
Education And Implementation Of Early Mobilization Towards Achievement Of Enhanced Recovery After Surgery (ERAS) In Post-General Anesthesia Patients At Siaga Medika Hospital, Purbalingga

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Abstract

Surgical procedures may lead to postoperative complications such as pain, respiratory disorders, decreased muscle function, and limited mobility, which can delay recovery. Early mobilization is a key component of the Enhanced Recovery After Surgery (ERAS) protocol to accelerate recovery and reduce these complications. This community service activity aimed to improve patients' knowledge and optimize ERAS achievement in post-general anesthesia patients through education and the implementation of early mobilization at Siaga Medika General Hospital, Purbalingga. The implementation methods included education and demonstrations of deep breathing exercises, effective coughing, and Range of Motion (ROM) exercises within the first 6–24 hours postoperatively. Evaluation was conducted using pre–post education questionnaires and ERAS achievement observation sheets. A total of 38 patients participated, with characteristics based on age, gender, and type of surgery. The results showed a significant increase in knowledge, with all participants reaching a very good category after the education. A total of 36 participants (94.7%) achieved ERAS targets, while 2 participants (5.3%) did not achieve them due to pediatric age and invasive surgical procedures affecting pain tolerance. Education and implementation of early mobilization were proven to improve patient knowledge and support optimal ERAS achievement.

Keywords: Early Mobilization, Eras, General Anesthesia, Education.

INTRODUCTION

Surgical procedures are widely performed worldwide and play a crucial role in managing various health conditions. However, major surgeries carry a significant risk of postoperative complications, including pain, respiratory disorders, decreased muscle strength, and limited mobility, which may worsen patient outcomes, increase mortality rates, and impose additional burdens on healthcare systems and patients (Saputra et al., 2023). To manage intraoperative pain, general anesthesia is commonly administered, inducing a reversible state of unconsciousness, analgesia, and amnesia. As a result, patients are unable to recall events during surgery and anesthesia (Millizia et al., 2023).

According to the World Health Organization (WHO, 2020), more than 313 million surgical procedures are performed annually worldwide. Nevertheless, an estimated additional 143 million procedures are still needed in low- and middle-income countries to prevent mortality and disability. In Indonesia, surgical procedures reached approximately 1.2 million cases in 2020. Despite these advancements, postoperative complications remain a major concern, particularly those associated with immobility, such as impaired gas exchange, muscle weakness, joint stiffness, and delayed functional recovery (Westerdahl et al., 2024).

One evidence-based approach to improving postoperative outcomes is the Enhanced Recovery After Surgery (ERAS) protocol. ERAS is a multidisciplinary perioperative care pathway designed to enhance recovery through a combination of scientifically supported interventions. Its implementation has been shown to improve patient mobilization, reduce postoperative complications, shorten hospital length of stay, and lower healthcare costs when applied appropriately (Altman et al., 2019; Moningi et al., 2019).

Early mobilization is a fundamental component of ERAS. It aims to prevent catabolic changes due to prolonged immobilization, maintain muscle strength, and promote physiological recovery. Postoperative mobilization also plays an essential role in preventing musculoskeletal stiffness,

reducing pain, and restoring organ function, thereby accelerating wound healing. In addition, physical movement contributes to psychological well-being, reducing stress and supporting overall recovery (Asnaniar et al., 2023).

Failure to implement early mobilization may lead to serious complications, including increased body temperature as an early sign of infection, abnormal bleeding due to impaired circulation, and delayed uterine involution in postoperative obstetric or gynecological patients. These conditions highlight the importance of physical activity in stimulating circulation and supporting recovery processes (Daiyana et al., 2024).

Previous studies have demonstrated the effectiveness of ERAS combined with prehabilitation programs in improving postoperative outcomes. For instance, Ploussard (2020) reported reduced hospital stays and lower costs among patients undergoing prostatectomy after implementing ERAS pathways. Furthermore, educational interventions incorporating visual and multimedia approaches have been shown to improve patient understanding and adherence to mobilization protocols (Jones, 2019). A narrative review by Tazreean (2022) also confirmed that early mobilization is safe and effective in reducing postoperative complications, enhancing functional recovery, shortening hospitalization duration, and improving quality of life. Despite existing barriers, these challenges can be addressed through education, technology utilization, and multidisciplinary collaboration.

