



The Relationship Between Early Mobilization and Wound Healing After Caesarean Section in the Postpartum Ward of Sultan Suriansyah Hospital Banjarmasin

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ABSTRACT

Background: The rate of cesarean section (CS) births shows a continuous upward trend worldwide, including in Indonesia. One of the main challenges following CS is the risk of postoperative complications, particularly problems related to surgical wound recovery. Early mobilization is recognized as an effective strategy to support faster wound healing. Nevertheless, its application is frequently limited because many post-cesarean mothers experience pain and anxiety about moving after surgery. Objective: This study sought to examine the association between early mobilization practices and the wound healing process in mothers who underwent cesarean delivery at the Postpartum Ward of Sultan Suriansyah Regional Hospital, Banjarmasin. Methods: An observational analytical study with a quantitative cross-sectional design was conducted. The study involved 90 postcesarean mothers who were recruited using accidental sampling. Data collection was carried out through direct observation of early mobilization activities and assessment of wound healing using the REEDA scoring system. Statistical analysis employed the Spearman Rank correlation test with a significance level set at 95% ($\alpha = 0.05$). Results: The findings revealed that the majority of participants demonstrated adequate early mobilization behavior (92.2%), accompanied by favorable wound healing outcomes (91.1%). Correlation analysis showed a very strong and statistically significant relationship between early mobilization and postoperative wound healing in cesarean mothers ($r = -0.935$; $p < 0.001$). Conclusion: Early mobilization is strongly and significantly associated with improved wound healing following cesarean section. Mothers who engage more actively in early mobilization tend to experience better recovery of surgical wounds. Therefore, early mobilization should be emphasized and consistently implemented as a standard component of postpartum nursing care to enhance recovery after cesarean delivery.

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1. INTRODUCTION

Cesarean section (CS) has become an increasingly common method of delivery, particularly when vaginal delivery poses risks to the safety of the mother or fetus. Although this procedure is intended to save lives, mothers who undergo CS still face postoperative recovery challenges, especially those related to surgical wound healing. Globally, the proportion of deliveries performed by cesarean section reached 21.1% of all births and is projected to continue increasing to nearly 29% by 2030, which significantly exceeds the ideal rate recommended by WHO, namely 10–15%, indicating a growing trend in the use of surgical interventions in childbirth[1]. In Indonesia, data from the Basic Health Research showed that cesarean section deliveries account for 17.6%, with considerable variation across regions and

healthcare facilities. In referral hospitals, including those in South Kalimantan Province, the rate of cesarean section tends to be higher due to the large number of referred cases with obstetric complications. This increase in cesarean section rates reflects progress in access to maternal healthcare services; however, it also presents new challenges in the management of postoperative care, particularly during the postpartum period (Basic Health Research, 2023).

As a major surgical procedure, cesarean section has significant clinical consequences. Post-cesarean mothers are at risk of experiencing various postoperative complications, such as significant pain, surgical site infection, bleeding, limited mobility, and delayed wound healing. Surgical site infection following cesarean section remains one of the leading causes of maternal morbidity, which can prolong the length of hospital stay and increase healthcare costs [2]. In addition to physical effects, delayed wound healing can also impact the psychological aspects of mothers, such as increased anxiety, fear of movement, and feelings of inability to perform the maternal role, particularly in caring for and breastfeeding the infant.

Surgical wound healing does not occur instantly but proceeds through a series of interrelated biological mechanisms. This process begins with an inflammatory response as the initial stage of tissue protection, followed by the proliferative phase characterized by new tissue formation, and ends with the maturation or remodeling phase, which involves the adjustment and strengthening of the formed tissue structure. This process is highly influenced by various factors, both local and systemic, such as oxygen supply to the tissue, blood perfusion, nutritional status, metabolic condition, pain level, and the patient's level of physical activity. Adequate tissue perfusion is essential to ensure the supply of oxygen and nutrients required for cell regeneration and new tissue formation[3]. Increased blood flow to the wound area also accelerates the migration of inflammatory cells and fibroblasts, thereby speeding up the healing process (Smeltzer and Bare, 2018). Therefore, interventions that can enhance blood circulation and tissue metabolic activity have a strategic role in accelerating postoperative wound healing.

