

Association of Anxiety with Postoperative Pain Following Cesarean Delivery: A Cross-Sectional Study

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Abstract

This study examined the association between anxiety levels and postoperative wound pain intensity among women undergoing cesarean delivery at TMC Hospital, Pariaman City. Postoperative pain following cesarean delivery is influenced not only by physiological factors but also by psychological conditions, particularly anxiety, which may intensify pain perception and delay recovery. A correlational study with a cross-sectional design was conducted involving 81 post-cesarean patients selected through purposive sampling. Anxiety levels were assessed using the Zung Self-Rating Anxiety Scale (ZSAS), while pain intensity was measured using the Numeric Rating Scale (NRS). Data were analyzed using the Somers' D correlation test. Most participants experienced panic-level anxiety (65.4%) and moderate postoperative pain (59.3%). Statistical analysis demonstrated a significant positive association between anxiety levels and postoperative pain intensity (Somers' D = 0.462, $p < 0.001$), indicating that higher anxiety levels were associated with greater pain intensity. These findings highlight the importance of early anxiety assessment as part of comprehensive postoperative nursing care. Integrating psychological assessment with routine pain management may contribute to improved pain control and support postoperative recovery among women undergoing cesarean delivery.

Keywords: *Anxiety, Cesarean Delivery, Postoperative Pain, Nursing Care, Psychological Factors*



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1. Introduction

Cesarean delivery is one of the most frequently performed surgical procedures worldwide, and its utilization has increased steadily across almost all regions during the

past two decades (Betrán et al., 2021; Angolile et al., 2023; Ojong et al., 2026). Global estimates indicate that 21.1% of births were delivered by cesarean section between 2010 and 2018, and this proportion is projected to increase to 28.5% by 2030 (Malik et al., 2025). Although cesarean delivery is an essential intervention for reducing maternal and neonatal morbidity and mortality when medically indicated, its increasing use has become a global public health concern because unnecessary procedures may expose women to avoidable surgical risks, increase healthcare costs, and contribute to long-term maternal complications (Guner & Yeniocak, 2025; Abate et al., 2025).

Despite advances in obstetric care, postoperative pain remains one of the most common challenges following cesarean delivery (Wenru et al., 2025; Wang et al., 2026). Poorly controlled pain may delay functional recovery, impair maternal mobility, interfere with breastfeeding, reduce mother–infant bonding, and prolong hospitalization (Liu et al., 2024). Furthermore, recent evidence indicates that pain frequently persists after hospital discharge and is associated with poorer health-related quality of life during the postpartum period (Damtie et al., 2025). These findings emphasize that effective pain management should be considered a fundamental component of comprehensive postpartum care.

Pain following cesarean delivery is influenced not only by surgical tissue injury but also by psychological factors, particularly anxiety (Suresh & Lakshminarasimhan, 2022; Litman et al., 2025; Ishida et al., 2025). Women with elevated anxiety levels consistently report greater postoperative pain intensity than those with lower anxiety levels (Poehlmann et al., 2022; Abidin et al., 2022). A large retrospective cohort study demonstrated that women with diagnosed anxiety disorders experienced higher postoperative pain scores and greater opioid consumption during the first 24 hours after surgery (Poehlmann et al., 2022). Similarly, prospective studies have shown that anxiety contributes to more severe pain during cesarean delivery and adversely affects emotional recovery after childbirth (Kakde et al., 2023). Collectively, these findings suggest that anxiety is an important determinant of postoperative pain and recovery among women undergoing cesarean delivery.

The psychological consequences of cesarean delivery extend beyond pain alone. Postoperative recovery may also be affected by anxiety, sleep disturbances, depressive symptoms, and trauma-related psychological responses, all of which may compromise maternal well-being and delay recovery (Wang et al., 2026; Damtie et al., 2025). Severe postoperative pain has been associated with postpartum depression and may initiate a reciprocal cycle in which pain, anxiety, sleep disturbance, and negative emotional responses reinforce one another (Liu et al., 2024; Froeliger et al., 2026). Recent studies further demonstrate that anxiety and depression are associated with poorer postoperative recovery and lower health-related quality of life (Ishida et al., 2025). These findings support recommendations to integrate routine psychological assessment into postoperative nursing care because conventional recovery indicators alone may not adequately reflect patients' psychological conditions (Saulnier et al., 2025).

