of the procedure.

Preoperative anxiety is a complex phenomenon that impacts expectant mothers preparing for caesarean section. It encompasses concerns about pain, potential surgical damage, risks associated with anaesthesia for both the foetus and the mother, uncertainties about the procedure's outcome, fears of complications, worries about not waking up from anaesthesia, and concerns about the behaviour of the surgical team [2]. These anxious thoughts can manifest into physical stress reactions that may impede the healing process postsurgery. The objective was to alleviate these fears and enhance a more positive surgical experience through targeted preoperative educational initiatives. Preoperative education encompasses a variety of interventions aimed at providing patients with comprehensive information and support [3]. This includes self-management techniques, pharmacological therapies, postoperative physical restrictions, pain management strategies, and educational materials about the condition. Various media, such as verbal communication, written materials, visual aids, and multimedia resources, are utilised to deliver these educational interventions. Enhancing patient understanding and preparedness for surgery is particularly achievable through structured educational formats employing resources like handouts and videos. Videos demonstrating the procedural steps and featuring real-life experiences of individuals who have undergone similar surgeries can help patients feel more confident and dispel common misconceptions. Tailored, one-on-one communication is essential for addressing each patient's specific needs and concerns [3,4]. Preoperative education, adopting a patient-centered care approach, aims to promote a safe and successful surgical experience and a positive recovery journey for pregnant mothers undergoing caesarean section. It serves as a crucial component of comprehensive perioperative care strategies by providing patients with information and support. Thus, it is essential for reducing anxiety and promoting positive surgical outcomes for pregnant mothers undergoing caesarean section [1,2,5]. By employing various teaching modalities and evidence-based approaches, healthcare providers can empower patients to face surgery with resilience and confidence. This study was innovative as it examined the impacts of preoperative education on postoperative outcomes and anxiety reduction in parturients undergoing caesarean section. The education is delivered through handouts and videos. Therefore, the present study was conducted with an aim to evaluate the effectiveness of a preoperative education program using materials and videos on spinal anaesthesia in reducing anxiety and improving postoperative outcomes for patients undergoing caesarean section.

The primary objective was to compare anxiety levels, pain management, and length of stay in the study groups, while the secondary objective was to compare maternal satisfaction between the study groups.

MATERIALS AND METHODS

This intervention research was conducted at the Government TD Medical College in Alappuzha, Kerala, India, focusing on patients undergoing elective caesarean section. The research was carried out from March 2021 to September 2022. Ethical clearance was obtained from the Institutional Ethics Committee (IEC) of Government TD Medical College, Alappuzha, with approval number G1/2021. Informed written consent was obtained from all patients in the study, and confidentiality of patient details was strictly maintained.

Inclusion criteria: Expectant mothers categorised as American Society of Anaesthesiologists (ASA) physical status Class II, who were hospitalised for planned caesarean delivery with spinal anaesthesia were included in the study.

Exclusion criteria: Pregnant women with anxiety disorders, receiving psychiatric treatment, those anticipating airway difficulties, birth defects, high-risk pregnancies, or requiring additional surgical procedures were excluded. Individuals who did not speak Malayalam and those with visual or hearing impairments that hinder learning from video content were excluded from the study.

Sample size: The sample size was calculated based on a previous study [2] using the formula:

$$n = \frac{2{S_p}^2(Z_{1-\alpha/2} + Z_{1-\beta})^2}{\mu_d^2}$$

$$S_p^2 = \frac{S_1^2 + S_2^2}{2}$$

In determining the sample size, the standard deviation in the first group (S_1^2) was set at 2, while in the second group (S_2^2), it was 4.25. The mean difference (μ_d²) [4] between the samples was 4, with an effect size of 1.28. The significance level (α) was set at 5%, and the power at 90%. With a two-sided approach, the required sample size per group was calculated as 14. However, to enhance statistical robustness, 32 subjects per group were enrolled for the study.

