

## Original Article

## Enhanced Recovery After Surgery Protocol: Evaluation of the Effectiveness of Early Mobilization in Postoperative Laparotomy Patients: A Case Study

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### Abstract

**Objective:** This study aims to evaluate the effectiveness of early mobilization on Length of Stay (LoS) and recovery of intestinal motility.

**Method:** This research is a case study. Eight participants were involved in this study. Each participant in the intervention group was given early mobilization for 4 consecutive days. While the control group was given usual care according to hospital procedures.

**Results:** The average LoS of the control and intervention groups were 14.25 days and 10 days. While, the mean intestinal motility pre-test and post-test control groups were 3.25 x / minute and 4.5 x / minute respectively. The mean intestinal motility for the pretest and posttest intervention groups were 3.75 x / minute and 6.25 x / minute, respectively.

**Conclusion:** Findings from this review indicate that early mobilization interventions in postoperative laparotomy patients are very beneficial in decreasing LoS and recovery of intestinal motility.

**Keywords:** Early Mobilization, Length of Stay, Intestinal Motility, Postoperative Laparotomy

### Introduction

There are around 10 million patients who undergo laparotomy in the United States between 2009-2013 (Carney *et al.*, 2017). After the laparotomy action can cause various complications including pulmonary disorders, intraabdominal infections, bleeding, ileus / obstruction, anastomose leak, wound infection, wound dehiscence urogenital infection, and thromboembolic events (Tengberg *et al.*, 2017). The complications caused can affect

the length of stay and will greatly determine the progression of the patient's health problems so that it can affect the patient's morbidity and mortality (Schweinberger and Roukis, 2009; Tevis and Kennedy, 2013; Almashrafi and Vanderbloemen, 2016; Endo, Kumamoto and Matsuyama, 2017). This indicates that a postoperative integrated management is needed that can reduce the effects of these complications, so that it can accelerate indirectly postoperative recovery.

Based on clinical practical guidelines from the American Society of Colon and Rectal Surgeons (ASCRS) and the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) management interventions that can be used in minimizing some of the negative effects of operations on organ function is with Enhanced Recovery After Surgery (ERAS) (Carmicahel *et al.*, 2017). As a multimodal perioperative management approach that provides better results at less cost (Ahmed and Elzohry, 2018). ERAS has been introduced to clinical practice to improve the perioperative performance of patients thereby reducing the day of care and accelerating the process of restoring intestinal motility (Olle, Tonia and Demartines, 2017).

The ERAS protocol in the postoperative period basically contributes to the patient's recovery process (Gustafsson *et al.*, 2018). One of them is early mobilization is considered as a major component of ERAS which consistently aims to support the re-establishment of initial normal functions with strong recommendation values (Gustafsson *et al.*, 2018). Although it is recommended that early mobilization in ERAS is an independent predictor of early recovery after the postoperative period (Vlug *et al.*, 2012). However, compliance of health workers including nurses in this intervention is still low, where based on a survey conducted on hospital nurses in the United States, mobilization was the highest percentage of intervention missed by nurses at around 86.6%.(Kalisch *et al.*, 2011) This has the potential to cause an extended LoS. Based on data from the research location, shows that the average LoS per month is 11 days.(Sistem Informasi RS Wahidin, 2018) When compared with existing studies, LoS of postoperative patients with ERAS interventions is an average of 7-9 hospitalization days (Shida *et al.*, 2017). Therefore, the main objective of this study is to evaluate the effectiveness of early mobilization on LoS and recovery of intestinal motility.