In Indonesia, the application of ERAS, particularly early mobilization, is still not fully optimized in many healthcare settings. At Siaga Medika General Hospital, Purbalingga, preliminary findings indicated that although postoperative pain management aligns with ERAS principles, early mobilization has not been consistently implemented. Data from April 2025 showed that 298 out of 686 surgical patients underwent procedures under general anesthesia, yet mobilization practices remained suboptimal.

Based on these findings and supported by previous evidence, early mobilization has significant potential to enhance postoperative recovery as part of ERAS implementation. However, this approach has not yet been systematically applied in the study setting. Therefore, this study aims to evaluate the effect of education and implementation of early mobilization on the achievement of ERAS in patients undergoing surgery with general anesthesia at Siaga Medika General Hospital, Purbalingga.

RESEARCH METHODS

1. Preparation and Coordination

The study was conducted at Siaga Medika General Hospital, Purbalingga, using an educational and early mobilization intervention to support the achievement of Enhanced Recovery After Surgery (ERAS) in post-general anesthesia patients. The preparation stage included field surveys and administrative coordination with the hospital to obtain permission and assess the implementation setting. This stage aimed to identify clinical conditions, determine appropriate strategies, and anticipate potential barriers during the intervention. Participants were recruited preoperatively in the surgical unit, where informed consent was obtained, and the purpose of the study was explained. Baseline knowledge was assessed using a pre-test questionnaire regarding early mobilization in the ERAS pathway.

2. Participant Screening

Participants were selected based on the following criteria: patients aged 10–65 years undergoing surgery with general anesthesia, including general surgery, orthopedic, gynecological, and ENT procedures. Types of surgery included appendectomy, hernia repair, and tumor removal (e.g., thyroid or lipoma). Inclusion criteria were cooperative patients with full consciousness (compos mentis) and willingness to participate, while exclusion criteria included patients with postoperative emergency conditions or refusal to participate.

3. Implementation of the Intervention

The intervention was conducted from September 30 to October 8, 2025, in the surgical ward. The implementation consisted of two main stages.

a. Preoperative Stage

Participants were identified and assessed based on demographic characteristics (age, sex, and type of surgery). After informed consent, participants completed a pre-test consisting of 10 multiple-choice questions covering early mobilization, deep breathing exercises, effective coughing, and Range of Motion (ROM).

b. Postoperative Stage

The intervention was carried out within 6–24 hours after surgery. Participants received education on ERAS principles, the importance of early mobilization, and practical guidance on deep breathing techniques, effective coughing, and active ROM exercises. Patients were also encouraged to perform gradual mobilization, including turning and sitting at the bedside. The intervention lasted approximately 10–15 minutes and was adjusted to patient comfort. Following the intervention, participants completed a post-test questionnaire with similar content to evaluate knowledge improvement. In addition, an observation sheet consisting of five indicators was used to assess the effectiveness of early mobilization in supporting ERAS achievement.

4. Monitoring and Evaluation

Monitoring was conducted through direct observation during the intervention and documentation of patient responses. Evaluation focused on changes in participants' knowledge (pre–post test) and the effectiveness of early mobilization in achieving ERAS outcomes based on observation results. The findings were analyzed descriptively to determine the success of the intervention.

Project Timeline

The community service program was conducted throughout 2025, consisting of three main phases: preparation, implementation, and reporting. The preparation phase included title submission, preliminary survey, proposal development, seminar, revision, and administrative permission. The implementation phase involved observation, pre–post intervention activities, and monitoring and evaluation. The final phase included result dissemination, report revision, and preparation for journal publication. The core intervention activities were carried out between September and October 2025.

Budget Realization

The total budget allocated for this program was IDR 1,468,000. The expenses covered consumable materials, transportation, preliminary survey, administrative permits, printing of educational booklets, journal publication costs, and other supporting needs. Consumables included stationery, informed consent forms, questionnaires, and observation sheets. Additional costs were allocated for travel, field preparation, and dissemination outputs.

