



Early Mobilisation and Pain Intensity in Post-Caesarean Section Patients: Implications for Nursing Care

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Abstract

Background: Cesarean delivery, or Cesarean section, is one of the most common surgical procedures performed to ensure maternal and fetal safety during childbirth. However, the procedure often results in postoperative pain caused by tissue trauma, which may hinder the mother's recovery process. Uncontrolled pain can limit physical movement, delay early mobilisation, and reduce the mother's ability to perform self-care and infant care activities. Early mobilisation is widely recognised as an important non-pharmacological nursing intervention that may help reduce pain intensity and promote faster postoperative recovery. Therefore, understanding the relationship between early mobilisation and pain intensity is important to support evidence-based nursing care.

Aims: to examine the relationship between early mobilisation and pain intensity among post-caesarean section patients at Regional Hospital, Bukittinggi. **Methods:** This study employed a quantitative approach with a cross-sectional design. The population consisted of all post-caesarean section patients hospitalised in the maternity ward during the study period. A total of 68 respondents were recruited using a total sampling technique. Data were collected using an early mobilisation observation checklist and a pain intensity measurement using the Numeric Rating Scale. Data analysis included univariate analyses to describe the distribution of variables and bivariate analyses using the Chi-square test to assess the relationship between early mobilisation and pain intensity. **Results:** Most respondents performed good early mobilisation (66.2%), and a considerable proportion experienced mild pain intensity (39.7%). Statistical analysis revealed a significant relationship between early mobilisation and pain intensity ($p = 0.001$). **Conclusions:** Early mobilisation is significantly associated with lower pain intensity among post-caesarean section patients. These findings highlight the importance of encouraging early mobilisation as part of nursing care to support pain management and enhance postoperative recovery among mothers following cesarean delivery.

Keywords: early mobilisation, cesarean section, pain intensity, postoperative pain nursing care

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Introduction

Cesarean delivery, commonly referred to as Cesarean section, is one of the most frequently performed surgical procedures worldwide and continues to increase in many countries. Although the procedure plays a critical role in preventing maternal and neonatal complications during childbirth, it is associated with postoperative pain resulting from surgical incision and tissue trauma. Postoperative pain after cesarean section can significantly affect the recovery process, limiting maternal mobility and delaying the return to normal physical functioning. Inadequate pain control may also interfere with essential postpartum activities such as breastfeeding, newborn care, and self-care, thereby affecting the overall well-being of mothers during the postpartum period (Eisenach et al., 2008; Kehlet & Joshi, 2017; Pourfathi & Farzin, 2018).

Effective pain management in postoperative cesarean patients is therefore an important component of maternal nursing care. In addition to pharmacological therapy, non-pharmacological interventions are increasingly recommended to support pain control and accelerate recovery after surgery. Among these strategies, early mobilisation has been recognised as a beneficial intervention that encourages gradual physical activity shortly after surgery. Early mobilisation may improve blood circulation, reduce postoperative complications related to immobility, enhance gastrointestinal function, and facilitate faster recovery. Importantly, early mobilisation may also influence the perception of postoperative pain by promoting physical adaptation and reducing muscle stiffness during the recovery process (Kehlet, 2011; Nelson et al., 2016).

Postoperative pain following cesarean delivery remains a significant clinical concern because it directly influences maternal recovery, physical mobility, and the ability to perform essential postpartum activities (Marfuah et al., 2019). Several studies have reported that postoperative pain is one of the main barriers that prevent mothers from initiating early movement after surgery, which can consequently delay the recovery process and prolong hospitalisation. Evidence from previous research indicates that early mobilisation may improve postoperative outcomes by enhancing blood circulation, reducing muscle stiffness, and facilitating wound healing in post-cesarean section patients (Carney et al., 2023; Djafar et al., 2022; Ulandari et al., 2022). Furthermore, other studies have suggested that structured early mobilisation programs may contribute to reduced postoperative discomfort and improved maternal functional recovery during the early postpartum period (Kasim et al., 2024; Yurashevich et al., 2019). Although these findings highlight the potential benefits of early mobilisation as a nursing intervention, most existing studies primarily focus on physiological outcomes such as wound healing, gastrointestinal recovery, and postoperative complications rather than examining its direct association with pain intensity among cesarean patients. Nurses tend to implement early mobilisation as an effort to decrease pain among post-cesarean section patients as a non-pharmacological management (Roheman et al., 2020).