## Methods

This research is a case study conducted at the tertiary hospital in Makassar from March to April 2019. Participants recruited in this study numbered 9 people, there was 1 person who drop out of the study on the grounds the patient's condition worsened. So, who completed the study were 8 people who were divided into 2 groups, namely the intervention group 4 participants and the control group 4 Participants were selected

using accidental sampling techniques. Determination of participants was based on inclusion criteria, namely postoperative first-day laparotomy and patients aged 18 to 60 years. While the exclusion criteria are patients who have disease complications such as hypertension, diabetes mellitus, neurological disorders, and fractures. Each participant in the intervention group was given ERAS action: early mobilization for 4 consecutive days divided into 4 stages. Stage I in the first 6-24 hours, early mobilization was carried out by deep breathing and effective coughing, passive ROM (hand joint motion and leg joint motion and elevate the bed from position 15<sup>0</sup> to 90<sup>0</sup>. Stage II in the second 24 hours (25-48 hours) participants are recommended to sit in bed without leaning by observing the pain then proceed to sit on the edge of the bed. Stage III in the third 24 hours (49-72 hours) the patient is recommended to stand beside the bed and practice walking around the bed. Stage IV in the fourth 24 hours (73-96 hours) the patient is expected to be able to walk. While, the control group was given the usual treatment of mobilization according to hospital procedures. This study evaluates ERAS: early mobilization of LoS and intestinal motility. To see the Participant LoS, which is to count starting postoperatively until the Participant returns. Whereas, intestinal motility was assessed using an ABN stethoscope for 1 minute on the first postoperative day in both the control and intervention groups. After that, it is re-evaluated after the Phase I intervention. Data were analyzed using frequency distribution using the chi-square test. All participants agreed to the study by signing informed consent. Ethics permit was approved from the Faculty of Medicine, Hasanuddin University (Number: 766/UN4.6.4.5.31/PP36/2019).

## Results

### Participant Characteristics

The following is an of participants' demographic characteristics based on gender, age, and marital status on the control and intervention groups, which can be seen in the table below:

Table 1. shows that, the sex in the intervention group each had a frequency of 50%, while the control group was mostly male at 75%. The minimum-maximum age in the intervention group is 25-43 years, and the control group is 21-58 years, while the marital status in the intervention group is 100% married and the control group 75% married.

ERAS Intervention Evaluation: Early Mobilization on LoS in Postoperative Laparotomy Patients.

**Intervention Group.** Based on the graph above it can be interpreted that the longest intervention group LoS is participant 04 which is 13 days and the fastest is participant 05 which is 8 days.

**LoS Control group.** Based on the graph, it can be interpreted that the longest control group LoS is participants 08 and 09 with a length of stay of 15 days and the fastest is participant 06 is 13 days .

**Average LoS for Each Group.**

**Diagram 3. Average LoS for Each Group.**

Based on the diagram, it can be interpreted that the average LoS of the control group is 14.25 days. Whereas the average LoS for the intervention group is 10 days. ERAS Intervention Evaluation: Early Mobilization on Intestinal Motility in Postoperative Laparotomy Patients Intestinal Motility of the Intervention Group.

Based on the graph Intestinal Motility of the Intervention Group it can be interpreted that the lowest pretest intestinal motility of the intervention group was participant 04 which was 2 times / minute and the highest was participant 05 which was 5 times / minute. Whereas the lowest posttest intestinal motility of the intervention

group was participant 04 which is 4 times / minute and the highest was participant 03 which was 8 times / minute. The difference between the pretest and posttest was very significant is participant 03 with a difference of 4.

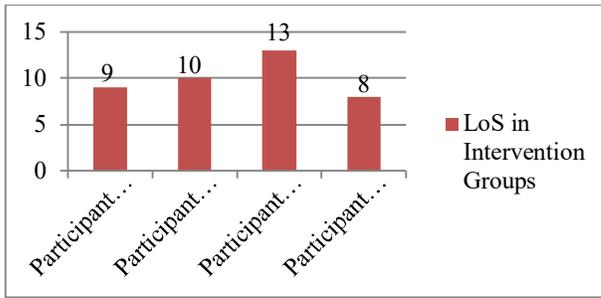
Based on the graph Intestinal Motility of the Control, it can be interpreted that the lowest intestine motility pretest in the control group was participant 07, which is 2 times / minute and the highest was participants 08 and 09, which were 4 times / minute respectively. While the lowest intestinal motility in the control group was participant 07 which is 3 times / minute and the highest was participant 08 which was 6 times / minute. The difference between the pretest and posttest was very significant, participant 08 with a difference of 2.