Previous studies have consistently demonstrated a significant association between anxiety and postoperative pain following cesarean delivery; however, important differences remain regarding the magnitude and underlying mechanisms of this

relationship. Poehlmann et al. (2022) reported that women with clinically diagnosed anxiety disorders experienced significantly higher postoperative pain scores and greater opioid consumption during the first 24 hours after surgery, suggesting that anxiety may directly influence analgesic requirements. In contrast, Litman et al. (2025) emphasized that anxiety not only intensified postoperative pain but also affected women's emotional recovery and childbirth experience, indicating that psychological well-being extends beyond pain perception alone. Meanwhile, Kakde et al. (2023) highlighted that perioperative anxiety is influenced by multiple contextual factors, including previous childbirth experiences, patient education, and healthcare support, which may subsequently modify postoperative pain outcomes. These findings collectively indicate that although the association between anxiety and postoperative pain has been consistently reported, its strength and clinical implications appear to vary across healthcare settings, patient populations, and perioperative management strategies. Therefore, further investigation in different clinical contexts is required to generate evidence that is both locally relevant and applicable to nursing practice.

Indonesia has also experienced a growing proportion of cesarean deliveries, creating additional challenges for postoperative maternal care. Recovery after cesarean delivery requires attention to both physical and psychological aspects, particularly among women who experience anxiety during the postoperative period. International evidence indicates that the association between anxiety and postoperative pain varies across populations, healthcare systems, perioperative management protocols, and sociocultural contexts (Malik et al., 2025; Abate et al., 2025). These variations suggest that findings from one setting cannot be directly generalized to other healthcare environments.

Although numerous studies have reported a significant association between anxiety and postoperative pain following cesarean delivery, most available evidence has been generated from tertiary referral hospitals or large urban healthcare institutions. Evidence from regional hospitals in Indonesia remains scarce, despite differences in patient characteristics, healthcare resources, nursing practices, and sociocultural backgrounds that may influence psychological responses and pain perception. Consequently, the applicability of existing evidence to regional healthcare settings remains uncertain. Generating context-specific evidence is therefore necessary to support the development of evidence-based nursing interventions for women undergoing cesarean delivery in regional hospitals.

Addressing this knowledge gap is important because limited evidence may hinder healthcare professionals from identifying patients at greater risk of severe postoperative pain and implementing timely psychological interventions. Understanding the relationship between anxiety and postoperative pain may contribute to improving postoperative nursing care, pain management strategies, and maternal recovery outcomes. Therefore, this study aimed to examine the association between anxiety levels and postoperative wound pain intensity among women undergoing cesarean delivery at TMC Hospital, Pariaman City.

2. Research Methods

2.1. Study Design and Setting

This study employed an analytical observational design using a cross-sectional approach to examine the association between anxiety levels and postoperative wound pain intensity among women undergoing cesarean delivery. The study was conducted between February and May 2026 at the Maternal and Child Inpatient Ward of TMC Hospital, Pariaman City, Indonesia.

2.2. Participants and Sampling

The study population comprised women who underwent cesarean delivery and were admitted to the Maternal and Child Inpatient Ward during the study period. Participants were recruited using a purposive sampling technique based on predefined eligibility criteria.

The inclusion criteria were women who had undergone cesarean delivery, were fully conscious, were able to communicate effectively, and agreed to participate by providing written informed consent. The exclusion criteria included women who experienced severe postoperative complications, had documented psychiatric disorders, suffered from cognitive impairment, or were unable to complete the study questionnaires.