Location of Activity

This program was implemented at Siaga Medika General Hospital, Purbalingga, located approximately 11.8 km from Universitas Harapan Bangsa, with an estimated travel time of 22 minutes by motor vehicle.

Follow-up Plan

Based on monitoring and evaluation results, it is recommended that early mobilization be continuously implemented as part of the ERAS protocol in postoperative care. Sustained application of this intervention is expected to improve patient recovery outcomes and reduce postoperative complications. Furthermore, integrating this approach into routine clinical practice may enhance service quality and support evidence-based care in hospital settings.

RESULTS AND DISCUSSION

A. Results of Community Service Activities

This community-based intervention aimed to provide education and implement early mobilization to improve the achievement of Enhanced Recovery After Surgery (ERAS) in post-general anesthesia patients at Siaga Medika General Hospital, Purbalingga. Data were collected using a questionnaire consisting of 10 items to assess knowledge and 5 indicators to evaluate ERAS achievement. The study was conducted from September 30 to October 8, 2025, involving 38 participants.

1. Characteristics of Community Service (PkM) Participants

Table 4.1 Characteristics of Participants at Siaga Medika General Hospital, Purbalingga (2025)

Characteristics	Frequency (f)	Percentage (%)
Age		
10–19 years	12	31.6
20–29 years	6	15.8
30–59 years	17	44.7
≥ 60 years	3	7.9
Total	38	100.0
Sex		
Male	20	52.6
Female	18	47.4
Total	38	100.0
Type of Surgery		
General Surgery	14	36.8
Gynecological Surgery	2	5.3
Orthopedic Surgery	19	50.0
ENT Surgery	3	7.9
Total	38	100.0

Table 4.1 shows that most participants were aged 30–59 years (44.7%), predominantly male (52.6%), and primarily underwent orthopedic surgery (50.0%).

2. Level of Knowledge of PkM Participants

Table 4.2 Participants' Knowledge Levels Before and After Education on Early Mobilization at Siaga Medika General Hospital, Purbalingga (2025)

Knowledge Level	Before Education (f)	Before (%)	After Education (f)	After (%)
Poor	1	2.6	0	0.0
Fair	21	55.3	0	0.0
Good	12	31.6	0	0.0
Very Good	4	10.5	38	100.0
Total	38	100.0	38	100.0

Table 4.2 indicates that prior to education, most participants had a fair level of knowledge (55.3%), with only 10.5% categorized as very good. Following the educational intervention, a significant improvement was observed, with all participants (100.0%) reaching a very good level of knowledge.

3. Achievement of Enhanced Recovery After Surgery (ERAS)

Table 4.3 ERAS Achievement After Early Mobilization Implementation at Siaga Medika General Hospital, Purbalingga (2025)

ERAS Achievement	Frequency (f)	Percentage (%)
Achieved	36	94.7
Not Achieved	2	5.3
Total	38	100.0

Table 4.4 shows that the implementation of early mobilization after surgery significantly contributes to the achievement of the Enhanced Recovery After Surgery (ERAS) program. A total of 36 participants (94.7%) successfully achieved ERAS outcomes, while 2 participants (5.3%) were still categorized as not achieving the target. These results indicate that the consistent application of early mobilization can effectively support postoperative patient recovery in accordance with ERAS principles, which focus on accelerating recovery, reducing complications, and improving the quality of perioperative care.

1. Characteristics of PkM Participants

Table 4.1 presents the characteristics of respondents. Most participants were aged 30–59 years (44.7%), followed by the 10–19 years age group (31.6%), while those aged >60 years constituted the smallest proportion (7.9%). It can be assumed that this age range indicates that surgical procedures using general anesthesia are generally experienced by the productive age group, where the need for surgery is often associated with pathological conditions requiring definitive surgical intervention. This

finding is consistent with Kumar (2023), who states that the productive age group has the highest proportion of undergoing major surgical procedures using general anesthesia due to higher activity levels and trauma risk. In younger groups, orthopedic surgery due to musculoskeletal injuries remains one of the main indications for general anesthesia, particularly to ensure airway control and optimal intraoperative stability (Thiel et al., 2025).

