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ORIGINAL ARTICLE

Incidence and Severity of Neuraxial Anesthesia-Related Back Pain in Postpartum Women: Insights from a Cross-Sectional Study

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Abstract

Introduction: Back pain is a prevalent global health issue, particularly among women during the postpartum period. Neuraxial anesthesia, commonly used in procedures such as cesarean section, is associated with complications, including postspinal back pain (PSBP). However, limited data exist on its incidence and characteristics, especially within specific demographic groups. This study aimed to examine the prevalence and features of PSBP among women who underwent neuraxial anesthesia for cesarean section in a tertary care center in south India. **Materials and Methods:** A cross-sectional study was conducted involving 168 women who underwent spinal anesthesia for cesarean section between January 2015 and December 2018. Data were collected through telephone interviews, utilizing a structured proforma covering sociodemographic profiles, pain characteristics, and disability assessment using the Oswestry Disability Scale. Descriptive statistics and chi-squared test were used for data analysis. **Results:** Among the participants, 40.5% reported experiencing back pain after neuraxial anesthesia, with 39.3% experiencing pain post-delivery and 1.2% since their first delivery. The majority of participants were under 30 years old (78%) and homemakers (92.3%). Severity of back pain varied, with 22.06% classified as mild, 35.29% as moderate, and 42.65% as severe. Statistical analysis revealed a significant association between the number of children and the incidence of back pain ($p<0.05$). **Conclusion:** The research emphasizes a significant proportion (40.5%) of postpartum back pain (PSBP) in women who have cesarean sections with neuraxial anesthesia. The intensity of pain experienced varied, with a notable link detected between the number of children a woman has and the likelihood of experiencing back pain. These results highlight the necessity of recognizing and managing factors that contribute to PSBP, aiming to enhance maternal health and recovery after surgery.

Keywords: Back pain, Neuraxial anesthesia, Cesarean section, Postspinal back pain, Postpartum, Prevalence.

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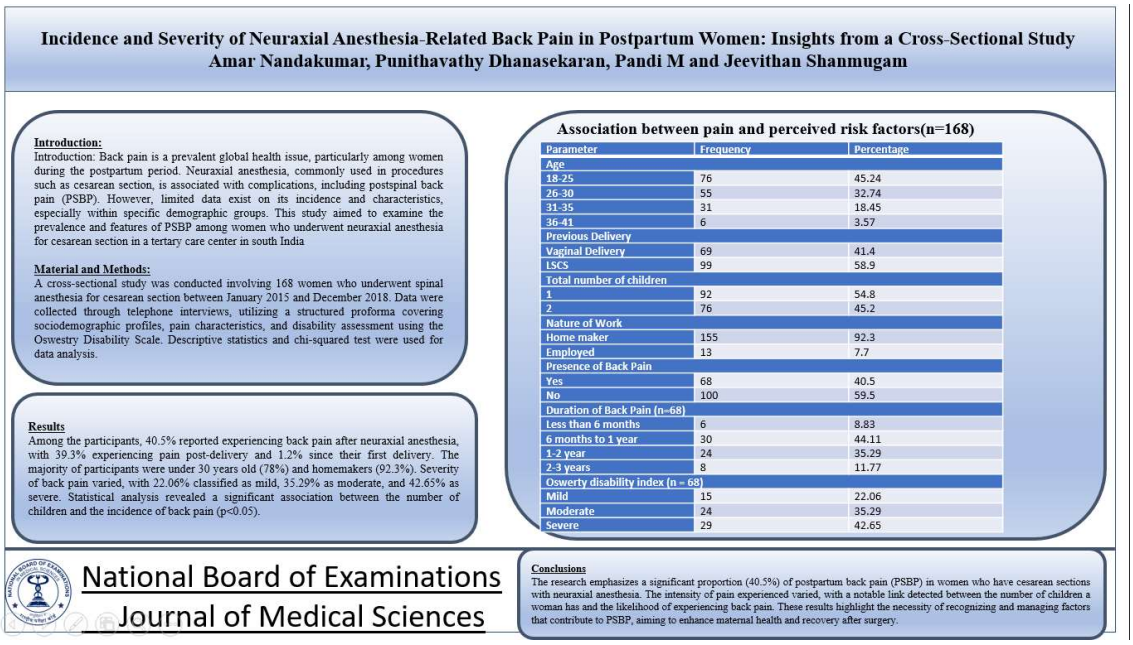
Graphical Abstract



