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The effectiveness of early mobilization program to improve pain level, intestinal peristaltic and physiologic paramaters on post-surgery patients

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Abstract

Introduction: Surgery is an invasive medical procedure which performed to diagnose or treat illness, injury, or disability. The decrease of intestinal peristaltic and incidence of pain may occur as a result of these actions; moreover, it affects blood pressure and other physiologic parameters; thus, will make prolong the healing period because it will interfere with the patient activity and become one of the reasons for the patient unwilling to perform early mobilization.

Objective: The purpose of this study was to determine the effectiveness of early mobilization program to improve pain level, intestinal peristaltic and physiologic parameters on Post Surgery Patients.

Method: This study used quasi experimental design with One – Group Pretest-Posttest, and there were 33 patients which chosen using total sampling technique. Pain level, intestinal peristaltic, blood pressure, heart rate and body temperature were measured at before and after 3 days intervention of early mobilization program.

Result: Wilcoxon statistical analysis revealed significant difference in decreasing levels on pain, increasing intestinal peristaltic, decreasing systolic blood pressure and decreasing heart rate ($p<0.05$) at before compared to after intervention of early mobilization on post-surgery patients. Multivariate analysis showed that intervention of early mobilization, age and type of surgery simultaneously affect dependent variables (($p<0.05$; moreover, the r-squared is 0.727 which indicates that early mobilization intervention contributed 72.7% to changes in pain level, intestinal peristaltic and physiologic parameters.

Conclusion: It is suggested that nurses should perform and apply early mobilization program to post surgery patients, because of its positive impact to patient will faster patient's recovery process.

Keywords: Early mobilization; Intestinal Peristaltic; Level of Pain; Physiologic parameter; Surgery

1. Introduction

Surgery is an invasive procedure that involves opening a part of the body, which is generally carried out by making an incision to prevent disability and complications; this action is the therapy of choice for various conditions that are difficult and impossible to cure with simple medicines (1). The impact of this action can vary, such as changes in peristalsis, which results in nausea and vomiting, and complaints of post-operative pain, which also impact changes in the body's physiological parameters.

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Experts and hospitals have widely recommended early mobilization intervention because this intervention is thought to speed up the healing process and reduce post-surgical complications. Intestinal function works more quickly after surgery because early mobilization can help increase the tone of the gastrointestinal tract and abdominal wall, stimulating peristalsis. On the other hand, recovery from abdominal wounds occurs more quickly if mobilization is carried out early.

However, several gaps remain regarding implementing early mobilization interventions in Indonesia. Previous research found that most respondents, namely 57.1% of patients, had poor early mobilization behavior (2), and 40% had insufficient patient knowledge about early mobilization (3) .This happened because the nurse only gave leaflets about early mobilization and advised the patients to do so with their families.

Some hospitals also experience obstacles in implementing early mobilization interventions for post-operative patients, such as problems with patients with various complications, service arrangements, and human resource problems (4) Furthermore, previous study (5) found obstacles for ICU nurses, namely the lack of trained nurses (76%), lack of staff during shift work (72%), limited time (58%), and difficulty in mobilizing obese patients (82%) as a barrier to early mobilization actions. Furthermore, nurses' understanding regarding early mobilization interventions is still mixed where one study only carried out left and right oblique interventions to increase intestinal peristalsis in post-operative patients (13). Due to this situation, this study aimed to determine the effectiveness of an early mobilization program in decreasing pain levels and increasing intestinal peristaltic in post-surgery patients.

2. Material and methods

2.1. Participants

This was quasi-experimental, one group pretest-posttest without control group design. Sample size was calculated using Slovin formula. In this study, non-probability method, purposive sampling technique was applied and there were 33 laparotomy post operation patients met the inclusion and exclusion criteria. All patients given an early mobilization program, adopted from previous study (6). The intervention was developed for days, namely 1st day: passive ROM and positioning every 2 hours; 2nd day: sitting position in bed with or without back supported; 3rd day: sitting on edge of bed. The study was approved by Sint Carolus School of Health Sciences ethics committee (No. 005/KEPPKSTIKSC/II/2021).