Operational Defenitions

a) VAS: The patient's level of pain was rated on a scale of zero to ten. No pain is indicated by a score of 0, and the worst pain is indicated by a score of 10 [6].

b) APAIS: APAIS was developed by Moerman N et al., [4]. The APAIS scale consists of six questions. The questions are scored from 1 to 5 based on the Likert method ranging from "not at all" to "extremely," respectively. The total score ranges from 4 to 20 points for the anxiety component and from 2 to 10 points for the information component. A higher score indicates a higher level of anxiety and a greater need for information. However, the main limitation of the APAIS scale is its inability to distinguish anxiety related to anaesthesia from anxiety related to surgery. The questions to assess the anxiety component are as follows:

1. I am worried about the anaesthetic.
2. The anaesthetic is on my mind continually.
3. I am worried about the procedure.
4. The procedure is on my mind continually.

The questions to assess the information component are as follows:

1. I would like to know as much as possible about the anaesthetic.
2. I would like to know as much as possible about the procedure.

A validated version of the Amsterdam Preoperative Anxiety Scale for use in Malayalam put forward by Srinivasaiah M et al., was used for the study [7].

Research approach: The research employed an interventional method with participants randomly assigned. The parameters examined included levels of anxiety before surgery, haemodynamics during surgery, and pain and recovery outcomes after surgery. Data collection involved using standardised questionnaires, conducting clinical assessments, and gathering patient feedback. Every participant followed the same protocol while receiving spinal anaesthesia, and their perioperative and postoperative information was carefully documented.

Procedure

The first parturient who met the inclusion criteria was enrolled in the study and randomly allocated into one of two groups. Parturient demographics were assessed using a questionnaire, and baseline measurements of systolic blood pressure, diastolic blood pressure, mean arterial pressure, and heart rate were recorded. Subsequent parturients were randomised into two equal groups: the study group (group A) and the control group (group B).

Preoperative anxiety levels were initially assessed in both groups. The study group received a handout and a video providing structured education about spinal anaesthesia. Patients were educated on positioning, procedural steps, assessment of analgesia and motor blockade, monitoring processes, complications of spinal anaesthesia, alternative options in case of technique failure, and the advantages of spinal anaesthesia over general anaesthesia. They were instructed on how to use the VAS. A validated Malayalam version of the APAIS was administered by a blinded questionnaire to assess the parturient's anxiety approximately 4-5 hours after leaving the Pre-Anaesthetic Checkup (PAC). The control group received routine preoperative information.

The validated Malayalam version of the APAIS was used to measure preoperative anxiety, and the VAS was used to assess pain at 4 hours, 12 hours, and 24 hours postoperatively.

Both groups received standard care throughout the procedure. All parturients underwent subarachnoid blockade at the L3-L4 level using Inj. Bupivacaine 0.5% (H) 1.8 mL+25 µg Fentanyl. Following surgery, at the 4^{th}, 12^{th}, and 24^{th} hour postoperatively, all parturients were asked to quantify their pain by marking on a VAS to assess the degree of pain.

STATISTICAL ANALYSIS

The information gathered was inputted into Microsoft Excel and then analysed using SPSS version 27.0. Categorical variables were presented as proportions and ratios, while numerical variables were displayed as mean values and measures of variation. The Chi-square test and Fisher's-exact test were utilised to explore relationships between categorical variables, while the t-test and paired t-test were used for quantitative variables. A p-value <0.05 was considered statistically significant, ensuring robust and reliable statistical findings.

RESULTS

The demographic information for the case (group A) and control individuals is shown in [Table/Fig-1]. The age distributions of both groups are balanced, with a small predominance in the 26-30 age group. In both groups, most qualifications are at the graduate level or higher. The bulk of workers were housewives, followed by medical professionals. The inclusion of a large range of demographics is essential for conducting a thorough study and providing insights into the effects of interventions on different population segments.

Parameters	Case (group A) n (%)	Control (group B) n (%)
Age distribution (years)		
20-25	8 (25)	9 (28.1)
26-30	13 (40.6)	12 (37.5)
>30	11 (34.4)	11 (34.4)
Education		
Below graduate	14 (43.7)	10 (31.3)
Graduate and above	18 (56.3)	22 (68.7)
Occupation		
Medical professional	3 (9.4)	4 (12.5)
Skilled worker	5 (15.6)	4 (12.5)
Semi-skilled worker	1 (3.1)	5 (15.6)
Manual labourer	3 (9.4)	1 (3.1)
Housewife	20 (62.5)	18 (56.3)

[Table/Fig-1]: Distribution of subjects based on demographic details.