Data on gender distribution show that most respondents were male (52.6%) and female (47.4%). The dominance of male patients in surgical procedures may be associated with a higher incidence of trauma and occupational accidents in this group, thus requiring more surgical interventions. The distribution of surgical types indicates that orthopedic surgery was the most common procedure, with 19 participants (50.0%), followed by general surgery with 14 participants (36.8%), while ENT surgery accounted for 3 participants (7.9%) and gynecological surgery for 2 participants (5.3%). The dominance of orthopedic cases suggests that most patients underwent procedures with a higher risk of postoperative pain and mobility limitations compared to other surgical types.

It can be assumed that the high proportion of orthopedic surgeries is due to the increasing incidence of trauma and musculoskeletal disorders, such as fractures, soft tissue injuries, and joint disorders caused by traffic accidents or occupational activities. According to DeMaio (2024), the global burden of musculoskeletal diseases continues to rise significantly, particularly in middle-income countries such as Indonesia, leading to an increased demand for orthopedic surgical services. Musculoskeletal injuries are one of the leading causes of disability and the need for operative interventions in healthcare facilities (Wu et al., 2021). Therefore, the implementation of Enhanced Recovery After Surgery (ERAS) principles, including early mobilization, is crucial in orthopedic patients to accelerate recovery, reduce complications, and shorten hospital stay.

General surgery also represents a considerable proportion in this study, covering various procedures involving the digestive and hepatobiliary systems, as well as debridement. Within the ERAS framework, general surgery patients require attention to pain management, early nutrition, and progressive mobilization to support optimal recovery (Ljungqvist et al., 2020). Gynecological and ENT surgeries were fewer in number, likely due to the hospital's characteristics, which primarily handles major surgical cases such as orthopedic and general surgery. Despite their lower volume, the quality of care must still be maintained, as postoperative complications can affect recovery duration. Kaya (2021) reported that complications following laparoscopic gynecological surgery can reach 6.5%, highlighting the importance of intensive postoperative monitoring. Regardless of the surgical type, strict monitoring and the application of ERAS principles, particularly in the postoperative phase, remain essential to prevent complications, promote early mobilization, and reduce length of stay. Overall, orthopedic and general surgery cases are the primary focus for ERAS protocol implementation, particularly in early mobilization and postoperative pain management. Optimizing collaboration among nurses, anesthesia personnel, and surgical teams is essential to accelerate patient recovery and improve ERAS achievement across various surgical types

2. Level of Knowledge Before and After Education

Table 4.2 shows that before education, most respondents had a moderate level of knowledge (21 participants; 55.3%), while 12 participants (31.6%) were in the good category, 4 participants (10.5%) in the very good category, and 1 participant (2.6%) in the poor category. The low level of knowledge prior to education may be attributed to several factors, particularly limited access to health information and education before undergoing medical procedures. Chang (2020) states that individuals with low health literacy tend to have difficulty understanding medical information, including pre- and postoperative instructions.

The findings also indicate that many respondents believed that the ideal time to initiate early mobilization was 24 hours after surgery. However, according to ERAS guidelines, early mobilization should begin within 6–24 hours postoperatively, provided the patient is stable. This reflects insufficient understanding of early mobilization within the ERAS pathway. Misconceptions often lead

patients to delay activity, assuming that complete rest is safer after surgery. In fact, ERAS emphasizes that early mobilization is crucial for accelerating physiological recovery, reducing hospital stay, and minimizing complications (Tazrean et al., 2022).

A significant improvement was observed after education, with all participants (100%) achieving a very good level of knowledge. This suggests that the educational intervention was highly effective in increasing participants' understanding of the topic. This improvement not only reflects successful information transfer but is also expected to encourage positive behavioral changes in preparing for surgery and actively participating in recovery.

This improvement may be attributed to the interactive educational methods used, accessible learning media, and materials tailored to participants' needs. Syamsul (2023) supports that health education plays a vital role in improving knowledge through effective learning processes.

Active participation during the educational sessions also contributed to the success of the intervention. Two-way interaction enabled clarification and reinforcement of understanding. Wardeni (2024) highlights that active engagement enhances memory retention and comprehension. Interpersonal communication-based education methods have proven effective in increasing awareness of early mobilization importance. These findings align with Sari (2021), who reported that direct education significantly improves knowledge, especially when delivered through communicative and evidence-based approaches. Thus, the education provided successfully improved participants' knowledge to a very good level.