2.2. Measures and Analysis

Research data were collected over three days using datasheet for profile of the participants. Numbering Pain Rating Scale was utilized to measure pain level; Littmann stethoscope to measure intestinal peristaltic; Omron sphygmomanometer to measure blood pressure and axillary thermometer to measure body temperature. Wilcoxon signed rank test was used to determine whether there are statistically significant differences before and after intervention of pain level, intestinal peristaltic and physiologic parameters of blood pressure, heart rate and body temperature. Multivariate analysis of Ancova was applied to determine the effect of early mobilization program and confounding variables of age, gender, type of surgery to dependent variables.

3. Results

Table 1 Frequency and percentage distribution of the participants

Characteristics	N	%
Age		
12-25	4	12.1
26-45	23	69.7
46-55	4	12.1
>56	2	6.1
Gender		
Male	11	33.3

Female	22	66.7
Type of surgery		
Appendectomy	11	33.3
Sectio Caesarea	12	36.4
Herniorrhaphy	3	9.1
Others	7	21.2
Total	33	100

Table 1 showed the frequency and percentage distribution of the participant. Most of the participants were age between 26-45 years old (69.7%) female (66.7%), and underwent for laparotomy surgery on indication of Sectio Caesarea (36.4%).

Table 2 Mean and significant difference within the group

Variables	**Pre**		**Post**		**P value**
	N	**%**	**N**	**%**	
Level of Pain					0.000
Mild	0	0	33	100	
Moderate	24	72.7	0	0	
Severe	9	27.3	0	0	
Intestinal Peristaltic					0.000
Weak	20	60.6	0	0	
Normal	12	39.4	33	100	
Systolic blood pressure					0.02
Normal	5	15.2	14	42.4	
Prehypertension	19	57.6	15	45.5	
Stage 1	8	24.2	3	9.1	
Stage 2	1	3.0	1	3.0	
Diastolic blood pressure					0.13
Normal	12	36.4	11	33.3	
Prehypertension	14	42.4	16	48.5	
Stage 1	6	18.2	6	18.2	
Stage 2	1	3.0	0	0	
Heart Rate					0.000
Normal	18	54.5	33	100	
Tachycardia	15	45.5	0	0	
Body Temperature					0.256
Hypothermia	19	57.6	21	63.6	
Normal	14	42.2	12	36.4	

Table 2 presents the difference in the mean score level of pain, intestinal peristaltic and physiologic parameters namely systolic and diastolic blood pressure, heart rate and body temperature. There were a significant within the group differences in level of pain, intestinal peristaltic, systolic blood pressure and heart rate before and after intervention of early mobilization program *(*$p<0.05$). Moreover, there were a significant decrease in level of pain and systolic blood pressure, while 100% patients develop normal for intestinal peristaltic and heart rate after receiving an early mobilization program for 3 days.

Table 3 Simultaneous Multivariate test of the effect of early mobilization program

Effect	value	F	Hypothesis df	Sig
Intercept	1226.948	6134.739[b]	4.000	0.000
Age	1.788	8.941[b]	4.000	0.000
Gender	.205	1.023[b]	4.000	0.420
Type of surgery	2.775	1.8333	28.000	0.020

R Squared = ,727 (Adjusted R Squared = ,620)

Table 3 revealed Simultaneous Multivariate test of the effect of early mobilization program on pain level, intestinal peristaltic and physiological parameters and confounding variables using Ancova Statistical test. It declared that early mobilization intervention, together with variables of age, gender bring effect to dependent variable simultaneously, with p value <0.05. In addition, the table shows r-square = 0.727, which indicated that early mobilization intervention give contribution of 72.7% decreased level of pain, intestinal peristatic and physiologic parameters, such as systolic and diastolic blood pressure, heart rate and body temperature on post-surgery patients; while 37.3% is provided by other variables which is in not examined in this study.

4. Discussion

From the patient characteristics, it can be seen that most respondents were post-appendectomy and cesarean-section patients. This is in accordance with the data that women and adults aged 26-45 dominate the sample. The incidence of appendicitis can be found at all ages, with the highest peak in the 20-30-year age group. This is caused by the hyperplasia factor of lymphoid tissue, where the tissue reaches its peak growth at that age, so if there is a blockage, it will cause an increase in intraluminal pressure (7).

