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RESEARCH

Comparative Analysis of the Use of Visual Analogue Scale versus Numeric Rating Scale in Measuring Pain in Post-Cesarean Section Surgical Patients with Spinal Anesthesia

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ABSTRACT

Background: Postoperative pain following sectio caesarea (CS) is a significant clinical issue that requires effective assessment and management to accelerate healing and improve patient comfort. This study aimed to compare the effectiveness of the visual analogue scale (VAS) and the numeric rating scale (NRS) in measuring pain intensity in patients after CS with spinal anesthesia.

Objective: To compare the effectiveness of the VAS and Numeric Rating Scale (NRS) in measuring pain intensity following caesarean section (CS) under spinal anesthesia.

Methods: A quantitative research approach was applied, involving a sample of 90 patients from several hospitals in Medan, including Prof. Dr. Chairuddin P. Lubis Hospital, Dr. Pirngadi Regional General Hospital, and Haji Medan General Hospital. Data were collected through interviews and pain measurements using both instruments.

Result: The results showed that most respondents experienced moderate pain according to VAS (75%) and NRS (77%). Seventy-nine percent of respondents perceived VAS as a more effective method for pain assessment compared to 21% for NRS. Statistical analysis indicated no significant difference between pain measurements using VAS and NRS ($p = 0.832$).

Conclusion: This study confirms that both tools can be used to measure pain intensity after CS; however, VAS tends to be preferred by patients due to its more concrete visual representation of pain.

Keywords: NRS; pain; sectio; spinal; VAS

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INTRODUCTION

Pain often experienced by patients after CS surgery consists of various types, with pain at the incision area described as sharp, throbbing, or pulling around the lower abdomen, worsened by movement, coughing, or laughing. Patients may also experience pain radiating to the lower back or pelvis, as well as discomfort in the reproductive organ area due to the surgical process. Pain can potentially cause emotional stress and broader psychological impacts. A study by Samadi et al. (2022 showed that uncontrolled post-CS pain can reduce mobility, slow healing, cause emotional stress, and increase the risk of anxiety and depression.[1]

Spinal anesthesia is the primary choice of regional anesthesia for CS surgery because it provides effective pain control and faster recovery without compromising patient safety. Its high prevalence reflects its effectiveness and advantages in modern medical practice. Nonetheless, anesthesia type selection depends on comprehensive medical considerations and individual patient conditions.[2]

Spinal anesthesia use for CS is highly prevalent globally, especially in countries with advanced healthcare systems. Global data shows that around 70-80% of all Cesarean deliveries use spinal anesthesia. This prevalence varies with local factors, including medical practice, hospital policies, and patient and healthcare personnel preferences.

In Indonesia, the increasing trend of Cesarean deliveries mirrors the global pattern. The CS rate in Indonesia rose rapidly from 1.6% in 1991 to 17.6% in 2017, influenced by better healthcare access, strict health policies, and obstetric protocols facilitating CS indications. Personal preference of mothers, especially those with higher education or delivering at private hospitals, also contributes due to comfort or fear of normal delivery pain.

Postoperative pain measurement after CS is crucial for effective pain management, ensuring patients receive appropriate care. Using tools such as the numeric rating scale (NRS) or visual analog scale (VAS), healthcare providers can objectively evaluate pain intensity, aiding in analgesic regimen adjustment and other interventions.[3]

The VAS and NRS are common methods for assessing pain intensity in post-CS patients. VAS uses a 10 cm line representing pain, ranging from none (0) to worst (10), where patients mark their own pain level. This method allows patients to express pain visually, helping healthcare workers understand pain intensity. VAS is also effective in assessing pain changes over time and evaluating analgesic effectiveness.[4]

A study by Nadilla et al. indicated that 63.2% of respondents found pain assessment methods effective. Bivariate analysis showed no difference in effectiveness between VAS and NRS in post-CS patients (mean rank 56.26, $p = 0.831$), confirming both scales' applicability.[5]

The study conducted by Nadilla et al. showed that the effective pain assessment method according to the respondents' perception was chosen by 24 respondents (63.2%). The bivariate analysis results of pain scale assessments that are more effective and applicable to patients after sectio caesarea (SC) surgery are the VAS and the NRS, with mean ranks of 56.26 and a significance value of $p = 0.831$ ($P >$

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0.05), indicating no difference in the effectiveness of the pain scale measurement tools used for patients post SC surgery.[6]

METHOD

This study is an analytical observational study using a cross-sectional method aimed at comparing the use of pain scales, specifically the NRS and the VAS, in patients before and after cesarean section surgery at Prof. Dr. Chairuddin P. Lubis Hospital, Dr. Pirngadi Regional General Hospital, Haji Medan General Hospital, and Bhayangkara Tk II Medan Hospital. The study was conducted at Prof. Dr. Chairuddin P. Lubis Hospital, Dr. Pirngadi Regional General Hospital, and Haji Medan General Hospital. The study population consisted of all patients post-SC surgery at these hospitals. The total sample was 84 patients, rounded up to 90 patients.