In the context of post-cesarean care, early mobilization is considered an important component of nursing and midwifery care. Early mobilization refers to efforts to encourage mothers to begin moving gradually from the early postoperative period, while taking into account their physical condition and clinical stability. This activity may begin with changes in body position in bed, then progress to sitting, standing, and eventually walking slowly according to the mother's tolerance [4]. The implementation of early mobilization helps improve blood circulation, increase oxygen supply to the tissues, and activate cellular metabolic processes, thereby supporting tissue regeneration and accelerating wound recovery. In addition, early body movement contributes to reducing the risk of postoperative complications, such as respiratory disorders, blood clot formation, elimination disorders, and urinary retention, which may delay the healing process.

Several studies have confirmed the benefits of early mobilization in post-cesarean mothers. Mothers who were able to perform optimal mobilization experienced faster wound recovery compared to those who tended to limit physical activity [5]. Early mobilization not only affects wound condition but also plays a role in reducing pain levels, increasing self-confidence, and enhancing the mother's ability to perform self-care and care for the infant (Yanti et al., 2022). This indicates that early mobilization has a broad impact, encompassing physical, psychological, and functional aspects in supporting maternal recovery after cesarean delivery.

Although early mobilization has been widely recognized as a beneficial intervention in postoperative recovery, its implementation in mothers after cesarean section still often faces various barriers. Many mothers delay or limit body movement in the early postpartum period due to pain experienced after surgery. In addition, there are concerns that physical activity may interfere with the stability of the surgical sutures, coupled with the limited information received by mothers regarding the benefits, stages, and safety aspects of early mobilization. These conditions result in early mobilization not being optimally implemented in healthcare practice. Furthermore, support from healthcare providers and family also plays a role in determining the success of early mobilization. Support and education from healthcare providers greatly influence patient compliance in performing mobilization recommendations (Kozier et al., 2018). Knowledge is also an important factor in shaping health behavior, so a lack of maternal knowledge can become a major barrier to the implementation of early mobilization[6]. This condition indicates a gap between evidence-based recommendations and practice in the field.

Preliminary findings obtained at Sultan Suriansyah Regional Hospital Banjarmasin revealed that within the period from January to August 2025, hundreds of deliveries were performed through cesarean section, reaching a total of 363 cases. However, not all mothers who underwent the procedure immediately implemented early mobilization as recommended. Some mothers reported experiencing considerable pain as well as concerns that body movement could affect the condition of the surgical wound, leading them to limit physical activity during the postpartum period. This situation reflects that the practice of early mobilization in the postpartum ward has not been optimally implemented. If this condition persists, there is a potential for slower wound recovery, an increased likelihood of postoperative complications, and prolonged hospital stays.

Therefore, special attention is required through a scientific approach to understand the role of early mobilization in the wound healing process of post-cesarean mothers in hospital-based midwifery care. In line with this condition, the main focus of this study lies in the suboptimal implementation of early mobilization and the differences in wound healing outcomes experienced by mothers after cesarean section. This study aims to systematically examine the relationship between the implementation of early mobilization and the wound healing process in post-cesarean mothers in the Postpartum Ward of Sultan Suriansyah Regional Hospital Banjarmasin. It is expected that the findings of this study will enrich scientific evidence in postpartum care practice, serve as a basis for the development and refinement of standard operating procedures related to early mobilization, and support the enhancement of the role of midwives and healthcare providers in delivering effective education and assistance. In addition, the findings are expected to contribute to reducing the risk of postoperative complications, accelerating maternal recovery, and improving the quality of midwifery services.

2. RESEARCH METHOD

This study was designed as an analytical study with a quantitative approach using an observational method. A cross-sectional approach was selected, in which the measurement of the variables studied was conducted within the same period of time. This approach was used to assess the relationship between the implementation of early mobilization and wound healing conditions in mothers who underwent cesarean section. The data analyzed were primary data, collected directly from respondents through field observation and the completion of research instruments. The population in this study consisted of post-cesarean mothers receiving care in the Postpartum Ward of Sultan Suriansyah Regional Hospital Banjarmasin during the study period. The sample was determined using an accidental sampling technique, which involved selecting respondents based on the availability of subjects encountered during data collection and who met the predetermined criteria. The inclusion criteria included mothers on the first to the third day after cesarean section, who were conscious, hemodynamically stable, and willing to participate. Meanwhile, mothers with severe postoperative complications, impaired consciousness, or those unwilling to participate were excluded from the study sample. Data collection was conducted through direct observation of early mobilization activities and surgical wound conditions using an observation instrument developed by the researcher.