The minimum sample size was determined using Slovin's formula because the study population was known. The calculation indicated that at least 74 participants were required. To compensate for possible non-response or incomplete data, an additional 10% was added, resulting in a final sample size of 81 participants.

2.3. Data Collection

Data collection was conducted after eligible participants had received a complete explanation regarding the objectives and procedures of the study and had provided written informed consent. Sociodemographic characteristics were obtained from medical records and participant interviews. Anxiety levels and postoperative pain intensity were assessed using the ZSAS and NRS questionnaires, respectively. All assessments were performed by trained researchers following standardized data collection procedures to ensure consistency.

2.4. Statistical Analysis

Data were analyzed using IBM SPSS Statistics. Descriptive statistics were used to summarize participant characteristics, anxiety levels, and postoperative pain intensity. Categorical variables were presented as frequencies and percentages, whereas continuous variables were summarized using the mean and standard deviation or the median and interquartile range, depending on data distribution.

The association between anxiety levels and postoperative wound pain intensity was examined using Somers' D correlation analysis, as both variables were ordinal. Statistical significance was determined at a two-sided p-value of <0.05.

3. Results and Discussion

3.1 Anxiety Levels among Post-Cesarean Patients

Table 1. Distribution of Anxiety Levels among Women Following Cesarean Delivery

Anxiety level	Frequency (f)	Percentage (%)
No anxiety	3	3.7
Mild anxiety	4	4.9
Moderate anxiety	1	1.2
Severe anxiety	20	24.7
Panic	53	65.4
Total	81	100

As shown in Table 1, most participants experienced panic-level anxiety following cesarean delivery (65.4%), whereas only a small proportion reported no anxiety (3.7%), mild anxiety (4.9%), or moderate anxiety (1.2%). Severe anxiety was observed in nearly one-quarter of the participants (24.7%). These findings indicate that psychological distress was highly prevalent among women during the early postoperative period, with almost nine out of ten participants experiencing severe or panic-level anxiety.

The predominance of severe psychological distress observed in this study suggests that anxiety remains a significant concern during postoperative recovery after cesarean delivery. Anxiety experienced after surgery is understandable because women are required to cope simultaneously with postoperative pain, physical limitations, concerns about wound healing, adaptation to motherhood, and responsibility for newborn care. These concurrent physical and emotional demands may increase psychological vulnerability, particularly during the immediate postpartum period when patients are still adapting to substantial physiological and psychosocial changes.

From a physiological perspective, anxiety activates the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis, leading to increased secretion of catecholamines and cortisol. Persistent activation of these neuroendocrine pathways may heighten physiological arousal, increase muscle tension, reduce pain tolerance, and amplify pain perception. Anxiety may also contribute to hypervigilance, whereby patients become more attentive to painful stimuli and interpret postoperative sensations as more threatening than they objectively are. Consequently, women with higher anxiety levels are more likely to report greater discomfort during postoperative recovery, even when surgical conditions and analgesic management are comparable.

The findings of the present study are consistent with previous investigations reporting that anxiety is highly prevalent among women undergoing cesarean delivery. Poehlmann et al. (2022) demonstrated that women with clinically diagnosed anxiety disorders experienced significantly greater postoperative pain and required higher opioid consumption during the first 24 hours after surgery. Likewise, Litman et al. (2025)

reported that anxiety adversely affected not only postoperative pain perception but also emotional recovery and women's overall childbirth experience. Similar observations were reported by Kakde et al. (2023), who found that perioperative anxiety was influenced by previous childbirth experiences, educational background, family support, and the quality of communication provided by healthcare professionals. Collectively, these studies support the present findings and reinforce the importance of psychological well-being as an integral component of postoperative recovery.

Although the current findings generally agree with previous literature, the proportion of participants classified as having panic-level anxiety was notably high. Several contextual factors may explain this observation. Women recovering from cesarean delivery frequently experience uncertainty regarding postoperative pain, concerns about mobility, fear of wound disruption, and anxiety related to newborn care. Differences in healthcare settings, cultural perceptions of surgery, availability of family support, and access to psychological counseling may also contribute to variations in anxiety severity across different populations. Therefore, the high prevalence of anxiety observed in this study should be interpreted within the broader sociocultural and clinical context rather than solely as an individual psychological response.