This study's results align with the theory, which states that the impact of an early mobilization program can speed up the patient's healing process by reducing post-surgical pain, improving intestinal peristalsis, and stabilizing the body's physiological parameters. The pain sensation after surgery occurs due to incision or trauma to the tissue, which is the complaint most feared by patients undergoing surgery. The sensation of pain begins to be felt before the patient's consciousness has fully recovered and will increase as the effect of the anesthesia wears off (8).

In this study, the initial pain assessment was carried out when the post-operative patient was fully conscious. The post-test was carried out after early mobilization 6 hours after surgery. In this condition, the anesthetic effect disappears and does not work, so the respondent begins to feel an acute pain sensation. The results indicate that early mobilization promotes a positive experience in significantly reducing pain. The reduction in pain levels after early mobilization occurs because early mobilization can reduce the patient's concentration on the location or area of surgery and reduce the activity of chemical mediators such as histamine, bradykinin, prostaglandin, acetylcholine, leukotrienes, and potassium in the inflammatory process and minimize pain nerve transmission to the central nerve (9).

Early mobilization can reduce the incidence of complications, including helping to increase the tone of the gastrointestinal tract and abdominal wall and stimulating peristalsis to reduce the possibility of post-operative abdominal distension. The recovery of abdominal wounds is faster if mobilization is carried out early. In this research, the movements carried out through early mobilization intervention refer to Moris (2008) (6). The mobilization movements carried out have four stages, namely ROM exercises and changes in left and right tilt positions, followed by a sitting position for the first 24 hours. The movement continues with sitting next to the bed, and the last is standing up to moving to a chair with assistance. In previous research (6) explains that this mobilization movement reduces the length of stay for patients in the ICU, thereby reducing treatment costs.

Another effect of this study is that the pain scale is significantly reduced if early mobilization occurs. This also impacts physiological parameters, where the pulse rate and body temperature return to normal more quickly if the patient tries to reach normal preoperative activity levels as quickly as possible.

In patients undergoing surgery, the anesthetic drug will cause peristaltic movements to stop temporarily, where the anesthetic agent that enters the body inhibits parasympathetic nerve impulses to the intestinal muscles. The anesthetic works to slow or stop peristaltic waves. If peristaltic movements stop for too long, around 24-48 hours, it will result in peristaltic ileus, complicating the patient's healing process (9).

Early mobilization carried out on post-operative patients aims to increase physical activity. Skeletal muscle contractions during mobilization will cause muscle tension by providing sudden electrical stimulation around the area of the contracting muscle. If skeletal muscle contractions are carried out around the abdomen, then these contractions can trigger contractions of the muscles in the abdomen, especially the gastrointestinal muscles. The movements carried out also cause impulses in the spinal cord. These impulses will spread to the part of the spinal cord, which regulates the parasympathetic nerves, which regulate the digestive nerves, namely the lumbar and sacral nerves (10).

The results of this research align with the results of research conducted (11). His research showed a significant influence on respondents before and after early mobilization intervention (ROM) on the recovery of intestinal peristalsis in post-operative patients with general anesthesia (p=0.0001). Early mobilization exercises can increase intestinal peristalsis with an average increase of 4 times per minute. This will have a broad impact where the length of stay in hospital will be shorter and cheaper, and the broad impact will provide benefits for hospitals and patients (12).

5. Conclusion

Early mobilization is an effective program for post-operative patients because it has been proven to significantly reduce pain, increase intestinal peristalsis, and improve physiological parameters such as systolic blood pressure and heart rate, statistically even providing an impact of 72.7%. It is recommended that nurses implement early mobilization by implementing movements according to the procedures to shorten the patient's length of stay.

Compliance with ethical standards

Disclosure of conflict of interest

All authors declare that no competing interests were disclosed.

Statement of ethical approval

Ethical clearance was approved by Sint Carolus School of Health Sciences ethics committee (No. 005/KEPPKSTIKSC/II/2021).

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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