In addition, several previous investigations have emphasised the importance of early mobilisation in postoperative care protocols, particularly within enhanced recovery pathways designed to accelerate surgical recovery and improve patient outcomes, especially in post-caesarean settings using Enhanced Recovery After Surgery methods (Soni et al., 2025). However, despite growing recognition of early mobilisation in clinical guidelines, empirical evidence examining its relationship with pain intensity among post-cesarean section patients remains limited and often inconsistent across healthcare settings. Some studies have used small samples, descriptive case approaches, or focused on different clinical outcomes, which limits the generalizability of their findings to broader maternal populations (Kasim et al., 2024). Early mobilisation has also been associated with reduced levels of perceived pain and improved maternal comfort during the postoperative period (Sulistiawati et al., 2024). These findings highlight the potential role of early mobilisation as an effective nursing intervention in postoperative maternal care.

Despite the recognised benefits of early mobilisation, its implementation in clinical practice remains

inconsistent across many healthcare settings (Wshah et al., 2025). Some patients may delay mobilisation due to fear of pain, concerns about surgical wound safety, or lack of adequate guidance from healthcare providers. Although early mobilisation has been widely recommended as an essential component of postoperative recovery following cesarean section, previous studies have primarily evaluated its contribution within comprehensive Enhanced Recovery After Surgery (ERAS) protocols rather than as an independent nursing intervention. ERAS pathways combine multiple perioperative strategies, including multimodal analgesia, optimised nutrition, early oral feeding, and early mobilisation, making it difficult to determine the specific contribution of early mobilisation to postoperative pain reduction (Sultan et al., 2026). Consequently, while ERAS has consistently demonstrated improved postoperative recovery, the independent relationship between routine early mobilisation and pain intensity remains insufficiently understood.

Furthermore, most published studies have emphasized outcomes such as postoperative complications, length of hospital stay, bowel function recovery, maternal functional recovery, and patient satisfaction rather than pain intensity as the primary clinical outcome (Bollag et al., 2021; Caughey et al., 2026)(Bollag et al., 2021). Although pain is one of the most common barriers preventing women from performing early mobilisation after cesarean section, relatively few observational studies have specifically investigated whether patients who achieve better mobilisation during routine postoperative nursing care also experience lower pain intensity. This evidence gap is particularly important in low- and middle-income countries, where the implementation of standardised protocols is still limited and postoperative nursing care largely depends on local clinical practices and available healthcare resources (Walker et al., 2025).

Therefore, evidence describing the relationship between routine early mobilisation and postoperative pain intensity under real-world nursing practice remains scarce. Unlike previous studies that primarily evaluated early mobilisation as one component of multimodal ERAS pathways, the present study specifically examined early mobilisation as an independent nursing intervention and explored its association with pain intensity among women following cesarean section. The findings are expected to strengthen the evidence supporting early mobilisation as a feasible and evidence-based non-pharmacological strategy for postoperative pain management in routine maternal nursing care. Then, the present study aimed to examine the relationship between early mobilisation and pain intensity among post-cesarean section patients treated at Regional Hospital in Bukittinggi, West Sumatera. This study employed a quantitative cross-sectional approach to determine whether early mobilisation is associated with lower pain intensity during the postoperative recovery period.

Methods

Study Design

This study employed a quantitative design using a cross-sectional approach to examine the relationship between early mobilisation and pain intensity among women who underwent a Cesarean section. The study was conducted among postoperative mothers hospitalised in the maternity ward of a regional public hospital in Indonesia. A cross-sectional design was considered appropriate because it allowed the researchers to measure the exposure and outcome variables during the same period of observation and to describe the relationship between early mobilisation practices and pain intensity in the postoperative phase.