Introduction

Back pain is a prevalent health issue globally, affecting a significant proportion of the population at some point in their lives. It imposes substantial physical, psychological, and economic burdens on both individuals and societies. The term "back pain" encompasses a spectrum of discomforts and pathologies involving the muscles, nerves, bones, and supporting structures of the spine [1].

The adoption of neuraxial anesthesia/analgesia, particularly spinal anesthesia (SA), has become widespread across various surgical interventions due to its efficacy and safety profile. However, alongside its benefits, neuraxial anesthesia is associated with complications, foremost among them being postspinal back pain (PSBP). This complication is of particular concern, given its potential to undermine patient comfort and surgical outcomes [2,3].

The incidence of back pain, including PSBP, is staggering, with studies indicating that between 50% and 80% of individuals experience back pain at some juncture in their lives. Chronic low back pain, characterized by persistent discomfort lasting beyond three months, affects approximately 23% of the population and contributes to substantial disability rates, affecting 11-12% of individuals [2,4-7].

Among women, back pain assumes added significance, especially during the postpartum period. Studies reveal that lower back pain is a common complaint among postpartum women, further highlighting the need for a comprehensive understanding of its etiology, risk factors, and management strategies. Despite the recognized importance of addressing postoperative pain, particularly chronic pain after surgical procedures such as cesarean section (CS) with spinal anesthesia, there is a paucity of data regarding its incidence, especially within

specific demographic groups such as the Asian population. Chronic pain following CS not only impairs functional abilities but may also disrupt the maternal-infant bonding process, underscoring the urgency of identifying predisposing factors and implementing targeted preventive measures [4,5,8,9].

Against this backdrop, this study aims to investigate the incidence of back pain, with a specific focus on PSBP, among women who underwent neuraxial anesthesia/analgesia. By elucidating the prevalence and associated features of back pain in this context, this research endeavors to inform clinical practice and facilitate the development of tailored interventions to mitigate the burden of postoperative pain and optimize patient outcomes.

Materials and Methods

This cross-sectional study was conducted at a tertiary care center in south India after receiving approval from the Institutional Health Ethics Committee (IHEC) between June and December 2019. The study aimed to investigate the experiences of patients who underwent Neuraxial anesthesia at the center between January 2015 and December 2018.Patients who had underwent spinal anaesthesia for Caesarean section during the specified period were contacted via telephone and provided with detailed explanations regarding the study's purpose, objectives, and ethical considerations. They were then invited to participate in the study, and only those who provided consent were included. Out of the 1372 mothers contacted, 168 agreed to participate.

A structured proforma was developed and validated prior to commencing the study. This proforma included sections covering sociodemographic profiles, pain status before and after the procedure, and the Oswestry Disability Scale was employed to assess pain characteristics, duration, exacerbating and relieving factors, and any associated conditions. Data collected from the participants were entered into Microsoft Excel and analyzed with SPSS version 27. Descriptive statistics, including mean with standard deviation and frequency with percentages, were utilized to describe the data. The association between pain and various parameters or risk factors was examined using the Chi-square test, with a significance level set at $p<0.05$.

Results

A retrospective cross-sectional study was conducted to determine the prevalence of lower back pain (LBA) in women who underwent Lower Segment Cesarean Section (LSCS) under spinal anesthesia. The study included 1372 women who delivered at our hospital between 2015 and 2018. From June to December 2019, at least six months after the procedure, we contacted these women by phone. Out of those contacted, 168 women consented to participate in the study. Those who experienced back pain were further questioned about the pain's characteristics, duration, exacerbating and relieving factors, and any associated conditions.