The assessment of early mobilization was based on the mother's ability to perform activity stages gradually, starting from changing body position in bed, sitting, standing, and walking in accordance with postoperative care standards. Wound healing conditions were assessed using clinical indicators, including the condition of the wound edges, the presence of redness, swelling, discharge, pain level, and wound dryness. The results of these assessments were then classified into specific categories based on predetermined criteria. In this study, early mobilization served as the independent variable, categorized into good and poor based on the achievement of mobilization stages according to postoperative timing. The dependent variable was wound healing, which was also categorized into good and poor based on the evaluation results of the surgical wound condition. The instrument used had undergone review and evaluation by academic supervisors to ensure the suitability of the indicators with the research objectives. Data processing and analysis were carried out in two stages, namely univariate and bivariate analysis. Univariate analysis aimed to describe the characteristics of respondents and the frequency distribution of each research variable. Furthermore, bivariate analysis was used to examine the relationship between early mobilization and wound healing using the ChiSquare test at a significance level of 0.05.

The results of the analysis were presented in the form of tables and narrative descriptions to facilitate understanding. This study received ethical approval from the Research Ethics Committee of Universitas Muhammadiyah Banjarmasin. All stages of the study were conducted in accordance with research ethics principles, namely respect for persons, beneficence, and justice. Ethical approval was documented in the Ethical Approval Letter Number 544/UMB/KE/XI/2025. Prior to data collection, each respondent was provided with an explanation regarding the objectives, benefits, and procedures of the study, and was assured of the confidentiality of their identity as well as their freedom to refuse or withdraw participation at any time without any consequences, as evidenced by the signing of a written informed consent form.

3. RESULTS AND DISCUSSION

3.1. Results

The results of this study are presented through univariate and bivariate analyses to describe the implementation of early mobilization and wound healing conditions, as well as to examine the relationship between early mobilization and wound healing among post-cesarean section mothers. Data analysis was conducted on 90 post-cesarean section mothers who met the inclusion criteria and were treated in the Postpartum Ward of Sultan Suriansyah

Hospital Banjarmasin. The assessment of early mobilization was carried out through direct observation of mothers' activity performance, while wound healing was evaluated using the REEDA scale.

Table 1. Distributin of Early Mobilization Among Post-Cesarean Section Mothers

Early Mobilization	Frequency (n)	Percentage (%)
Good	83	92.2
Moderate	6	6.7
Poor	1	1.1
Total	90	100

Based on Table 1, it can be seen that the majority of respondents were categorized as having good early mobilization, accounting for 83 respondents (92.2%). Meanwhile, 6 respondents (6.7%) were categorized as moderate, and only 1 respondent (1.1%) was categorized as poor. These findings indicate that most post-cesarean section mothers were able to perform early mobilization appropriately during the postpartum recovery period.

Table 2. Distributin of Wound Healing Based on REEDA Scale

Wound Healing	Frequency (n)	Percentage (%)
Good	82	91.1
Moderate	4	4.4
Poor	4	4.4
Total	90	100

Based on Table 2, most respondents demonstrated good wound healing outcomes, accounting for 82 respondents (91.1%). Meanwhile, 4 respondents (4.4%) experienced moderate wound healing and another 4 respondents (4.4%) were categorized as poor. These findings indicate that the majority of mothers experienced optimal postoperative wound recovery following cesarean section.

Table 3. The Relationship Between Early Mobilization and Wound Healing in Post-Cesarean Section Mothers

Variables	Correlation Coefficient (r)	p-value
Early mobilization and wound healing	-0.935	<0.001

Based on the results of the Spearman Rank correlation test shown in Table 3, the correlation coefficient obtained was $r = -0.935$ with a significance value of $p < 0.001$. These findings indicate that there is a very strong and statistically significant relationship between early mobilization and wound healing among post-cesarean section mothers. The negative correlation value indicates that better implementation of early mobilization is associated with lower REEDA scores, reflecting improved wound healing conditions. Physiologically, early mobilization enhances blood circulation, improves tissue perfusion, and increases oxygen and nutrient supply to the surgical wound area, thereby accelerating the wound healing process.

3.2. Discussions

The research findings indicate that the majority of mothers who underwent post-cesarean section care demonstrated a high level of adherence to early mobilization practices. Of the 90 respondents, nearly all were classified in the optimal early mobilization group, while only a small proportion fell into the moderate category, and very few had not adequately implemented early mobilization. This finding suggests that postpartum care practices implemented at Sultan Suriansyah Regional Hospital in Banjarmasin have supported mothers in gradually resuming physical activity from the early recovery period.