Sample and Settings

The study population consisted of all mothers who underwent cesarean delivery and were hospitalised during the data collection period. The sample size included 68 respondents who met the inclusion criteria and were recruited using a total sampling technique. The inclusion criteria were postpartum mothers who had undergone cesarean section within the first 24–48 hours after surgery,

were in stable clinical condition, and were willing to participate in the study. Mothers who experienced severe postoperative complications, required intensive care, or had medical conditions that prevented mobilisation were excluded from the study. The sampling technique ensured that all eligible patients during the study period were included in the research to obtain comprehensive data regarding postoperative mobilisation practices.

Data Collection

Data were collected using two main instruments. Early mobilisation was assessed using an observation checklist developed from postoperative nursing care guidelines, which evaluated the patient's ability to perform gradual physical movements, such as turning in bed, sitting, standing, and walking, within the recommended postoperative period (Eldawati, 2018; Supriani & Rosyidah, 2024). The checklist consisted of five sequential mobility indicators, namely changing body position, leg movement, sitting, standing, and walking. As the checklist was used to objectively document the achievement of observable mobility milestones rather than to measure a latent construct, internal consistency reliability was not applicable. Prior to data collection, the checklist was reviewed by three experts in surgical nursing to ensure its content relevance, clarity, and clinical applicability.

Pain intensity was measured using the Numeric Rating Scale (NRS), which is widely used in clinical settings to assess subjective pain perception on a scale ranging from 0 (no pain) to 10 (worst possible pain). The NRS instrument has demonstrated good validity and reliability in measuring postoperative pain in various patient populations. Prior to data collection, the observation checklist used in this study was reviewed by clinical nursing experts to ensure content validity and clarity of measurement indicators (Hansen et al., 2020). Pain intensity was measured using the 11-point Numeric Rating Scale (NRS), ranging from 0 ("no pain") to 10 ("worst imaginable pain"). The NRS is a standardised pain assessment instrument that has demonstrated excellent construct validity, with strong correlations with the Visual Analogue Scale ($r = 0.86\text{--}0.95$), and good responsiveness for assessing acute postoperative pain. In addition, systematic reviews have reported that the NRS has high test–retest reliability, with an intraclass correlation coefficient (ICC) ranging from 0.95 to 0.99, making it one of the most reliable instruments for measuring pain intensity in clinical settings (Hjermstad et al., 2011).

The data collection procedure began with identifying eligible respondents based on the inclusion criteria during the postoperative hospitalisation period. After obtaining informed consent, the researchers observed the implementation of early mobilisation using the structured checklist and recorded respondents' pain intensity using the NRS. Data collection was conducted during the early postoperative recovery phase to capture the patient's experience of mobilisation and perceived pain intensity during hospitalisation.

Data analysis

Data analysis was conducted using descriptive statistics to summarise respondent characteristics and study variables, while inferential analysis using the Chi-square test was performed to examine the relationship between early mobilisation and pain intensity among post–cesarean section patients.

Ethical Consideration

Ethical approval for this study was obtained from the institutional research ethics committee prior to data collection with referral number 552/UFDK-KEPK/2025. All respondents were informed about the purpose of the study, the voluntary nature of participation, the confidentiality of their information, and their right to withdraw from the study at any time without affecting their medical care. The rights, dignity, and privacy of the participants were protected throughout the research process.

Results

A total of 68 women who underwent a caesarean section participated in this study. The findings are presented according to the study objectives, beginning with the characteristics of respondents, followed by the distribution of study variables, and concluding with the analysis of the relationship between early mobilisation and pain intensity during the postoperative period.

