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## **The Relationship of Early Feeding and the Length of Stay in Post-gastrointestinal Surgery Patients**

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### **Abstract**

**Background:** The length of stay in postoperative patients are varied. Prolonged duration of treatment and rest is due to several factors, extrinsic factors such as inadequate nutrition fulfillment, surgical techniques, medications, and wound management. Meanwhile intrinsic factors consist of age, circulation disorder, pain, and comorbidities. **7** This study aims to investigate the influence of early feeding **6** on the length of stay in post-gastrointestinal surgery patients in Dr. Wahidin Sudirohusodo Hospital from January to December 2016. This **5** research is a cross-sectional analytic approach by using secondary data from medical records. The highest **5** number of patients with a length of stay less than nine days is at <24 hours early feeding with percentage 60% and the highest number of patients with a length of stay more than nine days **3** is at > 48 hours nutrition intake with rate 94.1%. There was a significant relationship between initial feeding time and the length of stay in the postoperative gastrointestinal patient. The results suggest to clinicians to provide early nutrition to the patient after having gastrointestinal surgery.

**Keywords:** Early feeding; Length of stay; Gastrointestinal; Surgery.

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## 1. Introduction

There are many cases of gastrointestinal surgery prevailing in the world including Indonesia. The operation is a medical intervention that requires specific skills to handle particular circumstances such as gastrointestinal disease. Gastrointestinal disease (GI) often linked to changes in environmental factors caused by industrialization, dietary changes, sanitation improvement, and increased use of antibiotics. Among the common GI diseases include colorectal cancer, gastroesophageal reflux disease, ulcerative colitis, inflammatory bowel disease, and Crohn's disease. World Health Organisation data show that for more than a century, surgical care has become an essential component of healthcare worldwide. It is estimated that every year there are 230 million curative operations performed worldwide [1].

Length of Stay (LOS) is one of the elements or aspects of care and service in a hospital that can be assessed or measured. The range of the day of the patient's hospitalization after laparotomy surgery is the number of patient days since undergoing surgery until the patient is cured and can be discharged [2].

Postoperative recovery of gallbladder removal or cholecystectomy patient needs to be hospitalized for three to five days and four weeks in the recovery period [3]. This is also similar to the length of post-cesarean section treatment which required standard treatment time of three to five days, and the process of clean postoperative stitching is five to seven days according to wound healing [4].

Postoperative patients need 7 to 30 days care, with an average day of hospitalization between seven to 14 days [5]. This exposure is also supported by a study conducted by Nursiah to patients undergoing laparotomy surgery which stated that the duration of short treatment is seven to 14 days as much as 74.2% and long-term of therapy (more than 14 days ) of 25.8% [2].

Potter and Perry stated that the length of prolonged treatment is due to several factors, namely extrinsic factors and intrinsic factors [3]. External factors consist of inadequate nutrition fulfillment, surgical techniques, medications, and wound management. While internal factors include age, circulatory disorders, pain, and comorbidities. Other factors are mobilization [6].

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Several reports have emphasized that early enteral feeding should begin as soon as possible after resuscitation because the immunomodulatory effects of enteral nutrition may aid recovery.

Furthermore, improved recovery after surgery has been shown to improve postoperative recovery after elective GI surgery. However, patients undergoing GI emergency surgery have edematous or ischemic bowel and have a high risk of postoperative complications, such as ileus, obstruction, or anatomic failure. For this reason, most surgeons are alert to early feeding after emergency GI surgery [7].

Furthermore, relatively few reports have been released regarding the safety of early feeding after emergency GI surgery [8].

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However, nutrition plays an essential role in the healing process of wounds and post-surgical healing. Patients

with poor nutritional status can cause wounds slowly improved and lengthened the time was in the hospital after surgery [9]. In practice, post-surgical patients digestif operating predominantly gastrointestinal (GI) will have problems and nutritional status of the basal energy needs they also increased. Therefore, intake of nutrients considered essential [10].

Thus, this research was conducted to find out more the influence of the early feeding to the length of stay in patients post-gastrointestinal surgery in RS Dr. Wahidin Sudirohusodo Makassar

## 2. Material & Methods

The design of this researches was a cross-sectional study by analyzing the data from the medical record and used total sampling that is taking all members of the postoperative patient population of large and specialized surgical operation group in RS Dr. Wahidin Sudirohusodo Makassar in one year Period, from January to December 2016.