The height and weight distribution of research participants in the case (group A) and control groups are shown in [Table/Fig-2].

Variable	Case (group A)	Control (group B)
	Mean±SD	Mean±SD
Height (cm)	155.06±4.95	156.25±7.33
Weight (kg)	64.78±12.08	64.38±9.93

[Table/Fig-2]: Distribution of study subjects based on height and weight.

The past history features of the patients and controls are shown in [Table/Fig-3]. Of the case group, 62.5% had previously experienced spinal anaesthesia, 25% were primigravida, and 50% displayed co-morbidity. Interestingly, 46.9% of patients had only one prior caesarean section, and none of the cases had three. Important for outcome analysis, these data highlight the frequency of co-morbidities and previous exposure to therapies among cases.

Past history	Cases n (%)	Controls n (%)
Absence/presence of co-morbidity		
Co-morbidity	16 (50)	15 (46.9)
No co-morbidity	16 (50)	17 (53.1)
Gravida		
Primi	8 (25)	14 (43.7)
Multi	24 (975)	18 (56.3)
Exposure to spinal anaesthesia		
Had previous exposure	20 (62.5)	18 (59.4)
No previous exposure	12 (37.5)	13 (40.6)
Caesarean section delivery		
Nil	12 (37.5)	15 (46.9)
1	15 (46.9)	10 (31.3)
2	5 (15.6)	5 (15.6)
3	0	2 (6.3)

[Table/Fig-3]: Distribution of subjects based on past-history.

The APAIS scores (Mean±SD), t values, and p-values for the cases' various demographic data are shown in [Table/Fig-4]. With a t value of 2.17 and a p-value of 0.03, primigravida women showed a significantly higher APAIS score (19.05±5.80) than multigravida women (15.90±5.34). The p-values of 0.11 and 0.64, respectively, indicated that there were no significant variations in APAIS scores across education and occupation. These results underscore the impact of gravidity on the anxiety levels of mothers.

Parameters	APAIS score	t-value	p-value
Education			
Graduate	17.85±5.33	1.59	0.11
Below graduate	15.54±6.01		
Occupation			
Medical	18.29±0.95	1.68	0.64
Non medical	16.82±5.98		
Gravida			
Primi	19.05±5.80	2.17	0.03
Multi	15.90±5.34		

[Table/Fig-4]: APAIS score (Mean±SD), t-value and p-value for various demographic parameter among the cases.

[Table/Fig-5] shows how preoperative education affects hospital stay and maternal satisfaction in parturient having caesarean section. Remarkably, compared to 34.4% of controls, 53.1% of patients expressed a moderate level of satisfaction. In contrast to cases (9.4%), controls had a larger percentage (21.9%) of hospital stays longer than five days. Maternal satisfaction showed no discernible variation, but the length of hospital admissions for patients tended to be shorter, suggesting that preoperative education may have a beneficial effect.

Parameters	Cases n (%)	Controls n (%)	χ^2	p-value
Maternal satisfaction				
Not at all satisfied	0	2 (6.3)	6.06	0.17
Not really satisfied	5 (15.6)	7 (21.9)		
Undecided	4 (12.5)	9 (28.1)		
Somewhat satisfied	17 (53.1)	11 (34.4)		
Very much satisfied	6 (18.8)	3 (9.4)		
Hospital stay				
≤5 days	29 (90.6)	25 (78.1)	1.89	0.17
>5 days	3 (9.4)	7 (21.9)		

[Table/Fig-5]: Assessment of maternal satisfaction and effect of preoperative education about spinal anaesthesia on hospital stay among parturient undergoing caesarean section.