Table 1. Characteristics of Respondents (n = 68)

Characteristics	Category	n	%
Age	< 20 years	6	8.8
	20–35 years	46	67.6
	> 35 years	16	23.6
Education Level	Primary School	8	11.8
	Secondary School	40	58.8
	Higher Education	20	29.4
Parity	Primipara	29	42.6
	Multipara	39	57.4

Table 1 shows that the majority of respondents were aged between 20 and 35 years, accounting for 46 participants (67.6%), while 16 respondents (23.6%) were older than 35 years, and a smaller proportion were younger than 20 years (8.8%). Regarding education level, most respondents had completed secondary education (58.8%), followed by higher education (29.4%), while a smaller proportion had primary school education (11.8%). In terms of parity, more than half of the respondents were multiparous mothers (57.4%), while 42.6% were primiparous.

Table 2. Distribution of Early Mobilisation and Pain Intensity Among Post–Caesarean Section Patients (n = 68)

Variable	Category	n	%
Early Mobilization	Good	45	66.2
	Poor	23	33.8
Pain Intensity	Mild	27	39.7
	Moderate	31	45.6
	Severe	10	14.7

Table 2 indicates that most respondents demonstrated good early mobilisation (66.2%), while 33.8% showed limited mobilisation. Regarding pain intensity, the largest proportion of respondents reported moderate pain (45.6%), followed by mild pain (39.7%), with a smaller proportion reporting severe pain (14.7%).

Table 3. Descriptive Results of Early Mobilization Indicators

Variable	Mean ± SD	Min–Max
MP1 – Changing Position (Right–Left Lateral)	2.65 ± 0.79	0–4
MP2 – Leg Movement	2.87 ± 0.73	1–4
MP3 – Sitting	3.44 ± 0.68	2–5
MP4 – Standing	3.87 ± 0.71	2–5
MP5 – Walking	4.51 ± 0.72	2–5

Table 3 presents the descriptive statistics of early mobilisation indicators among patients following Caesarean section. The findings show a gradual increase in mobilisation from the initial to the more advanced stages of physical activity during the postoperative recovery period. The first mobilisation indicator, changing position from right to left lateral (MP1), had a mean score of 2.65 ± 0.79 , with values ranging from 0 to 4, indicating that patients initially demonstrated limited ability to perform positional changes during the early recovery stage. The second indicator, leg movement (MP2), showed a slightly higher mean score of 2.87 ± 0.73 , with a range of 1 to 4, suggesting that most patients were able to initiate simple lower-extremity movements shortly after surgery. Further improvement was observed in the sitting activity (MP3), which had a mean score of 3.44 ± 0.68 and a range of 2 to 5, indicating that many patients had progressed to a higher level of mobility. The standing indicator (MP4) demonstrated a mean score of 3.87 ± 0.71 , with values ranging from 2 to 5, suggesting that patients had gained greater physical stability and independence during recovery. The highest mean score was observed for the walking indicator (MP5), with a mean of 4.51 ± 0.72 and a range of 2 to 5, indicating that most patients were able to ambulate during the recovery period. Overall, these results demonstrate a progressive improvement in early mobilization activities among postoperative patients, reflecting gradual recovery of physical function and mobility.

Table 4. Relationship Between Early Mobilisation and Pain Intensity Among Post-Cesarean Section Patients

Early Mobilization	Mild Pain (%)	Moderate Pain (%)	Severe Pain (%)	Total	p-value
Good	24 (53.3)	18 (40.0)	3 (6.7)	45	0.001*
Poor	3 (13.0)	13 (56.5)	7 (30.5)	23	

* $\alpha = 0.05$

Table 4 shows that among patients who performed well in early mobilisation, the majority experienced mild pain (53.3%), while only a small proportion reported severe pain (6.7%). In contrast, among respondents who demonstrated poor mobilisation, the proportion of severe pain was higher (30.5%). Statistical analysis revealed a significant relationship between early mobilisation and pain intensity (0.000), indicating that better early mobilisation was associated with lower pain intensity during the postoperative recovery period.