RESULTS

After conducting the research, the collected data were processed.

Table 1. Demographic data of the research sample

Variabel	Frequency	Percentage (%)
Age (Year)		
20-30	76	83 %
30-40	14	17%
40-50	0	0
Job		
Teacher	20	22
Employee	13	14
PNS	32	22
Others	5	35
Ethnic		
- bataknese	35	39%
-Javanese	28	31%
- minang	9	10%
- Aceh	8	9%
-others	10	11 %
Frequency SC		
- 1	14	15
-2	45	50
-3	25	28
-4	6	7
Pain Intensity (VAS)		
-Mild	25	27
- Moderete	65	63
- Severe	0	0
Pain Intensity (NRS)		
- Mild	20	20
- Moderete	70	70
- Severe	0	0

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Based on Table 1, it was found that the age range of the research sample was 20-30 years old, totaling 76 people or 83%, while the age range of 30-40 years old was 17%. The majority of respondents' occupations in this study were housewives at 35%, followed by teachers and civil servants (PNS) at 22%. Based on the table above, the majority of ethnic groups among the respondents were Bataknese at 39%, followed by Javanese at 31%, Acehnese at 9%, Minang at 10%, and other ethnicities at 11%.

Regarding the frequency of CS, the most common was the second CS at 50%, followed by the third CS at 28%, the first CS at 15%, and the fourth CS at 6%. The number of respondents experiencing mild pain was 25 people, or 27%, while those experiencing moderate pain were 65 people, or 63%. All respondents were interviewed to assess their responses to the measurement tools and to provide opinions on how both tools measure pain. Based on the table above, it is concluded that 82% of respondents responded that the VAS is an effective method for assessing pain, while 18% answered that the NRS is the most effective method for pain assessment.

Based on Table 1, the mean value of the VAS was 5.50, while the mean value of the NRS was 5.92. A statistical test was conducted to assess the correlation between the two pain measurement tools, yielding a p-value of 0.866 ($p > 0.05$), which means there is no significant correlation between VAS and NRS.

DISCUSSION

Based on this study, it was found that 90 respondents underwent SC surgery, selected from several hospitals in the city of Medan. Demographic data of the respondents were collected and analyzed to provide an overview of the demographics of the research sample involved.

The average age of respondents in this study was 20-30 years, accounting for 83%, while the remainder were aged 30-40 years. This study differs from the one conducted by Aria Aulia et al., which states that the number of cesarean sections in Indonesia increases annually. The prevalence of SC in Indonesia is around 17.7%, with the highest prevalence among women aged over 35 years, living in urban areas, having a high education level, more than four antenatal care visits, proximity to healthcare facilities, and birth timing.[7]

Age is one of the risk factors for surgery; according to several studies, the high-risk age group for SC includes those under 20 years or over 35 years old. Research conducted by Maryanti et al. in Kendari found that the average age of mothers undergoing SC was in the low-risk category for 48 individuals (84.2%), while the high-risk group included 9 individuals (15.4%). The reasons for performing a cesarean section between ages 20-35 may be due to complications during childbirth that can cause harm or death to the mother and baby. Possible complications during pregnancy include fetal-pelvic disproportion, prolonged labor, preeclampsia, premature rupture of membranes, fetal distress, abnormal fetal position, and multiple births.[8]

The research conducted by Hamdani Irfan et al. in the city of Medan found that the average age of mothers undergoing SC was young adulthood. This is due to the increasing number of SC surgeries in big cities, and young adults are the age group still productive for pregnancy.[9]

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In contrast, a study conducted by Arrifah Noer et al. in Banjarmasin found that the average age group undergoing SC surgery was the high-risk group, accounting for 80%.[10] The age difference is influenced by several factors, including the social, economic, and educational background of the patient as well as the patient's environment.

