

THE EFFECT OF EARLY MOBILIZATION ON THE ACCELERATION OF POSTOPERATIVE WOUND HEALING IN THE SURGICAL INPATIENT WARD OF ACEH BESAR REGIONAL HOSPITAL

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ABSTRACT

Post-operative wound healing and length of stay are common problems, due to physiological, psychological, and health care system factors, including pain, physical weakness, fear and anxiety, lack of motivation, and inadequate pre- and post-operative education. Early mobilization is an important non-pharmacological intervention in the patient's recovery process after surgery. This study aimed to determine the effect of early mobilization on the acceleration of postoperative wound healing in the Surgical Inpatient Room of RSUD Aceh Besar. This research used a quantitative method with a quasi-experimental design, applying a one-group pre- test and post-test approach without a control group. The

sample consisted of 36 respondents, selected using accidental sampling technique. Data were collected from June 13 to July 18, 2025, using the REEDA observation sheet, which includes five indicators: redness, edema, ecchymosis, discharge, and approximation. The results showed that before the intervention, most respondents were in the slow healing category (94.4%). After the early mobilization intervention, there was a significant decrease in REEDA scores, with 86.1% of respondents falling into the fast healing category. The Wilcoxon Signed-Rank Test showed a Z value of -5.114 and a p-value of 0.000 ($p < 0.05$), indicating a significant effect of early mobilization on the acceleration of postoperative wound healing.

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INTRODUCTION

Early mobilization refers to physical activities performed by patients, such as sitting, standing, walking, or other light activities, which are initiated as soon as possible after surgical procedures. The purpose of early mobilization is to accelerate the wound healing process, reduce postoperative complications, and improve the overall quality of life of patients (Rangkuti et al., 2023). Early mobilization has been shown to provide positive

effects by accelerating wound healing, reducing the risk of infection, and preventing other complications such as deep vein thrombosis and pneumonia. Several studies conducted over the past five years have demonstrated a relationship between early mobilization and improvements in postoperative conditions. However, despite the promising results, the implementation of early mobilization in medical practice is not always easy, particularly in patients with certain conditions that require extra attention (Rottie & Saragih, 2019).

Early mobilization can improve blood circulation, accelerate metabolic processes, and increase the supply of oxygen and nutrients to the wound area. These processes are essential for accelerating wound healing. In addition, early mobilization can speed up the recovery of organ functions affected by surgery and reduce patient dependence on analgesic medications (Castelino et al., 2016). Early mobilization has also been shown to reduce the incidence of postoperative complications such as pneumonia, thrombosis, and infection. In patients undergoing abdominal surgery, early mobilization can accelerate wound healing and shorten the length of hospital stay (Behairy et al., 2024).

The role of nurses in early postoperative mobilization is crucial in accelerating patient recovery. Nurses are responsible for monitoring and assisting patients in performing light physical activities such as sitting, standing, or walking after surgery. Early mobilization helps prevent complications such as deep vein thrombosis and pneumonia while accelerating wound healing. In addition, nurses provide education to patients and their families regarding the benefits of early mobilization and ensure that mobilization procedures are carried out according to the patient's condition. Collaboration between nurses and other healthcare professionals is essential in determining the appropriate type and timing of mobilization (Castelino et al., 2016).

Furthermore, it is important to consider the type of surgery performed, as early mobilization may pose risks if not implemented carefully in certain patients, such as those undergoing thoracic surgery or orthopedic surgery involving bone recovery or other hard tissues. Therefore, adjustments based on the type of surgery and the patient's medical condition are essential when planning appropriate early mobilization (Klein et al., 2015).

On the other hand, psychological factors also play a significant role in the implementation of early mobilization. Fear or anxiety experienced by postoperative patients may hinder their willingness to move. Psychological education and emotional support provided by the healthcare team can help patients become more prepared to

perform early mobilization. Psychological support can increase patient motivation to participate in early mobilization programs (Klein et al., 2015).