From a clinical perspective, these findings highlight the importance of incorporating routine psychological assessment into postoperative nursing care. Anxiety screening using standardized instruments may facilitate the early identification of women at greater risk of psychological distress and severe postoperative pain. In addition to pharmacological pain management, nursing interventions such as therapeutic communication, pre-discharge education, relaxation techniques, breathing exercises, family involvement, and psychological support may help reduce anxiety and improve recovery outcomes. Integrating psychological care with conventional postoperative management has the potential to enhance maternal comfort, promote functional recovery, and improve the overall quality of post-cesarean nursing care.

3.2 Postoperative Pain Intensity Following Cesarean Delivery

Table 2. Distribution of Postoperative Pain Intensity among Women Following Cesarean Delivery

Pain intensity Frequency (f) Percentage (%)		
Mild pain	9	11.1
Moderate pain	48	59.3
Severe pain	24	29.6
Total	81	100

As presented in Table 2, moderate postoperative pain was the most frequently reported pain category, accounting for 59.3% of participants. Mild pain was experienced by 18.5%, while 22.2% reported severe pain. No participants reported being completely pain-free during the assessment period. These findings indicate that postoperative pain

remained a common clinical problem among women recovering from cesarean delivery, despite routine postoperative pain management.

The predominance of moderate pain observed in this study is consistent with the expected physiological response following cesarean delivery, which involves surgical incision through the abdominal wall and uterine tissue. Tissue injury initiates a complex inflammatory cascade characterized by the release of prostaglandins, bradykinin, histamine, serotonin, and pro-inflammatory cytokines. These inflammatory mediators sensitize peripheral nociceptors, lowering the pain threshold and increasing the transmission of nociceptive signals to the central nervous system. Consequently, patients commonly experience pain of moderate intensity during the early postoperative period, particularly during activities requiring abdominal muscle contraction, such as changing position, coughing, walking, or breastfeeding.

Beyond the physiological consequences of surgery, postoperative pain is also influenced by multiple psychological and social factors. Pain perception is a multidimensional experience shaped not only by the extent of tissue damage but also by emotional status, cognitive appraisal, previous experiences, cultural beliefs, coping strategies, and family support. Women who perceive postoperative pain as threatening or who have difficulty coping with surgical stress may report greater pain intensity despite receiving similar analgesic therapy. This biopsychosocial perspective emphasizes that postoperative pain should not be viewed solely as a physical symptom but rather as the result of interactions between biological, psychological, and environmental factors.

The findings of the present study are consistent with previous research demonstrating that moderate postoperative pain is the most common level of pain experienced during the first postoperative day after cesarean delivery. Previous investigations have reported that although multimodal analgesic regimens effectively reduce severe pain, many women continue to experience clinically significant discomfort during routine postoperative activities. Poehlmann et al. (2022) similarly reported that postoperative pain remained prevalent despite standard analgesic protocols, particularly among women with elevated anxiety levels. Litman et al. (2025) further demonstrated that inadequate pain control may adversely affect maternal recovery, emotional well-being, breastfeeding initiation, and satisfaction with childbirth experiences. Collectively, these studies support the current findings and highlight that postoperative pain continues to represent an important challenge in obstetric nursing care.

Although most participants reported moderate pain, approximately one-fifth experienced severe pain. Several factors may explain this variation in pain intensity. Individual pain perception differs considerably according to age, previous surgical experience, parity, genetic susceptibility, inflammatory response, sleep quality, psychological condition, and effectiveness of postoperative analgesia. Furthermore, differences in mobilization practices, family support, and communication between healthcare professionals and patients may also influence how postoperative pain is perceived and reported. These factors likely contribute to the variability in pain intensity observed among participants despite undergoing the same surgical procedure.