The mean age of the participants was 26.9 years, with an age range of 19 to 41 years. Most participants (78%) were under 30 years old, and over 96% were under 35 years old. Among the participants, 54.8% were delivering their first child, while 45.2% were delivering their second child. Additionally, 92.3% of the participants were homemakers.

Among the participants, 40.5% reported experiencing back pain after neuraxial anesthesia. Of those, 39.3% experienced back pain after their recent delivery, while 1.2% reported pain since their first delivery. Among those reporting pain, 8.83% experienced it for less than 6 months, 44.11% for 6 months to one year, and the remaining 35.29% for 1-2 years. The severity was assessed using the Oswestry Disability Index, with 22.06% being classified as having mild pain, 35.29% as moderate pain, and 42.65% as severe pain (Table 1).

We analyzed the association of pain with the number of children, and their employment status using chi-square tests. There was no significant association between their nature of employment and pain. However, 33.69% of women who gave birth to one child reported pain, compared to 48.68% of those who gave birth to two children, and this association was statistically significant (Table 2).

Furthermore, we assessed the association between the Oswestry Disability Index with number of children, and employment status using chi-square tests, but found no significant associations.

Table 1. Distribution of study population according to socio demographics

Parameter	**Frequency**	**Percentage**
Age		
18-25	76	45.24
26-30	55	32.74
31-35	31	18.45
36-41	6	3.57
Previous Delivery		
Vaginal Delivery	69	41.4
LSCS	99	58.9
Total number of children		
1	92	54.8
2	76	45.2
Nature of Work		
Home maker	155	92.3
Employed	13	7.7
Presence of Back Pain		
Yes	68	40.5
No	100	59.5
Duration of Back Pain (n=68)		
Less than 6 months	6	8.83
6 months to 1 year	30	44.11
1-2 year	24	35.29
2-3 years	8	11.77
Oswerty disability index (n = 68)		
Mild	15	22.06
Moderate	24	35.29
Severe	29	42.65

Table 2. Association between pain and perceived risk factors (n=168)

Parameter	Sub classification	Pain Present		Pain Absent		CSV	P Value
		F	%	F	%		
	LSCS	40	40.40	59	59.60		
Number of Children	1	31	33.69%	61	66.31	3.881	0.049
	2	37	48.68%	39	51.32		
Employment status	House Wife	66	42.58	89	57.42	3.682	0.055
	Employed	2	15.38	11	84.62		

Discussion

This retrospective study was conducted to know if Neuraxial Anesthesia is associated with Low back ache or not. A total of 168 mothers participated. The prevalence of Low back ache was found to be 40.5%. In a study done in turkey in 2022, The Prevalance of Low back pain was 18.8% in Turkey in a study done by Hizir et al. [5]. In another study done by Mukhopadhyay et al. [4] in 2019 in West Bengal, India reported 22.2% prevalence of Back ache. In a study done in Ethiopia in 2021 by Zeleke et al., the prevalence was 40.5% [2]. In Germany [10] and Korea [11], the prevalence was 40% and 32% respectively. It was 10% in Singapore [9].

Back pain during and after pregnancy, particularly following neuraxial anesthesia, is a multifaceted issue which is influenced by various physiological, anatomical, and procedural factors.

Physiological and Anatomical Changes during pregnancy

During pregnancy, hormonal changes, such as increase in the levels of hormone namely relaxin, alongside biomechanical alterations and weight gain, contribute to spinal imbalance and increased lordotic posture [5]. These changes place additional strain on the spine, predisposing women to low back pain (LBP) during and after pregnancy.

1. **Anesthetic Technique and Persistent Low Back Pain (LBP)**

Persistent lower back pain (LBP) following either cesarean section (CS) or vaginal delivery doesn't exclusively correlate with the type of anesthesia administered but is instead influenced by physiological and anatomical changes during pregnancy. Despite this, a significant number of women may still encounter persistent LBP after undergoing a cesarean section [4,5,8].