Globally, surgery is often the only therapy that can alleviate disability and reduce the risk of death due to general health conditions. Each year, millions of people undergo surgical treatment, and surgical interventions are estimated to account for 13% of total disability-adjusted life years worldwide. In 2017, it was recorded that 140 million patients were treated in hospitals worldwide, which increased to 148 million in 2019. In Indonesia alone, the number reached 1.2 million patients in 2019. It is estimated that approximately 165 million surgical procedures are performed worldwide each year. In 2020, there were 234 million clients treated in hospitals globally. In Indonesia, surgical procedures in 2020 reached up to 1.2 million cases (WHO, 2020). According to data from the Indonesian Ministry of Health (2021), surgical procedures ranked 11th out of 50 disease management categories in Indonesia, with 32% being elective surgeries (Ramadhan et al., 2023).

In Aceh Province, based on data obtained by the researchers, throughout 2021 there were 42,124 visits to the Surgical Outpatient Clinic at RSUD dr. Zainoel Abidin. These visits included both preoperative consultations and postoperative follow-up visits after patients underwent surgical procedures (Diskominfo Aceh, 2021).

Preliminary data showed that the number of patients treated in the inpatient ward during the period of October to December 2024 was 143 patients, consisting of 51 patients in October, 43 patients in November, and 49 patients in December. Based on the most frequent diagnoses, the top five diseases identified were gastroenteritis and colitis of unspecified origin (A09.9) with 144 cases, unspecified pneumonia (J18.9) with 142 cases, dyspepsia (K30) with 138 cases, type 2 diabetes mellitus without complications (E11.9) with 75 cases, and benign neoplasms of connective and other soft tissues, unspecified (D21.9) with 69 cases. Most patients were discharged alive, with mortality recorded only in two diagnoses, namely pneumonia and type 2 diabetes mellitus (RSUD Aceh Besar, 2025).

Based on interviews with eight postoperative patients in the Surgical Inpatient Ward, most patients reported difficulty initiating movement after surgery. Six out of eight patients expressed concerns about pain or discomfort when attempting to move. The remaining two patients were more cooperative and began early mobilization within their ability limits. They reported experiencing benefits from early mobilization, such as

reduced stiffness and faster wound healing. However, many patients were still unaware of the importance of early mobilization for the wound healing process and tended to focus more on overall physical recovery. In addition, discomfort and fear of possible infection were also barriers to the implementation of early mobilization.

This study aims to see whether early mobilization intervention can reduce the level of inflammation and stress in the body, which plays a role in accelerating the wound healing process, as well as improving respiratory function, circulation, and endurance which supports the wound healing process and improves the general well-being of patients using the REEDA observation sheet, which consists of five indicator

Based on the above phenomena, the researchers were interested in conducting a study entitled "The Effect of Early Mobilization on the Acceleration of Postoperative Wound Healing in the Surgical Inpatient Ward of Aceh Besar Regional Hospital."

METHODS

This study was a quantitative study using a quasi-experimental method with a one-group pre-test and post-test design without a control group. The study began with an initial observation (pre-test) of postoperative wounds, which allowed the researchers to examine changes that occurred after the intervention (post-test) in the form of early postoperative mobilization. The study aimed to analyze the effect of early mobilization on the acceleration of postoperative wound healing in the Surgical Inpatient Ward of Aceh Besar Regional Hospital.

Population

The population in this study consisted of all postoperative surgical inpatients treated in the Surgical Inpatient Ward of Aceh Besar Regional Hospital during the last three months, with an average of 57 patients.

Sample

Based on the population, the number of samples used in this study was 36 respondents selected using an accidental sampling technique. The researchers established inclusion and exclusion criteria for the study sample.

RESULTS AND DISCUSSION

RESULTS

Table 1. Demographic Characteristics of Research Subjects (N = 36)

Karakteristik	Frekuensi (N = 36)	Presentase (%)
Age		
School-Age Children	1	2,8
Adolesecents	7	19,4
Early Adulthood	6	16,7
Late Adulthood	8	22,2
Middle Adulthood	9	25,0
Seniors	5	13,9
Gender		
Male	23	63,9
Female	13	36,1
Education		
Elementary School	7	19,4
Middle School	8	22,2
High School	14	38,9
University	7	19,4
Occupation		
Housewife	6	16,7
Student	9	25,0
Retiree	1	2,8
Farmer	6	16,7
Civil Servant	3	8,3
Private Employee	3	8,3
Self-Employed	8	22,2
Total	36	100

Middle Adult age group (9 (25.0%)), the majority of respondents were male (23 (63.9%). The education level of the majority of respondents was high school (14 (38.9%). Type of occupation, the majority of respondents were students (9 (25.0%). These characteristics can affect the level of physical activity and compliance with early mobilization interventions provided post-surgery.