Based on the graph Average Intestinal Motility for Each Group it can be interpreted that the average intestinal motility for the pre-test in the control group is 3.25 x / minute and the average intestinal motility for the posttest in the control group is 4.5 x / minute. While, the mean intestinal motility for the pretest in the intervention group was 3.75 x / min and the average intestinal motility for the post-test in the intervention group was 6.25 x / min. The difference between the posttest of the control and intervention groups is 1.75.

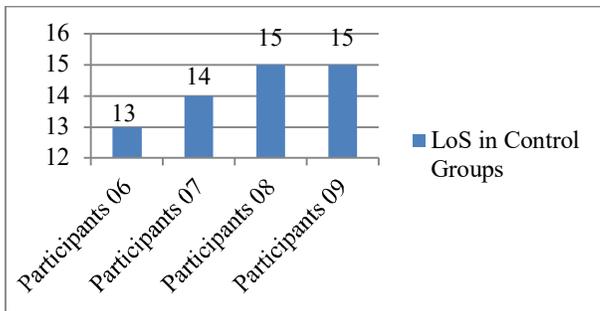
**Table 1. Characteristics of Participants on the Intervention and Control Groups**

Participant Characteristics	Intervention (n=4)	Control (n=4)
<b>Gender (%)</b>		
Male	2 (50)	3 (75)
Female	2 (50)	1 (25)
<b>Age ( years old)</b>		
Min-Max	25-43	21-58
<b>Marital status (%)</b>		
Married	4 (100)	3 (75)
Single	0 (0)	1 (25)

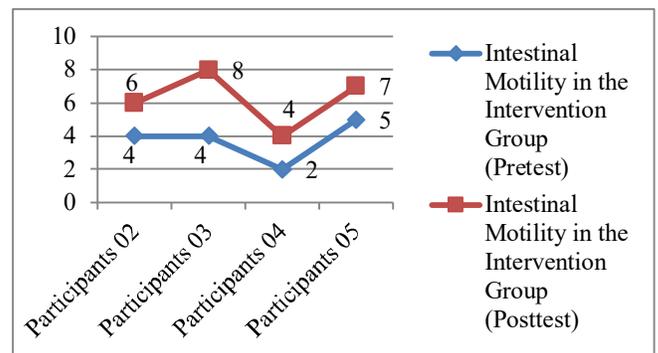
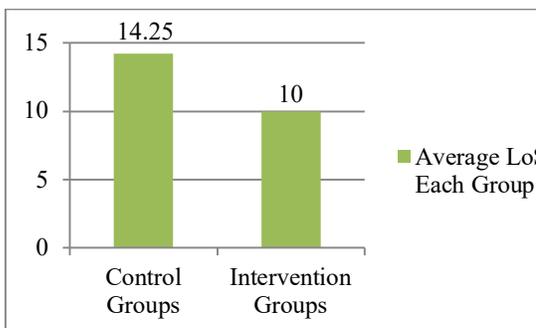
**Diagram 1. LoS Intervention Group**



