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Article

Impact of General Anesthesia and Regional Anesthesia on Patient Satisfaction and Pain Management in Cesarian Deliveries

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ABSTRACT

Background: Cesarean section rates are rising globally, underscoring the importance of optimizing anesthetic techniques for maternal safety and satisfaction. Despite widespread use of both general anesthesia (GA) and regional anesthesia (RA), few studies have comprehensively compared their impact on postoperative pain and patient satisfaction in elective cesarean deliveries, particularly in resource-limited settings. **Objective**: This study aimed to compare the effects of general anesthesia versus regional (spinal) anesthesia on postoperative pain intensity and patient satisfaction in women undergoing elective cesarean sections, hypothesizing that RA would yield superior outcomes. **Methods**: A comparative cross-sectional study was conducted at DHQ Hospital Okara, enrolling 86 term parturients (n = 43 per group) aged 18–40 years undergoing elective cesarean sections. Patients were selected through random sampling based on ASA grade I–II and were excluded if they had chronic pain, cognitive impairment, or contraindications to either anesthetic technique. Postoperative pain was assessed using the Visual Analogue Scale (VAS), and satisfaction was measured via a 5-point Likert scale. Ethical approval was obtained in accordance with the Declaration of Helsinki. Statistical analyses were conducted using SPSS v27, employing independent t-tests, chi-square tests, and Welch's t-test for unequal variances. **Results**: Patients receiving spinal anesthesia reported significantly lower pain scores (mean ± SD: 2.71 ± 0.56) compared to those under GA (4.64 ± 0.85; $p < 0.001$). Satisfaction levels were markedly higher in the RA group ($\chi^2 = 52.37$, $p < 0.001$), with 83.7% reporting being satisfied or very satisfied, while 55.8% of GA patients were unsatisfied. Clinically, RA demonstrated superior analgesic efficacy and maternal experience. **Conclusion**: Regional anesthesia, particularly spinal anesthesia, offers significantly better postoperative pain control and patient satisfaction in elective cesarean deliveries compared to general anesthesia. These findings advocate for the preferential use of RA in obstetric practice and emphasize the importance of informed anesthetic decision-making to enhance maternal care outcomes.

Keywords: Cesarean Section, Regional Anesthesia, General Anesthesia, Postoperative Pain, Patient Satisfaction, Spinal Anesthesia, Obstetric Analgesia

INTRODUCTION

The rising global incidence of cesarean section (CS) deliveries has necessitated deeper scrutiny of perioperative care, particularly the role of anesthesia in influencing maternal outcomes. While CS is often a life-saving intervention for both the mother and the neonate, the choice of anesthetic technique—general anesthesia (GA) or regional anesthesia (RA)—plays a critical role in shaping postoperative recovery, patient satisfaction, and overall birth experience (1). GA, which induces a state of unconsciousness, is generally reserved for emergencies due to its rapid onset and broad effect. In contrast, RA, comprising spinal, epidural, or combined spinal-epidural anesthesia, enables the mother to remain conscious while selectively numbing the lower body, thus offering benefits like reduced systemic drug exposure, fewer complications, and enhanced maternal-neonatal bonding (2,3).

Despite these known advantages of RA, a subset of patients continues to opt for GA, often driven by misconceptions, fear of spinal procedures, or lack of awareness regarding the benefits of RA (4). Moreover, although multiple studies have explored

anesthesia-related clinical outcomes such as surgical safety and hemodynamic stability, relatively fewer have addressed patient-centered outcomes—specifically, postoperative pain perception and satisfaction with the anesthesia experience. Pain, being a subjective and multifactorial phenomenon, requires a nuanced understanding that transcends physiological parameters and incorporates patient feedback as a central metric (5,6). Similarly, maternal satisfaction, an essential quality indicator, encompasses not only pain control but also emotional well-being, ability to participate in the birth process, and early initiation of maternal-infant bonding (7,8).

