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Effect of chewing gum on postoperative ileus reduction and improving gastrointestinal motility in postoperative abdominal patients at Jayapura city hospital

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ABSTRACT

Research Objective knowing the effect of chewing gum to prevent postoperative ileus in postoperative abdominal patients. Research Methods: this type of research is quantitative research with a quasi-experimental pre and post with a control approach with a total sample of 30 people with. The method of collecting accidental sampling is because the samples in Jayapura city for abdominal surgery are still limited. The tests used are Wilcoxon test and man whitney. Results: the results of the univariate analysis found that male respondents amounted to 20 respondents (66.7%) and women respondents amounted to 10 respondents (33.3). The age of the most respondents was between 16 - 35 years old was 19 respondents (63.3%) and the least was between the ages of 56 - 75 years old was 2 respondents (6.7%). Wilcoxon test results obtained p-value values of 0.001 < 0.005 meaning that there is an effect of chewing gum on improving intestinal motility of patients post-abdominal surgery. Conclusion: there is an effect of chewing gum on postoperative ileus decrease and improvement of gastrointestinal motility in Post Abdominal Surgery patients.

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INTRODUCTION

Postoperative ileus or post-operative ileus (POI) is a major and transient problem in patients undergoing abdominal surgery (Ding, 2022). Postoperative ileus generally occurs in 25% of patients undergoing abdominal surgery. Signs and symptoms of postoperative ileus include abdominal distention, nausea, vomiting, inability to eat or drink an oral diet, absence of flatus, and changes in bowel movements (Vasquez, W., Hernandez, AV., & Sabrido, 2019). Due to the presence of ileus, patients are at high risk of developing complications, expensive treatment costs, and prolonged hospitalization and delays in administering oral diet (Bhatti et al., 2021).

Colorectal cancer, gastric cancer, pancreatic cancer, duodenal cancer are usually performed by digestive surgeons by laparotomy (open laparotomy) while cholelithiasis (gallstones) is performed laparoscopically (Kanza Gül & Şolt Kırca, 2021). Normally, during the enhanced recovery

after surgery bowel sounds diminish or disappear in all four quadrants. Inspection of the abdomen determines the presence of abdominal distension possibly due to gas accumulation. In clients undergoing abdominal surgery, distention occurs due to internal bleeding (Vasquez, W., Hernandez, AV., & Sabrido, 2019). Postoperative ileus (IPO) is a major stress response to abdominal surgery. Signs and symptoms that appear are abdominal pain, nausea and vomiting, abdominal distension, and delayed stool passage and the inability to get enough food and drink (Damayanti S & May Syara, 2018). Postoperative ileus is defined as the time from surgery to passage flatus or defecation and the time to maintain adequate oral intake, namely the first 24 hours (Annafi, 2020). According to the guidelines for post-surgery in digestion and gynecology in the Enhanced Recovery After Surgery (ERAS) society, it is recommended to use chewing gum (chewing gum/shame feeding) to prevent post operative ileus (POI) or post operative ileus (IPO) (Yenigul et al., 2020). So that there are several kinds of interventions to reduce postoperative ileus, namely implementing chewing gum as an evidence based practice aimed at increasing intestinal motility and minimizing the side effects of postoperative ileus. Chewing gum is inexpensive, easy to obtain, and is a non-pharmacological intervention capable of producing changes in gastrointestinal motility and rapidly reducing postoperative ileus. Furthermore, the chewing gum intervention is relatively easy for nurses to implement (Alfian, 2021). The return of gastrointestinal function is marked by bowel movements, passage flatus, defecation and the emergence of hunger. When the first passage flatus appears, it is a sign that the digestive system is functioning (Roslan et al., 2020).

The patient receives the physiological effects of eating without actually enjoying eating. Chewing gum can activate the vagus nerve (Ping Yang , Wu Jun Long 1, 2018). This suggests increased production of gastric acid secretion, pepsin, and pancreatic polypetidase which all facilitate intestinal motility (Roslan et al., 2020). The cepalo vagal reflex directly stimulates and activates bowel motility. Through indirect stimulus, the gastrointestinal hormone will secrete the salivary glands, the hormone gastrin, the pancreas gland secreted. Chewing gum therapy is known to be effective as a meal that stimulates gastric secretion at the cephalic stage (Yenigul et al., 2020)(Bragg D, El-Sharkawy AM, Psaltis E, Maxwell-Amstrong CA, 2016).