This achievement cannot be separated from the role of healthcare providers in delivering information, guidance, and supervision during the postoperative period, as well as the implementation of standardized care procedures. Through this approach, mothers become more physically and psychologically prepared to initiate early mobilization. However, the presence of respondents who were not fully able to perform early mobilization indicates that the recovery process varies among individuals. Postoperative pain, concerns about the safety of the surgical wound, differences in pain thresholds, and variations in family support are factors that may hinder mobilization. Previous studies have also identified these factors as common causes of delayed early mobilization in post-cesarean section mothers [4].



Based on the evaluation of surgical wound conditions using the REEDA instrument, it was found that most post-cesarean section mothers exhibited satisfactory healing levels. Nearly all respondents had scores categorized as good healing, while only a small proportion fell into moderate and poor categories. This finding indicates that the tissue recovery process in the majority of mothers proceeded according to the expected stages of wound healing. Optimal wound healing was reflected in minimal clinical signs of inflammation, such as limited redness and swelling at the wound site, absence of significant bruising, minimal exudate, and well-approximated wound edges.

These results suggest that postoperative wound care management has been effectively implemented. Proper wound care practices, maintaining incision site hygiene, continuous monitoring by healthcare providers, and adherence of mothers to postoperative care instructions are important components that collectively contribute to successful wound healing [7][5]

The measurement of wound healing using the REEDA scale also showed that most mothers' surgical wounds were in good condition after cesarean section. The dominance of high scores indicates that only a small number of respondents experienced moderate or poor healing. This suggests that tissue repair mechanisms in most mothers progressed normally and in accordance with physiological wound healing processes.

Physiologically, early mobilization plays a role in improving systemic and peripheral blood circulation, enhancing tissue perfusion, and increasing the supply of oxygen and nutrients to the wound area. These conditions are crucial during the inflammatory and proliferative phases of wound healing, as oxygen and nutrients are essential for collagen synthesis, granulation tissue formation, and epithelialization. In addition, early mobilization helps prevent venous stasis and edema, which, if prolonged, can inhibit oxygen diffusion to the wound tissue and delay the healing process. This mechanism is consistent with wound healing theory, which states that adequate tissue perfusion is a key determinant of successful tissue regeneration [8][9].

Beyond physiological mechanisms, the relationship between early mobilization and wound healing is also influenced by various clinical and psychosocial factors. These include postoperative pain levels, use of analgesics, maternal nutritional status, age, parity, comorbidities such as anemia or diabetes, anxiety levels, and family support. Uncontrolled pain may hinder movement, leading to delayed mobilization and reduced wound tissue perfusion. Conversely, adequate pain management improves the mother's ability to perform early mobilization, thereby accelerating wound healing. This is consistent with findings by [4],[3],[10], which highlight the importance of pain control, maternal motivation, and support from healthcare providers and family.

Nutritional status is also an important factor mediating the relationship between early mobilization and wound healing. Adequate intake of protein, iron, vitamin C, and zinc plays a role in collagen synthesis and tissue repair. Mothers with good nutritional status tend to have more optimal wound healing capacity, thereby maximizing the positive effects of early mobilization. Conversely, anemia or malnutrition can delay healing, even when early mobilization is properly performed. These findings are consistent with studies by [5][2], which emphasize the importance of nutrition and overall health status in surgical wound healing.

The results of this study also strengthen evidence that early mobilization contributes to reducing the risk of surgical wound infection. Increased blood flow resulting from early mobilization enhances the local immune response, thereby suppressing microbial growth in the wound area. Thus, early mobilization not only accelerates structural wound healing but also serves as a protective factor against postoperative infection complications. This is in line with findings by [7], which indicate that good tissue perfusion and light physical activity after surgery are associated with reduced incidence of surgical site infections.

In the context of midwifery care, these findings emphasize that early mobilization is a multidimensional intervention that affects not only the physical aspect of wound healing but also psychological and functional aspects of the mother. Early mobilization increases maternal confidence, accelerates independence in daily activities, and facilitates adaptation in caring for the newborn. With a very strong correlation value, this study provides strong empirical evidence to reinforce early mobilization as a key component in the standard care of post-cesarean section mothers. Therefore, midwives and healthcare providers should integrate early mobilization education, pain management, wound monitoring, and psychosocial support into a comprehensive intervention package.