The Independent variable was a time of early feeding while the dependent variable was the length of stay.

Data processing was done after recording the required medical record using Microsoft Excel and SPSS to summarize, clarify and present the data to obtain the expected statistical results.

For the analysis of the relationship between variables, the researchers used Pearson Chi-Square Test and to determine the correlation between variables; the researchers used Spearman Rho correlation bivariate test.

## 3. Results

There are 64 medical records selected based on established study criteria. Criteria included were multiple medical records, patients who died and patients with small and medium operations. However, only 51 medical records were available with complete data and used as sample populations included in the study.

There are 19 people (37.25 %) of postoperative gastrointestinal patients started early feeding at  $\leq 48$  hours, followed by 17 people (33.33 %) at  $> 48$  hours, and 15 people (29.41 %) at  $< 24$  hours (table 1).

**Table 1:** Distribution of Patient Post Gastrointestinal Operation Based on Early Feeding Time

Early Feeding Time (Hours)	Total (N=51)	Percentage (%)
< 24	15	29.411
$\leq 48$	19	37.254
>48	17	33.333

The length of stay  $> 9$  days subjects was significantly higher percentage than  $\leq$  nine days subjects (32 subjects (62.75 %) vs. 19 subjects (37.25%) (table 3).

**Table 2:** Distribution of Patient Post Gastrointestinal Operation Based On Length of stay

Length of Stay	Total (N=51)	
		Percentage (%)
≤9	19	37.254
>9	32	62.745

Bivariate analysis showed a significant correlation between early feeding time and the length of stay in a postoperative gastrointestinal patient with p-value = 0.004. In the group with the length of stay >9 days, there are 16 subjects (94.1%) started early feeding at > 48 hours, followed by ten subjects (52.6%) at ≤ 48 hours and six subjects (40%) at < 24 hours postoperative. Then, another group with the length of stay <9 days there are nine subjects (47.4 %) started early feeding at ≤ 48 hours, nine subjects (40 %) at < 24 hours with the length of stay > 9days, one subjects (5.9 %) at > 48 hours (table 3).

**Table 3:** Correlation between Early feeding and Length of Stay of Post Operative Gastrointestinal Patients

Early Feeding Time (Hours)	Length of Stay (days)				P
	Short Term		Long Term		
	≤9		>9		
	N	%	N	%	
<24	9	60	6	40	0.004
≤48	9	47.4	10	52.6	
>48	1	5.9	16	94.1	

Spearman Rho correlation test results obtained p = 0.001 and r = 0.45 which means there is a significant correlation between early intake and the length of patient stay (table 4).

**Table 4:** Correlation Test between Nutrition Intake and length of stay postoperative gastrointestinal patient

Early Feeding Time (hours)	Length of Stay			Probability (p)	Correlation Koef (r)
	Short Term	Long Term	Total		
	( ≤ 9 days )	( > 9 days )			
	n	n			
<24	9	6	15	0.001	0.45
≤48	9	10	19		
>48	1	16	17		

#### 4. Discussion

Early feeding might improve clinical outcomes regarding morbidity and mortality in critical patients. Some researchers prove early feeding within the first 48 hours in the significant clinical cases such as multiple trauma, head trauma, severe sepsis and other acute inflammatory conditions [11]. Early feeding can improve the status of the Critical ill patients with more moderate degrees of systemic inflammation such as after major abdominal surgery, with improved rates of infection which protein-calorie malnutrition (PCM) existed.[12]. Most of the sample was the patient who got the primary gastrointestinal surgery. In this study, it was 78.43% who got surgical exploration laparotomy.

Medical acts that often cause pain are surgery. One of them which have a high prevalence rate is laparotomy. Complications in patients after laparotomy are severe pain, bleeding, even death. Post-laparotomy surgery that does not get the maximum care can slow the healing and cause complications. Reference [13] Post-laparotomy patients require the utmost attention to speed up the return of body functions. Severe pain is a residual symptom caused by surgery in the intraabdominal region (the inner abdomen). Approximately 60 % of patients suffer from severe depression, 25 % moderate pain and 15% mild pain [14].