Based on the data and background description above, the authors are interested in carrying out an intervention that is simple, safe, easy and inexpensive but provides great benefits for the recovery of gastrointestinal function entitled "The effect of chewing gum on reducing postoperative ileus and increasing gastrointestinal motility in post-abdominal surgery patients." in the Jayapura City Hospital Area.

RESEARCH METHOD

The research design used was a quasi-experimental non-equivalent group with the pre and post test, namely a design that tested the chewing gum intervention in the intervention group and without randomization to place subjects into the intervention and control groups (Masturoh & Aggita T, 2018)(Sugiyono, 2017). The sample consisted of 30 respondents consisting of 15 respondents in the intervention group, 15 respondents in the control group. The sampling technique used is non-probability sampling, namely the selection of samples that are not carried out randomly using the concecutive sampling method, namely the selection of samples carried out by selecting all the individuals found and meeting the selection criteria, up to the number of samples used.

RESULTS AND DISCUSSIONS

Univariate analysis

Age of Respondents

Table 1. Frequency distribution based on respondents age surgical ward Jayapura city hospital (n=30)

Age (years)	Group				Amount	
	Intervention		Control			
	frequency (n)	Percentage (%)	frequency (n)	Percentage (%)	frequency (n)	Percentage (%)
16 – 35 years	9	60	10	66,7	19	63,3
36 – 55 years	5	33,3	4	26,7	9	30
56 – 75 years	1	6,7	1	6,7	2	6,7
	15	100	15	100	30	100

Source: Primary Data, 2022

Based on Table 1, it was found that the age of the most respondents in the intervention and control groups was between 16-35 years, namely 19 respondents (63.3%) in the intervention group 9 (60%) respondents and in the control group 10 respondents (66.7%). While the age of the respondents was at least between the ages of 56 – 75 years with a total of 2 respondents (6.7%) namely 1 respondent (6.7%) in the intervention group and 1 respondent (6.7%) in the control group.

Gender of Respondents

Table 2. Frequency distribution by gender of respondents in the surgical ward of Jayapura city hospital (n=30)

Gender	Group				Amount	
	Intervention		Control			
	frequency (n)	Percentage (%)	frequency (n)	Percentage (%)	frequency (n)	Percentage (%)
Male	11	73,3	9	60	20	66,7
Female	4	36,7	6	40	10	33,7
	15	100	15	100	30	100

Source: Primary Data, 2022

Based on Table 2, it shows that the most common sex is male, totaling 20 respondents (66.7%) including 11 respondents (73.3%) in the intervention group and 9 respondents (60%) in the control group. While the least sex was female, namely 10 respondents (33.7%) including 4 respondents (36.7%) in the intervention group and 6 respondents (40%) in the control group.

Bivariate Analysis

This analysis uses the Wilcoxon test to determine the average difference between respondents in the intervention group before and after chewing gum. The results of this analysis are presented as follows**:**

Table 3. Differences in respondents ' bowel motility before and after treatment in the intervention group and the control group at Jayapura city regional hospital 2022 (n = 3 0)

Intervention Group	Means	Min	max	n	*p-values*
Intestinal Motility Pre	2.60	1	4	15	0.001
Post Gut Motility	8.73	7	10	15	
Control Group	Means	Min	max	n	*p-values*

Intervention Group	Means	Min	max	n	*p-values*
Intestinal Motility Pre	2.67	2	6	15	0.000
Post Gut Motility	4.87	3	6	15	

Source: Primary Data, 2022

The results of the analysis in Table 3 show that the mean intestinal motility in the intervention group before the chewing gum treatment was 2.60 with the lowest number of motility being 1 and the highest value being 4. Whereas in the intervention group after the chewing gum treatment was 8.73 with a total the lowest intestinal motility was 7 and the highest was 10. Based on the analysis using a non-parametric test, namely the *Wilcoxon test* , it showed that there was a significant difference in increased intestinal motility before and after being given chewing gum therapy (*p-value* = 0.000 1).

The results of the analysis in the control group before treatment were 2.67 with the lowest total intestinal motility, namely 2 and the highest, 6. Meanwhile, in the intervention group after standard treatment, the lowest score was 3 and the highest value was 6. Based on the analysis using a non-parametric test, namely the *Wilcoxon test* showed that there was a significant difference in the increase in intestinal motility before and after being given standard therapy (*p-value* = 0.000 0).