2. **Spinal Anesthesia and Neuropathic Pain**

While spinal anesthesia increases the neuropathic pain risk, the severity of pain perception is influenced by various factors beyond the anesthesia type. Lifestyle stress, anxiety, and depression can modulate pain perception levels, complicating the relationship between anesthesia and pain outcomes [1,2,4,11].

3. **Soft Tissue Damage and Lumbar Puncture Attempts**

Soft tissue damage during spinal anesthesia, possibly due to multiple lumbar puncture attempts, increases the risk of post-spinal back pain (PSBP). Higher BMI is associated with increased PSBP risk, potentially due to difficulties in identifying landmarks during lumbar puncture in obese patients [1,2,4,12].

4. Needle Type and Size

Despite extensive research on the type and size of spinal needles used for anesthesia, no significant variance in the occurrence of postoperative backache has been consistently observed between different needle types or sizes. Specifically, studies have produced inconsistent findings regarding the relationship between the type and size of needles used for neuraxial anesthesia and the incidence of postoperative backache. Furthermore, pre-existing back pain is recognized as a notable risk factor for persistent back pain following neuraxial anesthesia [2,4].

5. Posture and Epidural-Related Back Pain

Epidural anesthesia can lead to muscular relaxation and immobility, promoting stressed positions during labor and delivery. Prolonged poor posture under epidural anesthesia may contribute to chronic LBP post-delivery, exacerbated by the physical and physiological changes experienced during pregnancy and childbirth [1,4].

6. Additional Factors and Considerations

Urinary tract infections have been associated with an increased risk of LBP in postpartum women, suggesting a potential interplay between infection and pain perception [5,12,13].

Maternal workload, including repetitive bending and lifting, as well as hormonal and vascular changes, contribute to increased strain on the lower back [4,6,8,9].

The presence of epidural hematoma may exacerbate the risk of developing LBP [13].

7. Complex Nature of Back Pain

Back pain is a complex condition with various contributing factors, making it challenging to identify a single source of pain in many cases [3,4,13].

A notable limitation of our study on back pain prevalence among pregnant women following neuraxial anesthesia during delivery is the low participation rate. Out of 1672 individuals contacted, only 168 agreed to participate, potentially introducing selection bias. This bias could skew prevalence estimates if individuals who experienced back pain were more likely to participate, thus inflating the reported prevalence. Conversely, if those with severe back pain were less inclined to participate, the prevalence estimate may underestimate the true burden of back pain. Strategies to improve participation rates and sensitivity analyses to assess the impact of selection bias were not employed in this study. Therefore, caution should be exercised when generalizing our findings, as they may not fully represent the experiences of the broader population of pregnant women undergoing neuraxial anesthesia.

To address the limitations of our current study and further elucidate the association between neuraxial anesthesia and back pain among pregnant women, future research avenues should explore conducting large-scale prospective studies across multiple centers. By leveraging data from diverse populations and settings, these studies can provide a more comprehensive understanding of the factors contributing to back pain prevalence and its association with anesthesia techniques. Additionally, a multi-center approach allows for the examination of potential variations in practice patterns, patient demographics, and clinical outcomes, enhancing the

generalizability and robustness of findings. Moreover, these studies could incorporate comprehensive assessments of patient characteristics, procedural details, and postpartum outcomes to better inform clinical decision-making and optimize perioperative care for pregnant women. By advancing our understanding through rigorous multi-center investigations, we can effectively address the complexities surrounding back pain after neuraxial anesthesia and improve maternal outcomes on a broader scale.

Conclusions

Back pain after spinal anesthesia in pregnant women is influenced by a myriad of factors, including physiological changes during pregnancy, procedural aspects of anesthesia administration, and postpartum conditions. Understanding these complexities is crucial for implementing strategies to mitigate the risk of back pain and improve maternal outcomes during and after delivery.

Statements and Declarations

Conflicts of interest

The authors declare that they do not have conflict of interest.

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Ethics approval

Ethical approval obtained from the institute.

Human and animal rights

All ethical principles were strictly adhered by the authors.

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