[Table/Fig-6] shows the mean±standard deviation (APAIS) scores, t-values, and p-values for a range of preoperative education and anxiety-reduction factors for parturient having caesarean section. The results show that APAIS scores significantly decreased following preoperative instruction, as indicated by t values of 5.23 for overall pre/post intervention comparisons and 5.78 for cases. With t values of -3.73 and -6.55, respectively, anxiety over surgery and anaesthesia dropped dramatically after the education, showing notable improvements among the cases. Notably, significant p-values (<0.001) are found in the pre/post intervention comparisons for both cases and the overall study, indicating a considerable decrease in anxiety following the education, especially about surgery and anaesthesia-related issues. These results highlight how effective preoperative education is at reducing anxiety in parturient having caesarean section.

Parameter	APAIS score	t-value	p-value
Before/after intervention			
Before	18.06±6.19	5.23	<0.001
After	13.66±4.23		
Preoperative education in reducing anxiety in parturient undergoing caesarean section			
Cases	13.66±4.23	5.78	<0.001
Controls	20.31±4.91		
Anxiety reduction among parturient following pre and post education			
Surgery related anxiety			
Before	6.13±2.14	2.27	0.03
After	5.38±1.83		
Anaesthesia related anxiety			
Before	6.06±2.33	5.01	<0.001
After	4.09±1.61		
Information desire component			
Before	5.88±2.06	7.17	<0.001
After	4.19±1.33		
Preoperative education in reducing anxiety in parturient undergoing caesarean section under several categories			
Surgery related anxiety	5.38±1.83	-3.73	<0.001
Anaesthesia related anxiety	4.09±1.61	-6.55	<0.001
Information desire component	4.19±1.33	-5.36	<0.001

[Table/Fig-6]: APAIS score (Mean±SD), t-value and p-value for various parameters.

[Table/Fig-7] shows that 20% of the participants experienced pericardial effusion, headache, shivering, nausea, and localised adherent placenta among the cases. In comparison, the control group did not report any headache, shivering, or pericardial effusion; nevertheless, 33.3% of them did experience pain, nausea, and localised adherent placenta.

	Case	Control
Type of adverse event	Number (%) (n1=5)	Number (%) (n2=3)
Pericardial effusion	1 (20.0)	0
Focal adherent placenta	1 (20.0)	1 (33.3)
Headache	1 (20.0)	0
Shivering	1 (20.0)	0
Nausea	1 (20.0)	1 (33.3)
Pain	0	1 (33.3)
Total	5 (100)	3 (100)

[Table/Fig-7]: Distribution of study subjects based on type of adverse events.

DISCUSSION

This study investigated the effectiveness of structured preoperative education in reducing anxiety and improving postoperative outcomes for women undergoing elective caesarean section. The findings demonstrate that the intervention group receiving preoperative education (booklet and video) experienced a significant decrease in anxiety scores (APAIS) compared to the control group receiving standard care (p-value<0.001).

These results align with previous research by Kalliyath A et al., a randomised controlled experiment to investigate how preoperative education affected participants' anxiety levels [8]. The statistically significant median difference in APAIS ratings between the intervention and control groups (p-value <0.001) indicates that preoperative anxiety levels were significantly lower among people who received preoperative education in the trial. Additionally, the current study was in line with the findings of a randomised controlled trial conducted by Priya VV et al., which demonstrated a significant drop in the average APAIS scores in patients who received organised preoperative instruction [9]. This correlation suggests that structured preoperative education may be effective in lowering anxiety levels in individuals undergoing elective surgical procedures like caesarean section. Consistent with earlier research findings [8,9], patients who received structured preoperative education reported less discomfort following surgery and better satisfaction ratings.

An important observation in this study was the difference in baseline anxiety levels between the groups. The intervention group had a lower mean APAIS score (18.06) compared to the control group (20.31). While the cause for this initial difference is unclear, it highlights the potential influence of unknown factors on anxiety levels.

Consistent with previous research by Alsufyani F et al., and Baagil H and Gerbershagen MU, a positive correlation between reduced anxiety and improved patient outcomes was observed [10,11]. The intervention group reported lower postoperative pain scores and higher satisfaction levels compared to the control group. This suggests that preoperative education may not only benefit emotional well-being but also contribute to better pain management and patient satisfaction.