Table 4. Differences in respondents' post-treatment pain scales between the intervention group and the control group at Jayapura city regional hospital on August – October 2022 (n: 30)

Variable	Means	Min	max	n	*p-values*
Post Intervention Bowel Motility	8,73	7	10	15	0.000
Post Control Intestinal Motility	4.87	3	6	15	

Source: Primary Data, 2022

The results of the analysis showed that respondents in the intervention group in patients after abdominal surgery experienced an increase in intestinal motility, namely 8.73 with the lowest score being 7 and the highest score being 10. Meanwhile, respondents in the control group who experienced an increase in intestinal motility, namely 4.87 with the lowest score being 3 and the highest score being 6 Based on the results of the analysis using a non-parametric test, namely the *Man Whitney test* , it showed that there was a significant difference in increased intestinal motility between the intervention group and the control group (*p-value* 0.0000).

Bivariate Analysis

Intestinal Motility in the Intervention Group of Post-Abdominal Surgery Patients before and after chewing gum at Jayapura City Regional Hospital

The results of the analysis using a non-parametric test, namely the *Wilcoxon test ,* showed that there was a significant difference in increased intestinal motility before and after being given chewing gum therapy (*p-value* = 0.000 1). The results of this study are in line with (Basri & Sulistiyawati, 2018) that the effect of chewing gum on post-appendectomy intestinal peristalsis has a p-value of 0.0000 by giving chewing gum 3x per day for 30 minutes while chewing.

Chewing gum functions as *Sham Feeding* (pretend eating) can affect vagal nervous stimulation and release of gastrointestinal hormones and increase salivary secretion and pancreatic juice, gastrin, and neurotensin which can affect the process of intestinal motility, duodenum, and rectum in the stomach humans (Gong et al., 2015). According to (Short et al., 2015), the benefits of *Chewing Gum* include weight loss, but the most important benefit in this study is improving the digestive system. Effective intervention in postoperative patients suspected of activating *the cephalic-vagal reflex* . The *cephalic* release of hormone l occurs via vagal activation of efferent fibers in response to food-related sensory stimuli.

Intestinal motility is a gurgle sound from the intestine, a sign that the intestine is carrying out rhythmic contractions that aim to mix food or push food. In post-appendectomy patients,

abdominal surgery is carried out and anesthesia is used to reduce pain during the surgical process. One of the effects of the use of anesthetics is to inhibit parasympathetic nerve impulses to the intestine, thereby inhibiting intestinal peristalsis. Lack of early mobilization in post abdominal surgery can also slow down the process of recovering the patient's intestinal motility. Adult age is also a factor in the process of restoring intestinal motility.

The results of this study are in accordance with previous studies conducted by OV (Hsu YC, 2022). Post-cesarean section ileus, a total of one hundred and eighty women ordered for elective caesarean section were grouped into the gum chewing group (n = 90) or the control group (n = 90).) Subjects chewed sugarless gum three times daily from 6 hours postoperatively until the first piece of flatus, each chewing session lasting 30 minutes. Choice of cesarean section is performed with a Pfannenstiel incision (Alfian, 2021).

Intestinal motility in the control group of post-abdominal surgery patients who were given standard therapy in the Jayapura City Hospital area

The results of the analysis using a non-parametric test, namely the *Wilcoxon test* , showed that there was a significant difference in increased intestinal motility before and after standard therapy was given (*p-value* = 0.0000). This study has similar results with several previous studies. PRoved that there has been recovery of intestinal peristalsis in postoperative patients after being given standard early mobilization therapy in the form of active ROM and passive ROM with a p value = 0.000.