3. Achievement of Enhanced Recovery After Surgery (ERAS)

Table 4.3 presents data on ERAS achievement, showing significant improvement following the implementation of early mobilization. A total of 36 participants (94.7%) achieved ERAS outcomes, while 2 participants (5.3%) did not. This indicates that early mobilization, as a core component of the ERAS protocol, is effective in improving adherence and success in postoperative recovery.

Despite the overall success, two participants did not meet all ERAS indicators. This was associated with factors such as pediatric age and the type of general surgery performed, both of which are known to influence postoperative recovery. Pediatric patients often have different pain thresholds and tolerance, resulting in stronger pain responses that are more difficult to manage. It can be assumed that the inability of these participants to manage pain independently contributed to slower recovery, preventing full ERAS achievement.

Highly invasive general surgical procedures also play a role in reduced ERAS achievement. Such procedures tend to cause more severe postoperative pain, which decreases pain tolerance, limits early mobilization, delays physiological recovery, and reduces readiness for enteral nutrition. Effective pain management is therefore a key component of ERAS success.

ERAS achievement in this study is closely linked to active patient participation in its key components, including preoperative understanding, willingness to mobilize early, adherence to pain management, and maintenance of proper nutritional intake. Before implementation, low achievement was likely due to limited patient knowledge and lack of systematic support. After structured education and assistance, patients became more aware of ERAS benefits and actively engaged in recovery, leading to improved clinical outcomes.

These findings are consistent with Zhu (2021), who reported that consistent ERAS implementation accelerates recovery, reduces complications, and shortens hospital stay. Lobo (2024) also emphasized that ERAS success depends on multidisciplinary collaboration and adherence monitoring. Therefore, the improved ERAS achievement demonstrates that comprehensive protocol implementation can enhance perioperative care efficiency, safety, and recovery outcomes.

C. Limitations of Community Service (PkM)

This community service activity has several limitations. The relatively small number of participants limits the generalizability of the findings. The short duration of implementation restricted optimal postoperative monitoring to assess long-term behavioral adherence to ERAS principles.

Variations in patient understanding, especially among those with lower educational levels or limited medical literacy, posed challenges in delivering the material effectively. Despite these limitations, the program provided meaningful benefits, particularly in improving patient knowledge and participation in ERAS implementation. These limitations should serve as considerations for future programs, including longer implementation periods, more varied educational media, and greater involvement of family members and multidisciplinary teams.

D. Follow-Up Plan

1. Continue preoperative patient education as a routine hospital program.
2. Develop interactive educational media, such as videos, to enhance patient understanding.
3. Conduct ongoing monitoring of adherence to early mobilization as part of the ERAS protocol. Involve patients' families in the educational process to provide optimal support during recovery.

CONCLUSION

Based on the analysis of participant characteristics, knowledge levels, and the effectiveness of early postoperative mobilization within the Enhanced Recovery After Surgery (ERAS) protocol among community service (PkM) participants undergoing surgery with general anesthesia, it can be concluded that adult male patients, particularly those undergoing orthopedic surgery, constituted the dominant group. The educational intervention demonstrated a significant impact, as participants' knowledge improved markedly from predominantly moderate levels before education to entirely very good levels (100%) after education. Furthermore, the implementation of early mobilization contributed substantially to the achievement of ERAS, with 36 out of 38 participants (94.7%) successfully meeting ERAS criteria. These findings indicate that structured and educational ERAS implementation is highly effective in enhancing postoperative recovery outcomes and patient readiness.

It is recommended that healthcare institutions, particularly RSU Siaga Medika Purbalingga, adopt ERAS protocols as standard operating procedures in perioperative care, supported by continuous training for healthcare professionals. Patients are encouraged to actively participate in preoperative education and adhere to early mobilization, pain management, and nutritional guidelines, with strong family involvement during recovery. Academic institutions such as Universitas Harapan Bangsa should enrich ERAS-related learning materials to strengthen student competence. Future community service initiatives should focus on long-term evaluations of ERAS implementation, including its impact on length of stay, complication rates, and patient satisfaction, to support the development of evidence-based surgical care policies.

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