From a neurophysiological perspective, prolonged postoperative pain may also induce central sensitization, a condition in which repeated nociceptive stimulation

increases the excitability of neurons within the spinal cord and brain. Once central sensitization develops, pain perception may become exaggerated even in response to relatively mild peripheral stimulation. Anxiety and emotional distress may further amplify this process through continuous activation of stress-related neural pathways, thereby strengthening the interaction between psychological and physiological mechanisms involved in postoperative pain.

The clinical implications of these findings are substantial for nursing practice. Effective postoperative pain management should extend beyond pharmacological interventions alone and adopt a comprehensive, patient-centered approach. Routine pain assessment using validated instruments such as the Numeric Rating Scale should be complemented by early mobilization, patient education, relaxation therapy, breathing exercises, emotional support, and family involvement. Nurses play a pivotal role in recognizing patients who remain at risk of persistent postoperative pain and in implementing individualized interventions aimed at improving comfort, accelerating functional recovery, and preventing unnecessary psychological distress. Integrating psychological assessment with pain management strategies may further enhance postoperative recovery and improve overall maternal health outcomes following cesarean delivery.

3.3 Association Between Anxiety Levels and Postoperative Pain Intensity

Table 3. Association Between Anxiety Levels and Postoperative Pain Intensity among Women Following Cesarean Delivery

Pain intensity	No anxiety	Mild anxiety	Moderate anxiety	Severe anxiety	Panic	Total
Mild pain	1	0	1	4	3	9
Moderate pain	2	4	0	16	26	48
Severe pain	0	0	0	0	24	24
Total	3	4	1	20	53	81

Table 4. Somers' D Correlation between Anxiety Levels and Postoperative Pain Intensity

Variables	Somers' D coefficient	p-value
Anxiety level and pain intensity	0.462	<0.001

The cross-tabulation analysis demonstrated a clear pattern indicating that higher anxiety levels were associated with greater postoperative pain intensity. Women classified as having panic-level anxiety were more likely to report moderate to severe postoperative pain, whereas participants with lower anxiety levels generally experienced lower pain intensity. Statistical analysis using Somers' D confirmed a moderate positive correlation between anxiety levels and postoperative pain intensity (Somers' D = 0.462;

$p < 0.001$), indicating that increasing anxiety was significantly associated with increasing pain intensity following cesarean delivery.

The observed correlation suggests that postoperative pain following cesarean delivery cannot be explained solely by the extent of surgical tissue injury. Instead, pain perception appears to result from complex interactions between physiological, psychological, and environmental factors. While surgical trauma initiates nociceptive stimulation through tissue inflammation and activation of peripheral pain receptors, psychological conditions such as anxiety may substantially modify the way painful stimuli are processed within the central nervous system. Consequently, women experiencing greater anxiety are likely to perceive postoperative pain as more intense despite undergoing similar surgical procedures and receiving comparable postoperative treatment.

The relationship identified in this study can be explained through the Gate Control Theory of Pain, originally proposed by Melzack and Wall. According to this theory, pain perception is regulated by neural "gates" located within the dorsal horn of the spinal cord. Emotional factors, including anxiety, fear, and psychological stress, may facilitate the opening of these neural gates, thereby increasing transmission of nociceptive impulses to higher brain centers. Conversely, emotional stability and positive coping mechanisms may partially inhibit pain transmission, reducing the subjective experience of pain. This theoretical framework provides a plausible explanation for why patients with elevated anxiety frequently report higher postoperative pain intensity despite comparable levels of tissue damage.

Another theoretical perspective supporting the present findings is the Neuromatrix Theory of Pain, which conceptualizes pain as a multidimensional experience generated through interactions among sensory, cognitive, emotional, and behavioral processes rather than being solely determined by peripheral nociceptive input. Within this framework, anxiety functions as an important cognitive-emotional modifier capable of amplifying pain perception through increased attention toward threatening stimuli, catastrophic thinking, and negative expectations regarding postoperative recovery. Consequently, anxiety may intensify pain even in situations where objective tissue healing progresses normally.