Another study by Safitri using frequency distribution showed that the age of mothers who had a history of SC delivery ranged from 21 to 34 years, and there are stronger factors influencing the occurrence of SC. Mothers aged 20 to 35 years undergo SC due to other factors such as maternal health conditions that are unfavorable at that age, including bleeding during pregnancy and physical or mental stress that may cause the mother to give birth prematurely, as well as pregnancy complications requiring SC.[11]

In this study, it was found that the majority of respondents were housewives, making up 35%, followed by teachers and civil servants (PNS) at approximately 22% of the total respondents. This differs from research conducted by Fadli Alfian et al. in Makassar, which found that the average mother undergoing SC surgery was a non-working pregnant mother, with a prevalence of 65%. This difference is attributed to variations in study location and region.[12]

In this study, using VAS and NRS scoring values, it was found that moderate pain was the most common pain category experienced by patients post-SC. Using these two different pain measurement methods, the results showed that most respondents reported moderate pain on both the NRS and VAS scales. Another study conducted by Anryati in Bali showed that the average respondents who experienced post-SC surgery pain were in the moderate pain category, with a prevalence of 61.4%.[13]

Medical causes underlying the implementation of SC can affect pain levels, such as complicated conditions requiring more intensive treatment; the diminishing effect of anesthetics, as the effects of spinal or epidural anesthesia wear off, surgical wound pain becomes more noticeable and intensifies; and the opening of the surgical wound and tissue healing process. The incision on the abdominal and uterine walls stimulates mechanical pain, which triggers inflammatory responses and peripheral nerve sensitization. Uterine contractions after delivery can cause additional pain, complementing the surgical wound pain.[14]

Complications of spinal anesthesia and side effects of regional anesthesia can also contribute to post-SC pain. Preoperative anxiety and psychological conditions can worsen postoperative pain perception. Patients with a history of previous SC tend to experience more severe pain due to scar tissue from prior surgeries. Lack of adequate regional analgesia or its ineffective use increases pain intensity. Patients with positive coping mechanisms (internal locus of control) tend to manage pain better and report lower pain levels. Sleep pattern disturbances and poor sleep quality: high pain intensity from the SC wound can disrupt sleep, while poor sleep further increases pain perception. Early mobilization: lack of early movement can prolong pain and slow recovery. Age and mobility level also affect pain perception and response ability.[12,13]

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Bivariate analysis was conducted to evaluate differences between the two measurement methods, resulting in no statistically significant difference ($p > 0.05$). This aligns with the study by Linda Andreyani et al. in Memwampah, which found a strong correlation between VAS and NRS measurements (Spearman's rho=0.937, $p<0.001$), indicating no significant difference and confirming that both tools can be used reliably for pain assessment. Similarly, research by Kölltveit et al. (2020) comparing VAS and NRS found no significant differences, meaning both can be effectively used to assess pain in patients.[14]

In addition, the VAS and NRS appear reliable in assessing the severity of low back pain (LBP) without significant differences between the two. Furthermore, VAS or NRS scores can predict disability in patients with LBP. This developed tool is expected to serve as a reference for anamnesis or assessment by healthcare professionals and can also be used by patients or families to detect pain experienced, enabling prompt handling by healthcare professionals.[14]

Another study by Diah et al. in Jambi, assessing the VAS and NRS pain scales in the emergency department of RSUD Raden Mattaher Jambi, found that NRS identified 37 people with severe pain. Bivariate analysis using the kappa test yielded a p-value of $0.00 < \alpha$ (0.05), with VAS sensitivity at 85.4%, NRS at 93%, VAS specificity at 45.9%, NRS at 31.7%, and accuracy for both VAS and NRS at 50%. NRS is better used as a measurement tool for pain assessment because its sensitivity value is higher than that of VAS. Therefore, paramedics are recommended to use the NRS scale.[15]

CONCLUSION

There is no significant difference in NRS and VAS scores in patients undergoing SC with the spinal anesthesia technique (p-value > 0.05). Most patients undergoing SC are aged 20-30 years, with the most common occupations being teachers and civil servants (PNS), predominantly of Batak ethnicity, and most had their second SC. The average VAS score in patients undergoing SC with spinal anesthesia is 5.5. The average NRS score in patients after SC with spinal anesthesia is 5.92.

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Conflict of Interest
Authors declare no conflict of interest to disclose.

Declaration of Use of Artificial Intelligence (AI)
The authors used AI-assisted tools solely to assist with paraphrasing and improving the manuscript's language. The authors take full responsibility for the accuracy, integrity, and originality of the manuscript, including all research data, results, interpretations, and conclusions.

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