1. REEDA Scores of Postoperative Wounds Before Early Mobilization

Tabel 1. Frequency Distribution of REEDA Score Identification in Postoperative Wounds Before Early Mobilization in Patients at the Surgical Inpatient Ward of Aceh Besar Regional Hospital (N = 36)

REEDA Score Before Early Mobilization	Frequency (N = 36)	Percentage (%)
Fast wound healing	2	5,6%
Slow wound healing	34	94,4%
Total	36	100,0%

Based on the analysis, it was found that before the early mobilization intervention, most respondents were categorized as experiencing slow wound healing, with 34 respondents (94.4%). Meanwhile, only 2 respondents (5.6%) were classified in the fast

healing category. These findings indicate that prior to the intervention, the majority of respondents experienced a slow postoperative wound healing process.

2. REEDA Scores of Postoperative Wounds After Early Mobilization

Tabel 2. Frequency Distribution of REEDA Score Identification in Postoperative Wounds After Early Mobilization in Patients at the Surgical Inpatient Ward of Aceh Besar Regional Hospital (N = 36)

REEDA Score After Early Mobilization	Frequency (N = 36)	Percentage (%)
Fast wound healing	31	86,1%
Slow wound healing	5	13,9%
Total	36	100,0%

After the early mobilization intervention was implemented, most respondents were categorized as experiencing fast wound healing, with 31 respondents (86.1%). Meanwhile, only 5 respondents (13.9%) remained in the slow healing category. These results demonstrate a significant improvement in postoperative wound healing following the intervention. The majority of respondents showed a reduction in REEDA scores, indicating decreased inflammation, edema, and signs of wound infection.

3. Effect of Early Mobilization on the Acceleration of Postoperative Wound Healing

Tabel 3. Effect of Early Mobilization on the Acceleration of Postoperative Wound Healing in the Surgical Inpatient Ward of Aceh Besar Regional Hospital (N = 36)

Group Comparison	N	Mean Rank	Sum of Ranks	Z value	p-value
REEDA Score After - Before Intervention (Negative Ranks)	34				
REEDA Score After - Before Intervention (Positive Ranks)	0	17,50	595,00	5,114	0,000
Ties	2				
Total	36				

Based on the Wilcoxon Signed-Rank Test, the analysis showed a significant difference between REEDA scores before and after early mobilization intervention in postoperative patients. The test produced a Z value of -5.114 and a p-value of 0.000 ($p < 0.05$), indicating that early mobilization had a statistically significant effect on accelerating postoperative wound healing. The negative Z value indicates that most respondents experienced a decrease in REEDA scores after the intervention, which reflects improvement in wound condition.

DISCUSSION

The results of this study indicate a significant difference between REEDA scores before and after early mobilization intervention in postoperative patients treated in the Surgical Inpatient Ward of Aceh Besar Regional Hospital, with a p-value of 0.000 ($p < 0.05$). These findings demonstrate that early mobilization has a statistically significant effect on accelerating postoperative wound healing.

The postoperative phase is a critical period in patient recovery following surgical procedures. According to (Mazda et al., 2021), this phase begins immediately after surgery until the patient reaches a stable condition, both physiologically and psychologically. During this period, various aspects such as vital sign monitoring, pain management, complication prevention, and wound healing must be closely observed. The success of this phase determines overall surgical outcomes and influences length of hospital stay, complication risk, and patient quality of life after discharge.

As stated by (G, 2017), common postoperative complications include wound infection, dehiscence (reopening of the surgical wound), and evisceration (protrusion of internal organs through an open wound). These complications not only worsen patient prognosis but also increase healthcare costs, prolong hospitalization, and pose psychological risks. Therefore, healthcare professionals must adopt interventions that are proven effective in accelerating healing and reducing complication risks.