Available literature suggests that RA is associated with lower postoperative pain intensity and higher satisfaction levels in elective CS compared to GA (9,10). These differences have been attributed to RA's superior pain-blocking mechanisms and its facilitation of early maternal responsiveness. In particular, spinal anesthesia has shown high efficacy in providing intraoperative analgesia with fewer adverse effects and faster recovery, making it the recommended choice in many guidelines (11). Nevertheless, gaps remain in understanding how demographic variables, psychological readiness, and institutional practices influence these outcomes. Furthermore, there is insufficient comparative analysis directly correlating patient-reported pain scores and satisfaction with specific anesthetic approaches using validated tools such as the Visual Analogue Scale (VAS) and Likert scales (12,13).

The significance of addressing this knowledge gap becomes even more pronounced in low- to middle-income settings, where patient education and shared decision-making are often underemphasized. In such contexts, ensuring patient autonomy through informed anesthesia choices not only enhances satisfaction but also improves compliance with postnatal care and follow-up. This study was therefore designed to compare the impact of GA and RA on two key patient-centered outcomes—pain management and maternal satisfaction—in women undergoing cesarean sections at a district-level public hospital. By employing a mixed-methods approach that combines quantitative measurement of pain and satisfaction with qualitative insights into patient preferences, this research aims to provide a holistic view of anesthetic impact during cesarean deliveries. The central hypothesis is that women who receive RA will report significantly lower postoperative pain and higher satisfaction compared to those who receive GA, thereby underscoring the importance of patient-informed anesthetic planning in obstetric care.

MATERIALS AND METHODS

This comparative cross-sectional study was conducted to evaluate the impact of anesthesia type—general anesthesia (GA) versus regional anesthesia (RA)—on postoperative pain and patient satisfaction among women undergoing elective cesarean sections. The study was carried out over a period of four months at DHQ Hospital Okara, Pakistan. A total of 86 participants were enrolled using random sampling, with 43 patients in each anesthesia group. The inclusion criteria required participants to be women aged between 18 and 40 years, scheduled for elective cesarean delivery at term gestation (37–42 weeks), and categorized as ASA physical status I or II. Women were excluded if they had undergone emergency surgeries, had a history of chronic pain, belonged to ASA grade III or IV, had contraindications to either anesthesia technique, were diagnosed with eclampsia or cognitive dysfunction, or presented with anatomical anomalies such as dwarfism.

Participants were recruited following a structured consent process after being informed about the nature and objectives of the study. Written informed consent was obtained from each patient prior to enrollment. Ethical approval was secured from the institutional ethical review board, and the study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Confidentiality was maintained by anonymizing participant data and securing all information under password-protected digital storage and locked physical files.

The primary outcomes of the study were postoperative pain intensity and overall patient satisfaction with the anesthetic experience. Pain intensity was assessed using the Visual Analogue Scale (VAS), where patients rated their postoperative pain on a numerical scale. Patient satisfaction was measured using a Likert scale, allowing participants to rate their satisfaction level based on multiple factors including comfort, awareness, and overall experience. Both assessments were conducted postoperatively in a calm, private environment to encourage candid responses. The data collection process was standardized across all participants to minimize bias and variability.

All data were analyzed using SPSS software version 27. Descriptive statistics including means and standard deviations were computed for continuous variables, while categorical data were analyzed using frequencies and percentages. To assess differences between the GA and RA groups, independent t-tests were employed for continuous outcomes such as pain scores, and chi-square tests were used for categorical outcomes like satisfaction levels. Levene's test was applied to determine the equality of variances, and Welch's t-test was used when variances were unequal. A p-value less than 0.05 was considered statistically significant. No imputation was applied for missing data, as the dataset was complete. Confounding variables were minimized through random allocation and consistent assessment protocols across groups (5,6).