Regional anesthesia has been shown to be able to improve the recovery of intestinal activity better than general anesthesia, and reduce the length of stay of post-surgery patients. This is due to the reduced use of postoperative opioids with regional anesthesia (Bayoumi, 2017). Although proven safer for the patient, intestinal hypomotility can still occur in patients undergoing regional anesthesia, if surgery is performed on the abdomen and bowel manipulation occurs. Normal bowel function normally returns within a few hours after surgery. In patients with gastric and colon surgery, the average is 48-72 hours, and 3-57% of patients with abdominal surgery experience problems with intestinal elimination (Ping Yang , Wu Jun Long 1, 2018). Providing early mobilization nursing interventions carried out by nurses is expected to be an action that supports the quality of nursing care for post-surgery patients providing early mobilization is important because it has become a standard in the Enhanced Recovery After Surgery (ERAS) procedure (Moh. Cholili, 2020). Early mobilization is able to launch the circulatory system and help the body's system return to normal quickly (RINDRIANI, 2019). Damayanti S & May Syara, (2018) explained that early mobilization movements can contract smooth muscles due to the process of calcium ions entering the muscles. These calcium ions will bind to calmodulin ions (as a protein regulator). The combination of these two ions will activate myosin kinase which will phosphorylate the myosin head and then bind to actin filaments, which will then actively work throughout the cycle, including intestinal contractions. Intestinal contractions will then stimulate intestinal smooth muscle peristalsis, flatus and minimize distension in the body's systems (Roslan et al., 2020).

Differences in Bowel Motility Values in the Intervention Group and the Control Group Post treatment at Jayapura City Regional Hospital.

The results of the analysis using a non-parametric test, namely the Man Whitney test, showed that there was a significant difference in increased intestinal motility between the intervention group and the control group (p-value 0.0000). This research was also supported by other researchers conducted (ZIKRI, 2020). Chewing gum can produce the same results after an open appendectomy. This study was conducted on 46 patients who were operated on with open appendectomy for acute catarhal appendicitis, appendicular abscess and generalized appendicular peritonitis (de Leede et al., 2018). By observing the occurrence of first flatus, first bowel movement,

duration and complications in hospital. The results of the study were that 46 patients were randomly divided into 2 groups: the gum group (n = 23) and the control group (n = 23).

In the first group, patients chewed sugarless gum (xylitol) for 30 minutes three times daily until bowel transit returned. Patient demographics, intraoperative care, and postoperative care were the same for both groups. The gum was well tolerated by all patients. The first batch of flatus occurred on postoperative day 2.2 in the chewing gum group and on day 3.0 in the control group (P < 0.0001). The first bowel movement occurred on postoperative day 2.3 in the chewing gum group and postoperative day 3.3 in the control group (P < 0.0001). Five complications were recorded overall. The chewing gum group's hospital stay was shorter (4.9 days) than the control group (6.7 days), (P < 0.0001).

Chewing gum improves recovery after the appendix opens by reducing postoperative ileus. Chewing gum in postoperative patients can help improve the work of the heart, so that blood circulation increases causing more oxygen and nutrients to be pumped to the brain. In addition, hypothalamic circulation also increases causing an increase in cognitive power which can lead to relaxation and reduce stress and tension. on the muscles (Damayanti S & May Syara, 2018)(Xiao-Qin Liao # 1, Sai-Lan Li 1, Yan-Chun Peng 1, Liang-Wan Chen 2, 2022). Because of its ability to make you more alert while relaxing tense muscles, it can reduce abdominal distention and can stimulate peristalsis. It is inexpensive and a useful treatment to be recommended in developing countries in Africa (Jalanko T, Helenius I, Pakarinen M, 2018).

Based on the results of research and theory, it was found that after chewing gum, the majority of post-abdominal surgery patients experienced normal intestinal peristalsis. The advantage of chewing gum is that the patient does not use all of his limbs, besides that it can be applied to patients with physical weakness and does not stimulate pain from post abdominal surgery wounds. The process of chewing gum for patients is very easy for patients to do, by chewing gum 3 times a day every 30 minutes can stimulate the digestive system and prevent postoperative ileus (IPO).

CONCLUSION

Based on the results of data processing and analysis, the results of this study can be concluded: 1) There is an effect of chewing gum on decreasing intestinal motility and increasing intestinal motility in post-abdominal surgery patients at Jayapura City Regional Hospital, and 2) Chewing gum can be used as a standard operational procedure therapy in treating post abdominal surgery patients according to the enhanced recovery after surgery (ERAS) protocol.

Based on the above conclusions, it is recommended for nurses to make chewing gum as an independent nursing intervention and as Standard Operational Procedure (SOP) for intestinal peristalsis after abdominal surgery because chewing gum is a method to speed up recovery of intestinal peristalsis that is easy and cheap.

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