An investigation into the effects of a preoperative educational approach on anxiety levels in patients undergoing open-heart surgery was carried out by Asilioglu K and Celik SS, [12]. Researchers randomly assigned half of the 100 patients in their trial to an intervention group, which received organised instruction from an educational booklet, and the other half to a control group, which received routine pre- and postoperative information from a nurse. Three days following surgery, a state and trait anxiety inventory self-evaluation questionnaire was used to gauge anxiety levels. Although the intervention group's anxiety scores were lower than those of the control group, the difference was not statistically significant. In contrast, Ortiz J et al., found that educational materials, while improving patient understanding of anaesthesia, did not significantly reduce surgical anxiety [13]. This emphasises the importance of educational content and delivery methods that effectively address preoperative anxieties.

The study by Fentie Y et al., aligns with present study in highlighting the higher anxiety levels experienced by first-time mothers [14]. This underscores the importance of tailoring educational interventions to address the specific needs of this vulnerable population. Understanding the characteristics of women undergoing caesarean section, as explored by Alsufyani F et al., [15], is crucial for better care planning and resource management. This study supports their findings that a history of prior caesarean section is a primary reason for subsequent caesarean deliveries. Less postoperative pain was experienced by the intervention group 12 and 24 hours after surgery, suggesting that preoperative education improved pain management results. In addition, a significant proportion of women in the intervention group were found to be significantly more satisfied than those in the control group when satisfaction was assessed using a Likert scale [10]. Better understanding and preparation for the procedure because of structured presurgery education may account for the higher level of satisfaction [13]. Shorter hospital stays were experienced by the intervention group, demonstrating the advantages of preoperative education in enhancing recovery and reducing the need for medical resources. Overall, these findings highlight how important it is to incorporate structured preoperative education into clinical settings to improve patient outcomes and satisfaction in the perioperative phase.

The effects of preoperative anxiety on the use of anaesthesia and pain medication in adult surgical patients were investigated by Baagil H and Gerbershagen MU [11]. The study stressed the significance of healthcare providers addressing preoperative anxiety for better pain control following surgery and overall patient outcomes. They underlined how crucial it is for nurses to use efficient strategies to lower preoperative anxiety to enhance patient care and avoid surgical problems. It has been discovered that preoperative anxiety is a significant predictor of postoperative problems and insufficient pain management. Overall, this study adds valuable evidence to the growing body of research supporting the positive impact of structured preoperative education for women undergoing caesarean section. By mitigating anxiety, these interventions have the potential to improve pain control, enhance patient satisfaction, and potentially shorten hospital stays. Future research can delve deeper into refining educational programs and exploring their long-term benefits for mothers and newborns. Additionally, investigating the cost-effectiveness of such programs can further strengthen the case for their implementation in clinical settings.

Limitation(s)

The educational program itself could be explored in more detail, investigating the specific components (information format, delivery method) might offer insights into optimising its effectiveness in reducing anxiety. Tailoring the program to address the specific needs of subgroups, such as first-time mothers who exhibited higher anxiety in present study, could be particularly beneficial.

CONCLUSION(S)

The results of the research emphasise how preoperative education effectively decreases anxiety levels in participants. There was a significant decrease in the average APAIS score after the educational intervention (p-value <0.001), demonstrating its effectiveness in reducing mental distress. Moreover, individuals who underwent the educational intervention had noticeably reduced levels of postoperative pain 12 hours after surgery compared to the control group (p-value <0.04). These findings highlight the advantages of providing preoperative education, especially when combined with handouts and videos about spinal anaesthesia. Future studies must investigate the best timing and approaches for providing preoperative education, along with its lasting impacts and cost-effectiveness. It is essential for healthcare organisations to continually evaluate and improve the integration of structured preoperative education into standard care protocols to enhance patient outcomes and experiences.

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PARTICULARS OF CONTRIBUTORS:

1. Junior Resident, Department of Anaesthesiology, Government TD Medical College, Alappuzha, Kerala, India.
2. Professor, Department of Anaesthesiology, Government TD Medical College, Alappuzha, Kerala, India.
3. Associate Professor, Department of Anaesthesiology, Government TD Medical College, Perungala, Kayamkulam, Kerala, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Vimal Pradeep,
Anugraha Nadackavu, Perungala, Kayamkulam, Alappuzha-690559, Kerala, India.
E-mail: vimalpradeep1980@gmail.com

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