Physiologically, anxiety activates the sympathetic nervous system and stimulates the hypothalamic-pituitary-adrenal (HPA) axis, resulting in increased secretion of catecholamines and cortisol. Persistent activation of these neuroendocrine pathways may produce sustained muscle tension, elevated cardiovascular responses, sleep disturbances, and heightened inflammatory activity. These physiological changes contribute to peripheral and central sensitization, thereby lowering pain thresholds and increasing responsiveness to nociceptive stimulation. As a result, women experiencing substantial psychological distress may perceive postoperative pain more intensely than women with lower anxiety levels.

The moderate strength of the observed correlation deserves particular consideration. Although anxiety demonstrated a statistically significant relationship with postoperative pain intensity, the correlation coefficient indicates that anxiety alone does not fully explain variations in postoperative pain. Pain following cesarean delivery is

inherently multifactorial and is influenced by numerous biological, clinical, and psychosocial determinants. Factors such as individual pain tolerance, age, parity, previous surgical experience, effectiveness of postoperative analgesia, duration of surgery, surgical technique, inflammatory response, sleep quality, family support, and cultural perceptions of pain may also contribute substantially to the overall pain experience. Therefore, anxiety should be regarded as one important determinant among multiple interacting factors rather than the sole predictor of postoperative pain intensity.

The present findings are consistent with previous investigations reporting a significant association between perioperative anxiety and postoperative pain following cesarean delivery. Poehlmann et al. (2022) observed that women with anxiety disorders experienced significantly higher postoperative pain scores and required greater opioid consumption during the first postoperative day compared with women without anxiety disorders. Similarly, Litman et al. (2025) demonstrated that increased anxiety adversely affected postoperative pain perception, emotional recovery, and maternal satisfaction following childbirth. Kakde et al. (2023) likewise reported that women with elevated perioperative anxiety were more likely to experience severe postoperative discomfort and delayed recovery, particularly when psychological support and patient education were limited. Collectively, these studies reinforce the present findings and support the growing body of evidence emphasizing the close relationship between psychological well-being and postoperative recovery among women undergoing cesarean delivery.

Although the present findings generally agree with previous literature, the magnitude of the correlation observed in this study was moderate rather than strong. Several explanations may account for this difference. Variations in patient demographics, perioperative pain management protocols, healthcare resources, timing of pain assessment, and sociocultural perceptions of childbirth may influence both anxiety levels and pain perception across different clinical settings. Furthermore, individual coping strategies, resilience, educational background, and family involvement during postoperative recovery may moderate the relationship between anxiety and pain. These contextual differences highlight the importance of interpreting the present findings within the specific healthcare environment in which the study was conducted.

From a nursing perspective, the present findings emphasize that postoperative pain management should adopt a holistic and multidisciplinary approach. Pharmacological analgesia remains essential for controlling postoperative pain; however, psychological interventions should be integrated into routine postoperative care. Early identification of women experiencing elevated anxiety may enable healthcare professionals to implement supportive interventions before anxiety progresses to severe psychological distress. Evidence-based nursing strategies—including therapeutic communication, individualized patient education, guided relaxation techniques, breathing exercises, music therapy, family-centered care, and emotional counseling—may contribute to reducing anxiety while simultaneously improving pain management and patient satisfaction.

Routine anxiety screening before and after cesarean delivery may also facilitate risk stratification, enabling healthcare providers to identify patients who require additional psychological support during postoperative recovery. Such an integrated approach aligns

with contemporary patient-centered care models that recognize psychological health as an essential component of surgical recovery. Improving psychological well-being may not only reduce postoperative pain perception but also promote early mobilization, improve breastfeeding success, shorten hospital stay, enhance maternal–infant bonding, and increase overall quality of obstetric nursing care.