Discussion

This study examined the relationship between early mobilisation and pain intensity among women who underwent a cesarean section during the postoperative recovery period. The findings demonstrate that patients who performed early mobilisation tended to experience lower pain intensity than those who had limited mobilisation during the early postoperative phase. These results support the assumption that gradual physical activity after surgery may contribute to improved physiological adaptation and reduced pain perception. Postoperative pain following cesarean delivery is commonly associated with tissue trauma, inflammatory responses, and limited movement during the early recovery phase (Ainnur Rahmanti et al., 2022). When patients remain immobile for extended periods after surgery, muscle stiffness and decreased circulation may worsen discomfort, thereby increasing the perceived intensity of pain (Andri et al., 2020; Desi, 2024).

The descriptive results of this study indicate a progressive improvement in early mobilisation activities among patients during the postoperative recovery period following Cesarean section. The gradual increase in mean scores from the initial mobilisation activities, such as changing body position and moving the legs, toward more advanced activities, including sitting, standing, and walking, reflects the natural progression of physical recovery after surgery. In the early postoperative stage, patients often experience discomfort and limited physical ability due to surgical trauma and pain, which can restrict their ability to perform basic movements. However, initiating gradual mobilisation is essential because early physical activity can stimulate blood circulation, improve muscle function, and reduce

the risk of postoperative complications associated with prolonged bed rest. Previous studies have reported that structured early mobilisation programs can accelerate recovery and support functional independence among postoperative patients by promoting physiological adaptation and improving musculoskeletal function (Anggraini et al., 2025). These findings support the present study's results, which demonstrate that early mobilisation indicators tend to improve progressively as patients adapt physically and psychologically during recovery.

The highest mean score observed in the walking indicator suggests that most patients were able to reach a relatively advanced stage of functional mobility during the postoperative period. Walking represents a critical milestone in postoperative rehabilitation because it reflects improved balance, muscle strength, and cardiovascular adaptation. Early ambulation is also associated with improved maternal outcomes, including enhanced circulation, reduced postoperative fatigue, and improved gastrointestinal recovery. Previous research has highlighted that patients who engage in early ambulation after cesarean delivery tend to demonstrate better postoperative recovery and greater independence in performing daily activities during the postpartum period (Charampel Kunjumon & Mary Iype, 2022; Rahayu et al., 2024). In addition, adequate nursing guidance and encouragement play a vital role in facilitating early mobility, as many patients initially experience fear or uncertainty about physical movement after surgery. Therefore, the progressive pattern of mobilisation observed in this study highlights the importance of structured postoperative nursing interventions and patient education to promote safe mobilisation practices and support optimal recovery outcomes among postoperative mothers.

The results of this study are consistent with previous research indicating that early mobilisation is associated with improved postoperative recovery outcomes among women undergoing cesarean section. Studies conducted in maternal health settings have reported that patients who initiate early physical activity after surgery tend to demonstrate better recovery, including faster wound healing and improved physical functioning during the postpartum period (Djafar et al., 2022). Similarly, research in postoperative care has shown that mobilisation stimulates blood circulation and promotes oxygen delivery to injured tissues, thereby potentially accelerating tissue repair and reducing inflammatory responses associated with pain (Kehlet & Joshi, 2017; Lavand'homme et al., 2020). These physiological mechanisms provide a plausible explanation for the reduced pain intensity observed among patients who actively engaged in early mobilisation activities.

Although the present study demonstrated that patients who achieved good early mobilisation generally experienced lower pain intensity, a small proportion of participants who performed good mobilisation continued to report severe postoperative pain. This finding suggests that postoperative pain is a multifactorial phenomenon and cannot be explained solely by physical activity level. Individual differences in pain perception, surgical characteristics, psychological responses, and the effectiveness of analgesic therapy may all influence pain intensity during the recovery period. Previous studies have shown that factors such as preoperative anxiety, previous pain experiences, incision length, operative duration, inflammatory responses, and individual pain thresholds can substantially affect postoperative pain regardless of the patient's mobility status (Bollag et al., 2021; Daly et al., 2017). Furthermore, some patients may remain motivated to perform early mobilisation despite experiencing considerable pain because they receive adequate education, family encouragement, or strong support from healthcare professionals. Therefore, achieving good mobilisation does not necessarily indicate complete pain relief but rather reflects the patient's ability to participate actively in postoperative recovery despite ongoing discomfort. This finding highlights the importance of combining early mobilisation with comprehensive pain assessment and individualised multimodal pain management to optimise recovery following cesarean section.