One intervention that has gained increasing attention in nursing and surgical practice is early mobilization. Early mobilization refers to the gradual initiation of physical activity shortly after surgery, based on patient condition and tolerance (Tazreean et al., 2022). This intervention has been shown to provide numerous benefits, including improved blood circulation, accelerated wound healing, pain reduction, and prevention of complications such as deep vein thrombosis and pulmonary embolism. In addition to physical benefits, early mobilization also has a significant impact on psychological aspects, including reducing anxiety and increasing patient confidence (Turan et al., 2023).

According to (LeMone, 2019), early mobilization is implemented gradually, starting from passive mobilization to independent ambulation. In the early stages, patients may only perform passive movements such as ankle or hand rotations with nursing assistance. As patient condition improves, activity levels progress to limited active mobilization, sitting on the bed or chair, standing, short-distance walking, and eventually independent ambulation with increased duration. Each stage is designed with consideration for safety, comfort, and recovery effectiveness.

(G, 2017) stated that the primary goal of early mobilization is to accelerate wound healing and prevent complications associated with immobility. Early mobilization improves blood circulation, which is essential for delivering oxygen and nutrients to the wound area, supports lymphatic system function to reduce edema, and optimizes immune system performance to prevent infection. Gradual physical activity also stimulates fibroblast activity and collagen production, which are critical components of the proliferative phase of wound healing.

Consistent with the study by Asnaniar et al. (2023), health education regarding early mobilization significantly increases patient and family knowledge, which subsequently improves postoperative mobilization practices. After receiving education through lectures and demonstrations, 83.33% of patients and families demonstrated good knowledge of early mobilization. This highlights the importance of nurses' roles in providing education and facilitating patient participation in recovery, ultimately supporting wound healing.

A study by (Arif et al., 2021) conducted at RSUD Dr. Achmad Mochtar Bukittinggi showed that among 28 post-laparotomy patients, only 10 performed early mobilization. Patients who did not mobilize early exhibited poorer wound conditions, such as redness and exudation on the third postoperative day. After early mobilization intervention, wound condition scores decreased significantly from an average of 4.40 to 1.40, indicating improved wound healing. With a p-value of 0.000, the study statistically confirmed that early mobilization is highly effective in accelerating postoperative wound healing, consistent with the findings of the present study.

Further supported by (Yuliana et al., 2021), significant differences were found between intervention and control groups in terms of wound healing ($p = 0.047$) and increased physical activity ($p = 0.005$). These findings reinforce evidence that early mobilization not only accelerates wound healing but also enhances patient functional capacity, demonstrating its multifactorial effects on both physiological and psychosocial aspects.

(Ananda et al., 2021) identified lack of mobilization as one of the main factors inhibiting wound healing. Their case study demonstrated that early mobilization accelerated wound healing without signs of infection. Patients who mobilized early showed favorable wound outcomes during the initial postoperative days. This emphasizes that early mobilization should be applied not only in major surgeries such as laparotomy but also in relatively minor procedures such as appendectomy.

Similarly, (Sirait et al., 2024) conducted a quantitative study using a post-test only design with a time-series approach involving 11 appendectomy patients. The mean wound healing score on postoperative day 2 (H2) was 2.909, which decreased to 1.545 by postoperative day 4 (H4), indicating significant improvement. The Wilcoxon test showed a calculated value of $0.000 < W_{table}$, confirming a significant effect of early mobilization on wound healing. This study also emphasized the importance of mobilization timing, recommending initiation between 2 and 48 hours postoperatively for optimal outcomes.

Consistent with the study conducted by (Xavier et al., 2024), which evaluated an early postoperative mobilization protocol following abdominal surgery, it was found that 60% of patients in the intervention group achieved independent mobility by postoperative day six, compared to only 50% in the control group. In addition, mobility scores and patient satisfaction were significantly higher in the intervention group ($p = 0.0001$). This study adds an important dimension by highlighting the relationship between early mobilization and functional recovery outcomes in postoperative patients. These findings are further strengthened by the study of (Ananda et al., 2021), which identified lack of mobilization as one of the main factors inhibiting wound healing. Their case study demonstrated that the implementation of early mobilization was able to accelerate wound healing without any signs of infection. Patients who initiated mobilization early showed favorable wound outcomes during the initial postoperative days. These results confirm that early mobilization should not only be applied in major surgical procedures such as laparotomy but should also be implemented in relatively less invasive surgeries, such as appendectomy.