The novelty of this study lies in the use of the REEDA scale as an objective indicator to assess wound healing quality and its direct association with the level of early mobilization implementation in a referral hospital in South Kalimantan. This approach provides a more specific description of wound healing quality compared to previous studies, which often focused on length of hospital stay or general recovery. Therefore, this study contributes scientific evidence by strengthening the implementation of evidence-based practice in postpartum care, particularly in optimizing early mobilization as a primary strategy to accelerate post-cesarean section wound healing.

This study has several limitations that should be considered when interpreting the findings. The non-interventional study design limits the ability to establish a causal relationship between variables, so the results only

describe associations. In addition, several factors that may influence wound healing, such as maternal nutritional status, anemia, and comorbidities, could not be fully controlled. The use of accidental sampling may also lead to uneven sample characteristics, which can affect the generalizability of the findings.

Another limitation is that wound healing assessment was conducted only during the hospital stay. As a result, the dynamics of wound healing after discharge were not observed, and long-term recovery outcomes could not be comprehensively assessed. Future studies are recommended to apply longitudinal or interventional research designs and to better control confounding variables. Such approaches are expected to provide stronger and more comprehensive scientific evidence regarding the effect of early mobilization on post-cesarean section wound healing.

4. CONCLUSION

This study found that 92.2% of post-cesarean section mothers performed early mobilization appropriately, while 91.1% demonstrated good wound healing outcomes based on the REEDA assessment. Statistical analysis showed a very strong and significant relationship between early mobilization and wound healing ($r = -0.935$; $p < 0.001$). These findings indicate that proper implementation of early mobilization plays an important role in supporting and accelerating postoperative wound healing in mothers after cesarean section at Sultan Suriansyah Hospital Banjarmasin.

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REFERENCES

- [1] World Health Organization, "Intrapartum Care For A Positive Childbirth Experience."
- [2] Albaharnah, S., Alshammari, M., Alzahrani, A., & Hassan R, "Factors affecting surgical wound healing and postoperative recovery: A systematic review," *Int. J. Nurs. Sci.*, vol. 11, no. 2, pp. 145–152, 2024, [Online]. Available: <https://doi.org/10.1016/j.ijnss.2024.02.005>
- [3] Marsaoly, M., Rahman, F., & Hidayat R, "Pengaruh mobilisasi dini terhadap pemulihan ibu post sectio caesarea," *J. Keperawatan Terap.*, vol. 10, no. 1, pp. 33–40, 2024.
- [4] Armayanti, L. Y., Nataningrat, A. A. I., & Sumiari Tangkas N. M. K, "Hubungan mobilisasi dini terhadap penyembuhan luka sectio caesarea (SC) di ruang nifas rumah sakit umum daerah Klungkung," *J. Ris. Kesehat. Nas.*, vol. 8, no. 1, pp. 45–52, 2024, [Online]. Available: <https://doi.org/10.37294/jrkn.v8i1>
- [5] Putri, D. A., & Rahmawati I, "Faktor-faktor yang memengaruhi penyembuhan luka operasi pada ibu post sectio caesarea," *J. Kebidanan Indones.*, vol. 15, no. 1, pp. 12–20, 2024.
- [6] Notoatmodjo, *Metodologi Penelitian Kesehatan*. 2018.
- [7] Setiawati, N., Lestari, P., & Wahyuni S, "Perawatan luka dan proses penyembuhan pada ibu post operasi sectio caesarea," *J. Keperawatan Klin.*, vol. 7, no. 2, pp. 101–108, 2023.
- [8] Osayande A. S, "Physiology of wound healing and the role of tissue perfusion," *J. Wound Care*, vol. 32, no. 5, pp. 256–262, 2023, [Online]. Available: <https://doi.org/10.12968/jowc.2023.32.5.256>
- [9] Negese, T., & Belachew T, "Determinants of surgical wound healing among postoperative patients: A hospital-based study," *BMC Nurs.*, vol. 22, no. 1, pp. 1–9, 2023, [Online]. Available: <https://doi.org/10.1186/s12912-023-01345-7>
- [10] Anggraini, N., & Novianes N., "Pengaruh edukasi pada ibu terhadap mobilisasi dini post sectio caesarea (SC) di RS Harapan Mulia Bekasi," *J. Ners*, vol. 9, no. 4, pp. 7541–7543., 2025.