In addition to physiological factors, psychological adaptation may also influence the relationship between early mobilisation and postoperative pain perception. Early mobilisation may enhance patient confidence in performing physical movements after surgery, thereby reducing anxiety and fear

associated with wound disruption or postoperative complications. Previous studies have indicated that psychological factors such as fear of movement, uncertainty regarding postoperative recovery, and concerns about pain can significantly influence patient willingness to mobilise after surgery (Fiol et al., 2025; Zandomenico et al., 2022). When appropriate nursing guidance and encouragement are provided, patients may feel more confident initiating gradual movement, which can ultimately contribute to improved recovery outcomes and reduced pain perception.

However, despite the potential benefits of early mobilisation, its implementation in clinical practice often varies depending on patient readiness, clinical conditions, and institutional practices. Some mothers who undergo a cesarean section may delay mobilisation due to fatigue, postoperative discomfort, or lack of adequate information regarding the benefits of early movement during recovery. Previous research has suggested that structured postoperative education and consistent nursing support are essential to ensure that patients understand the importance of mobilisation in their recovery (Nelson et al., 2016). In this context, nurses play a critical role in assessing patient readiness, providing education regarding safe mobilisation techniques, and encouraging gradual activity during the early postoperative period.

The findings of this study have important implications for nursing practice in postoperative maternal care. Early mobilisation should be considered an integral component of nursing interventions designed to support recovery among women following cesarean delivery. Incorporating structured mobilisation guidance into routine postoperative care may improve pain management, accelerate functional recovery, and enhance maternal well-being during the postpartum period. Furthermore, strengthening nursing education and patient counselling regarding the benefits of early mobilisation may help reduce patient anxiety and encourage active participation in recovery activities (Risaldar, 2021). These findings also contribute to the growing body of evidence supporting the integration of non-pharmacological strategies into postoperative pain management protocols.

Despite the valuable insights generated by this study, several limitations should be acknowledged. First, the study's cross-sectional design limits the ability to establish a causal relationship between early mobilisation and pain intensity. Second, the sample size was relatively limited and drawn from a single hospital setting, which may restrict the generalizability of the findings to broader populations. Third, pain intensity was measured using a self-reported scale, which may be influenced by individual differences in pain perception and psychological responses. Future studies are recommended to employ longitudinal or experimental designs with larger and more diverse samples to further explore the causal effects of early mobilisation on postoperative pain outcomes among cesarean section patients.

Conclusion

This study demonstrated that early mobilisation is significantly associated with pain intensity among patients following Cesarean section. Patients who performed early mobilisation during the postoperative recovery period tended to experience lower pain levels than those who were more limited in mobilisation. These findings indicate that gradual physical activity after surgery may support physiological recovery and help reduce discomfort experienced by postpartum mothers. The results highlight the important role of nursing interventions in encouraging and guiding early mobilisation as part of routine postoperative care. Providing clear education and assistance for safe mobilisation may help patients adapt to physical movement after surgery, thereby improving recovery outcomes and maternal comfort. Integrating early mobilisation into postoperative nursing care protocols may therefore contribute to more effective pain management and better functional recovery among post-cesarean section patients. Future research is recommended to explore this relationship using larger sample sizes and longitudinal or experimental study designs in order to strengthen the evidence regarding the effectiveness of early mobilisation in reducing postoperative pain and enhancing

recovery outcomes among women following cesarean delivery.

Conflicts of Interest

Nothing to declare

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Author's Contribution

All authors contributed substantially to the conception, writing, revision, and final approval of this manuscript. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The dataset generated during and analyzed during the current study is available from the corresponding author upon reasonable request.

Declaration of Use of AI in Academic Writing

The author used ChatGPT and Grammarly in the writing process to improve readability and remove grammatical errors. However, he took full responsibility for the content.

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