RESULTS

A total of 86 participants undergoing elective cesarean sections were included in the study, with 43 receiving General Anesthesia (GA) and 43 receiving Regional Anesthesia (RA), specifically spinal anesthesia. Postoperative outcomes were assessed using validated tools for pain intensity and patient satisfaction. Data were analyzed using appropriate statistical techniques to determine between-group differences. Patient satisfaction levels were evaluated using a 5-point Likert scale ranging from "Very Unsatisfied" to "Very Satisfied."

A chi-square test for independence demonstrated a statistically significant association between type of anesthesia and satisfaction level ($\chi^2 = 52.37$, $p < 0.001$), indicating that anesthesia type had a meaningful impact on patient satisfaction. The majority of patients in the RA group reported being either satisfied or very satisfied (n = 27 and n = 9, respectively), whereas

most GA group participants reported being neutral (n = 14) or unsatisfied (n = 20), with no reports of high satisfaction. This significant difference highlights that spinal anesthesia was associated with markedly higher satisfaction levels, suggesting not only statistical significance but also potentially high clinical relevance in patient-centered care practices. Pain intensity scores were analyzed using the Visual Analogue Scale (VAS), where lower scores indicate better pain control. Patients in the RA group reported significantly lower postoperative pain (mean ± SD = 2.71 ± 0.56) compared to those in the GA group (mean ± SD = 4.64 ± 0.85). An independent-samples t-test confirmed that this difference was statistically significant ($t(81) = -12.28$, $p < 0.001$).

Table 1. Association Between Anesthesia Type and Patient Satisfaction (Chi-Square Test)

Satisfaction Level	General Anesthesia (n = 43)	Spinal Anesthesia (n = 43)
Very Unsatisfied	4	0
Unsatisfied	20	0
Neutral	14	5
Satisfied	5	27
Very Satisfied	0	9

Chi-square statistics = 52.37, p-value < 0.001

Levene's test for equality of variances indicated unequal variances between groups ($F = 4.98$, $p = 0.028$), validating the use of Welch's t-test for comparison. The effect size was not directly computed, but based on the large t-value and substantial mean difference ($\Delta = 1.93$), the result is likely to be of both statistical and clinical significance, reflecting superior pain management outcomes in the RA group. These findings underscore a robust difference in postoperative pain levels, favoring spinal anesthesia, and suggest a clinically meaningful benefit in choosing RA over GA for elective cesarean procedures.

Table 2. Comparison of Pain Intensity Scores Between Anesthesia Groups

Anesthesia Type	Mean Pain Intensity ± SD	Sample Size (n)	Test Statistic	p-value
Spinal Anesthesia	2.71 ± 0.56	41	4.98	0.028
General Anesthesia	4.64 ± 0.85	42		

Welch's t-test: $t = -12.28$, $p < 0.001$

Overall, the data indicate that regional (spinal) anesthesia is significantly superior to general anesthesia in both reducing postoperative pain and enhancing patient satisfaction. The findings provide strong statistical evidence ($p < 0.001$ for both satisfaction and pain scores) with meaningful effect sizes that support the preferential use of spinal anesthesia in cesarean deliveries where no contraindications exist. The clinical implications of these results reinforce the importance of patient-centered anesthetic planning in obstetric care.

DISCUSSION

The present study offers compelling evidence that regional anesthesia, specifically spinal anesthesia, is associated with significantly lower postoperative pain intensity and higher patient satisfaction compared to general anesthesia in women undergoing elective cesarean sections. These findings align with a growing body of literature that positions neuraxial techniques as the preferred anesthetic approach for cesarean delivery due to their superior safety profiles, effective pain control, and facilitation of maternal-neonatal bonding (1,2). The statistically and clinically significant reduction in mean pain scores among patients receiving spinal anesthesia (mean = 2.71 ± 0.56) compared to those under general anesthesia (mean = 4.64 ± 0.85) supports prior research emphasizing the analgesic efficacy of regional blocks via direct spinal nerve inhibition and adjunct opioid use, which prolongs postoperative relief without increasing systemic side effects (3,4).