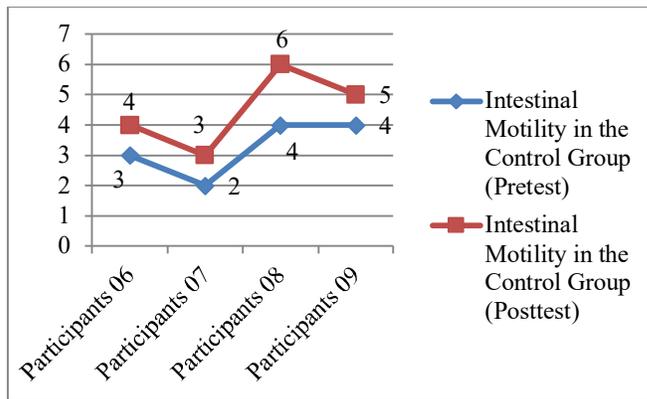
**Diagram 2. LoS Control group**



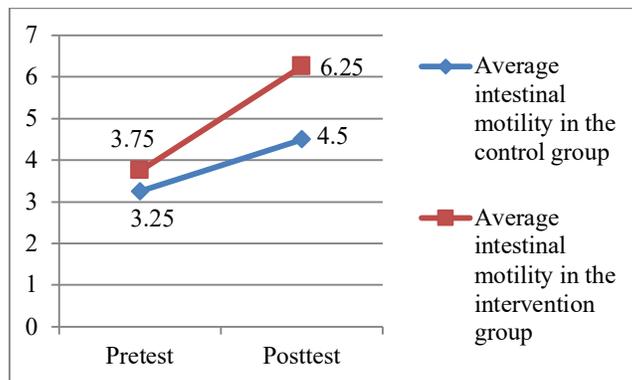
**Graph 1. Intestinal Motility of the Intervention Group**



**Graph 2. Intestinal Motility of the Control Group**



**Graph 3. Average Intestinal Motility for Each Group**



**Discussion**

**ERAS Evaluation: Early Mobilization of LOS in Postoperative Laparotomy Patients**

Based on the results of research conducted, early mobilization interventions gave significant results in decreasing LoS, namely an average of 10 days in the intervention group while the control group averaged 14.25 days. This is in line with the research conducted by Shida et al. (2017) obtained LoS results of 7-9 days in the intervention group while the control group was 10-14 days.(Shida *et al.*, 2017) This shows a reduction of 3 days of hospitalization between the intervention and control groups. Similarly, research by Teeuwen (2010) length of stay in the intervention group was 6 days while the control group was 9 days. This means that early mobilization in the ERAS protocol reduces the length of stay of patients in the hospital.(Teeuwen *et al.*, 2011)

**ERAS Evaluation: Early Mobilization of Intestinal Motility in Postoperative Laparotomy Patients**

Assessment of intestinal motility is done before the first stage of the ERAS protocol: early mobilization. The results obtained, more than 80% of patients have not experienced normal bowel recovery. This can be due to the effect of using anesthetic drugs that bind to peripheral nerve receptors attached to the gastrointestinal tract, consequently interfering with motoric propulsive activity of intestinal motility, so that bowel movements slowdown.(Leslie *et al.*, 2010) After the early mobilization intervention was given, it showed that there was a significant result in increasing the intestinal motility of post op laparotomy patients. Early mobilization interventions conducted after stage 1 show that the average intestinal motility of the patient has increased by 2.5 times / minute from an average range of 3.75 times / minute before the action to

6.25 times / minute after the action of stage 1 early mobilization. In accordance with previous studies describing that early mobilization carried out on postoperative day 1 significantly increased the intestinal motility of patients (Story and Chamberlain, 2009). Investigations from Morisawa, Takahashi, & Nishi (2015) support this study, where early mobilization with passive exercise carried out at stage 1 significantly increases intestinal motility with  $p < 0.05$  (Morisawa, Takahashi and Nishi, 2015). From the results obtained, it provides direction that the provision of early mobilization as a series of management of patients with postoperative laparotomy can affect the increase in intestinal motility of patients, thereby also minimizing post-surgical complications. Thus, nurses are expected to implement this intervention as a nurse's independent action.

**Conclusion:** This study found that there were significant differences in LoS and intestinal motility between the control group and the intervention group. Thus, early mobilization interventions in postoperative laparotomy patients are very beneficial in decreasing LoS and restoring intestinal motility.

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