In line with this, (Sirait et al., 2024) conducted a quantitative study using a post-test only design with a time-series approach involving 11 post-appendectomy patients. The mean wound healing score on postoperative day two (H2) was 2.909, which decreased to 1.545 by postoperative day four (H4), indicating a significant improvement in wound healing. The Wilcoxon test showed a calculated value of $0.000 < W_{table}$, indicating a statistically significant effect of early mobilization on wound healing. This study also emphasized the importance of timing in early mobilization, recommending initiation between 2 and 48 hours postoperatively to achieve optimal outcomes.

A study employing a more rigorous design was conducted by (Vermişli et al., 2022) in the form of a randomized controlled trial involving patients who underwent radical cystectomy and ileal conduit surgery. Patients in the intervention group were mobilized within the first 16 hours after surgery, and the results demonstrated that length of

hospital stay, duration of analgesic use, and time to recovery of gastrointestinal function (flatus and defecation) were significantly shorter compared to the control group. Furthermore, patient quality of life scores, including physical function and general health perception, were significantly higher in the early mobilization group. These findings not only reinforce the effect of mobilization on wound healing but also extend its impact to functional recovery and long-term patient well-being.

When compared with the findings of the present study, a similar pattern emerges, indicating that early mobilization has a significant impact on accelerating wound healing. In this study, REEDA scores decreased significantly after the early mobilization intervention, consistent with findings from other studies that utilized wound assessment scales or inflammatory indicators. The primary strength of this study lies in confirming that a simple non-pharmacological intervention such as early mobilization, when implemented consistently and progressively by nursing personnel, can significantly accelerate the postoperative wound healing process.

At the beginning of the study, postoperative wound conditions among patients in the Surgical Inpatient Ward of Aceh Besar Regional Hospital generally exhibited pronounced signs of inflammation. Based on REEDA scores, many patients experienced redness, edema, and wound discharge, indicating an active inflammatory process. Although this response represents the body's natural reaction to surgical trauma, prolonged inflammation can hinder the wound healing process. Following the implementation of early mobilization, significant improvements in wound conditions were observed. REEDA scores decreased substantially, indicating reductions in redness, swelling, and wound exudate. Wound approximation also showed improvement, suggesting enhanced tissue regeneration and better wound closure. These findings indicate that early mobilization plays a role in accelerating wound healing by improving circulation and reducing local complications such as edema and infection.

The results of this study demonstrate that early mobilization has a significant effect on accelerating postoperative wound healing. These findings provide important clinical implications for nursing practice and postoperative management in surgical inpatient settings. The implementation of early mobilization not only accelerates wound healing but also reduces the risk of complications such as wound infection, dehiscence, and edema formation. Therefore, early mobilization should be positioned as an integral component of standard postoperative care.

Based on the conditions and findings observed during the study in the Surgical Inpatient Ward of Aceh Besar Regional Hospital, the researchers assume that the effect of early mobilization on accelerated wound healing is driven by several contextual factors. Postoperative patients in this ward generally experience reduced mobility, which limits blood flow to the wound area and subsequently slows the distribution of oxygen and nutrients essential for tissue regeneration. Through the implementation of early mobilization interventions, blood flow to the wound is expected to increase, thereby directly supporting the healing process. In addition, early mobilization is believed to reduce edema commonly experienced by patients and decrease the risk of infection, both of which can delay wound healing. Therefore, based on direct field observations and REEDA score measurements, the researchers assume that early mobilization contributes substantially to accelerating the transition of patients from the inflammatory phase to a more effective wound healing phase.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this study, the following conclusions can be drawn:

1. Before early mobilization intervention, REEDA scores of postoperative patients in the Surgical Inpatient Ward of Aceh Besar Regional Hospital were predominantly categorized as slow healing, with 34 respondents (94.4%).
2. After early mobilization intervention, REEDA scores were predominantly categorized as fast healing, with 31 respondents (86.1%).
3. The Wilcoxon Signed-Rank Test yielded a Z value of -5.114 and a p-value of 0.000 ($p < 0.05$), indicating a statistically significant effect of early mobilization on the acceleration of postoperative wound healing among patients in the Surgical Inpatient Ward of Aceh Besar Regional Hospital.

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