The other factors such as age and the diagnosis of an illness can also prolong the length of a stay [14,15]. In this research, there are 32 people with > 9 lengths of stay, 13 people of them are with gastrointestinal system abnormalities such as liver, pancreas and vesica fellea, another 13 people with tumor abnormalities in 40.6 3% respectively. Followed by two people (6.25 %) with generalized peritonitis and others 12.5 %. The study presented gastrointestinal, and tumor abnormality needs more long of stay for caring and monitoring.

This research showed the correlation between initial intake with the length of daycare in postoperative patient gastrointestinal. There were 19 from 51 total patients hospitalized for <9 days then 32 the rest got > 9 days. From the 32 people who had longer treatment days, there were 16 people got early feeding at 48 hours postoperative, followed by ten people receiving an initial intake of ≤48 hours and six people at < 24 hours. In contrast, from 19 people whose duration was shorter, nine started at < 24 hours, followed by nine people began early feeding at ≤ 48 hours and one person begin early feeding at > 48 hours postoperatively.

Pearson Chi-Square test result, p-value obtained is 0.004. Spearman Rho correlation test obtained results  $p = 0.001$ , means there is a significant relationship. Correlation coefficient value,  $r = 0.45$  which shows the correlation moderate or moderate between initial intake and length of the day of care in postgastrointestinal surgery patient. The coefficient of correlation is positive, it means the nutrient intake is positively related to the extent of stay.

Injured people or patient with trauma need about <sup>3</sup> 1.2-2 g / kg/day protein to assist the wound healing process [16]. High-calorie and high protein diets should be maintained throughout the healing period. The formation of the tissue will be very optimal when the nutritional needs, especially proteins are adequate. Another nutrient that needed in the wound healing process is vitamin C [17]. Vitamin C is a natural antioxidant and is very important in the process of metabolism. Vitamin C is needed for the formation of collagen [18]. The amount of vitamin C

required for optimal wound healing is about 500-1000 mg/day. Other essential nutrients are fluid intake, which is the medium where all metabolic processes took place, and another compound cannot replace their function. The wound is the missing or damaged part of the body tissue [19]. This situation may be caused by sharp or blunt trauma, temperature changes, chemical substances, explosions, electric shock, or animal bites [20]. Intake of nutrients for wound healing that is in the form of high-calorie foods, high protein and vitamin C. High-calorie foods are mostly found in carbohydrate foods such as rice, cassava, potatoes, milk and others, while for high-protein diets can be obtained from side dishes provided daily such as fish, chicken, meat, eggs which are animal protein and can also be plant-based vegetable proteins such as green beans, soybeans and others [21]. Vitamin C can be obtained by consuming fruits every day, such as guava, oranges, papaya, mango, and others. If the early feeding given to the postoperative patient is adequate, the healing of a hernia inguinal wounds will be on time, on the other hand, the less intake of nutrients get the slower wound healing process reached [22].

Vitamin C deficiency reduced collagen production that was excreted by fibroblasts by decreasing *Hidroksilasi proline* dan *lysine metabolism* [20]. Nutrients especially protein and calories about 1.2-2 g / kg/day needed to help the wound healing process. Other nutrients that are also indispensable in the healing process are vitamin C and zinc. Vitamin C is necessary for the formation of collagen for optimal wound healing while the zinc increases the strength of the force (the force required to separate the edges) of wound healing. Therefore, the more fulfilled or fulfilled nutrition patterns, the wound healing speed will be faster and optimal [22,23]. In conclusion, this early feeding is significant for the postoperative wound healing process in addition to energizing the patient and then affect the length of stay in postoperative digestif patients [19,20].

Unfortunately, there are many other factors that can lengthen and shorten the length of the stay patients after gastrointestinal surgery. However, initial intake is one of the significant factors affecting the duration of postoperative patient which has been tested in this study.

## 5. Conclusions

This study showed a significant correlation between early feeding time and the length of stay in the postoperative gastrointestinal patient. The later the patient gets the early feeding, the more time of treatment required. The results suggest to clinicians to provide early nutrition to the patient after having gastrointestinal surgery. Furthermore, researchers expect this study will inform patient's family about the importance of providing nutritional support to accelerate the healing process.

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