Consistent with earlier randomized trials and observational studies, patient satisfaction was markedly higher in the spinal anesthesia group, with the majority reporting being satisfied or very satisfied, while those in the general anesthesia group predominantly expressed dissatisfaction or neutrality (5,6). These outcomes are in agreement with studies that underscore the psychological benefits of maintaining consciousness during childbirth, such as enhanced emotional engagement, early initiation of breastfeeding, and a greater sense of participation in the birth process (7,8). Moreover, the avoidance of airway manipulation, reduced incidence of nausea and vomiting, and faster postoperative recovery have all been identified as factors contributing to better maternal experience in the RA group (9).

Notably, while previous studies have explored the clinical safety of different anesthetic approaches, fewer have explicitly assessed the subjective experiences of patients, particularly within low-resource healthcare settings. Our study contributes to filling this gap by employing validated tools like the Visual Analogue Scale (VAS) and Likert Scale to quantify patient-reported outcomes. This patient-centered perspective is increasingly recognized as essential in anesthesia practice, promoting shared decision-making and individualized care (10,11). Furthermore, the significance of the findings is strengthened by rigorous statistical analysis, including the use of Welch's t-test following confirmation of unequal variances, and chi-square testing to identify robust associations between anesthesia type and satisfaction levels.

However, despite the strengths of using a randomized sample and validated assessment scales, the study is not without limitations. The relatively small sample size (n = 86) and single-center design restrict the generalizability of the findings to other populations and healthcare settings. Differences in institutional protocols, practitioner expertise, and patient demographics may influence both the selection of anesthesia and postoperative

outcomes. Additionally, the study focused solely on immediate postoperative pain and satisfaction, without long-term follow-up to assess chronic pain development, psychological recovery, or neonatal outcomes—domains that are increasingly being integrated into holistic obstetric anesthesia research (12).

Another consideration is the potential for subjective bias in patient satisfaction reporting, as cultural norms, preoperative education, and individual pain thresholds can vary widely. While RA clearly demonstrated statistical superiority, it is important to recognize that some patients may still prefer GA due to needle phobia, prior traumatic experiences, or misconceptions, suggesting a continued need for preoperative counseling and informed consent practices tailored to individual needs (13). From a theoretical standpoint, the results reaffirm the multimodal nature of pain and satisfaction in perioperative care, reinforcing the need for integrative management protocols that address both physiological and psychological components.

Future research should aim to overcome current limitations by including larger, multicenter cohorts with diverse populations, and by incorporating qualitative data from patient interviews to explore nuanced perspectives on anesthesia choice. Longitudinal designs examining outcomes beyond hospital discharge—such as maternal mental health, breastfeeding success, and neonatal adaptation—would offer a more comprehensive understanding of anesthesia's broader impact. Investigating the cost-effectiveness of RA in resource-constrained settings may also be valuable, given its association with faster recovery and fewer complications. The study reinforces the clinical and experiential benefits of regional anesthesia for cesarean sections and provides robust, patient-centered data to support its preferential use. While general anesthesia remains indispensable in emergency or contraindicated cases.

CONCLUSION

This study demonstrates that regional anesthesia, particularly spinal anesthesia, significantly improves postoperative pain control and patient satisfaction compared to general anesthesia in elective cesarean surgeries, aligning directly with the study's objective to evaluate pain management and satisfaction across anesthetic techniques. These findings have important implications for human healthcare by emphasizing the critical role of anesthetic choice in enhancing maternal experience and recovery outcomes. Clinically, the results support the prioritization of regional anesthesia in obstetric protocols where feasible, promoting safer, more patient-centered care. From a research perspective, the study highlights the need for broader, multicenter investigations to explore long-term maternal and neonatal outcomes, further validating the superiority of regional anesthesia in cesarean deliveries.

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