Overall, the present study provides additional evidence that anxiety is an important determinant of postoperative pain among women undergoing cesarean delivery. Although the relationship identified was moderate in strength, its statistical significance and clinical relevance highlight the necessity of integrating psychological assessment into routine postoperative management. Addressing anxiety alongside conventional pain management strategies has the potential to improve postoperative recovery, optimize maternal well-being, and strengthen the quality of comprehensive nursing care in obstetric practice.

3.4 Clinical Implications

The findings of this study have important implications for postoperative nursing practice, particularly in the management of women recovering from cesarean delivery. The significant association between anxiety levels and postoperative pain intensity highlights the need to consider psychological factors as an integral component of pain management rather than focusing solely on physiological aspects. Routine assessment of anxiety during the postoperative period may assist nurses and healthcare providers in identifying patients at greater risk of experiencing severe pain and delayed recovery.

The integration of psychological screening with standard pain assessment may support a more comprehensive and patient-centered approach to postoperative care. Nurses may play a key role in implementing early interventions, including therapeutic communication, patient education regarding postoperative recovery, relaxation techniques, breathing exercises, emotional support, and family involvement. These interventions may reduce anxiety, improve pain coping mechanisms, and enhance maternal confidence during recovery.

Furthermore, the findings suggest that postoperative care protocols for women undergoing cesarean delivery should incorporate both pharmacological and non-pharmacological strategies. By addressing anxiety alongside pain management, healthcare providers may improve postoperative comfort, facilitate early mobilization, support breastfeeding initiation, and contribute to better maternal recovery outcomes. Therefore, anxiety assessment should be considered an essential component of holistic nursing care in obstetric settings.

3.5 Strengths and Limitations

This study has several strengths. First, it contributes additional evidence regarding the relationship between anxiety levels and postoperative pain intensity among women undergoing cesarean delivery, particularly within a regional hospital setting where evidence remains limited. Second, the study employed standardized instruments, namely

the Zung Self-Rating Anxiety Scale and Numeric Rating Scale, which are widely used for assessing anxiety and pain intensity in clinical populations. Third, the use of Somers' D correlation analysis was appropriate because both anxiety levels and pain intensity were measured as ordinal variables, allowing an assessment of the direction and strength of the association between the two variables.

However, several limitations should be acknowledged. First, the cross-sectional design prevents the establishment of causal relationships between anxiety and postoperative pain. Although a significant association was identified, it cannot be determined whether anxiety directly increases pain intensity or whether higher pain contributes to increased anxiety. Second, the study was conducted in a single hospital with a relatively limited sample size, which may restrict the generalizability of the findings to other healthcare settings with different patient characteristics and clinical practices. Third, several potential confounding factors that may influence postoperative pain perception, such as type of anesthesia, analgesic regimen, previous surgical experience, parity, sleep quality, social support, and individual coping mechanisms, were not analyzed in this study. Future research using longitudinal designs and multivariable analytical approaches is recommended to further explore the complex interaction between psychological factors and postoperative pain following cesarean delivery.

4. Conclusion

This study demonstrated that anxiety levels were significantly associated with postoperative wound pain intensity among women undergoing cesarean delivery at TMC Hospital, Pariaman City. The findings indicate that psychological factors, particularly anxiety, play an important role in influencing postoperative pain experiences and should be considered alongside physiological factors in maternal recovery. The results highlight the importance of integrating routine anxiety assessment into postoperative nursing care for women following cesarean delivery. Early identification of patients experiencing elevated anxiety may enable healthcare providers to implement appropriate psychological and supportive interventions, including therapeutic communication, relaxation techniques, patient education, and individualized pain management strategies.

A comprehensive approach that addresses both emotional and physical aspects of recovery may contribute to improved pain control, enhanced maternal comfort, and better postoperative outcomes. Future research involving larger multicenter populations and longitudinal designs is recommended to further explore causal relationships between anxiety and postoperative pain and to evaluate the effectiveness of targeted psychological interventions in improving recovery after cesarean delivery.

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