

# BELITUNG NURSING JOURNAL

<https://belitungraya.org/BRP/index.php/bnj/index>

Online ISSN: 2477-4073

## DIFFERENCE OF BOWEL SOUND RETURN TIME AMONG POST-LAPARATOMY SURGERY PATIENTS AFTER CHEWING GUM

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<https://doi.org/10.33546/bnj.826>



**BELITUNG RAYA PUBLISHER**

Belitung Raya Foundation  
Dsn. Cemara I RT 007 RW 004 Desa Kurnia Jaya Kecamatan Manggar  
Belitung Timur Propinsi Bangka Belitung, Indonesia  
Email: [belitungrayafoundation@gmail.com](mailto:belitungrayafoundation@gmail.com) | [editorbnj@gmail.com](mailto:editorbnj@gmail.com)

**ORIGINAL RESEARCH**

# DIFFERENCE OF BOWEL SOUND RETURN TIME AMONG POST-LAPARATOMY SURGERY PATIENTS AFTER CHEWING GUM

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**Article Info:**

Received: 19 June 2019

Revised: 21 July 2019

Accepted: 23 August 2019

**DOI:**

<https://doi.org/10.33546/bnj.826>

**Abstract**

**Background:** A surgical procedure using general anaesthesia in laparotomy surgery results in reduced bowel sound. A large number of patients who experience a delay in returning bowel sound after laparotomy surgery become the reason to give proper intervention in order to increase bowel sound return time. One of the non-pharmacological interventions that can be used is chewing gum.

**Objective:** The purpose of this study is to identify the difference of bowel sound return time between groups of intervention and control after being given chewing gum intervention among post-laparotomy surgery patients.

**Methods:** This quasi-experimental study used post-test only control group design. Thirty respondents were selected by purposive sampling technique. Data were collected through observation by calculating the bowel sound return time among post laparotomy surgery patients in the intervention group ( $n=15$ ) and control group ( $n=15$ ), and were analyzed using the Mann Whitney test. The intervention group was asked to chew the gum once for 30 minutes, and bowel sound was measured every 30 minutes for 120 minutes.

**Results:** The results showed that bowel sound return time in the intervention group was 90 minutes and the control group was 150 minutes, and  $p$ -value was 0.005.

**Conclusion:** There was a difference in the return time of bowel sound between the intervention and control groups. Therefore, the intervention of chewing gum could become one of the non- pharmacological interventions that can be considered in increasing the bowel sound return time among post-laparotomy surgery patients.

**KEYWORDS**

bowel sound; chewing gum; laparotomy; post surgery

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ISSN: 2477-4073

## INTRODUCTION

Surgery is defined as a medical treatment performed by surgeons using an invasive method by opening the body part to be treated. This surgery causes physical and psychological stress to the patient because it is a complex event associated with life-threatening actions so that it will cause tense feelings in the patients themselves ([Sjamsuhidajat & Wim, 2010](#)).

One of the major surgeries that are mostly done is laparotomy. Laparotomy is a surgical technique that is performed by making an incision in the abdomen. Laparotomy is usually performed in cases of digestive and obstetric surgery ([Sjamsuhidajat & Wim, 2010](#)). At Royal Sussex Country Hospital (RSCH), it was noted that there are around 850 laparotomy surgical procedures carried

out from 2009 to 2010 ([Shapter et al., 2012](#)). The longer the return of bowel noise of the patients after laparotomy surgery will increase the accumulation of secretions and gases which can cause discomfort and risk of complications in patients ([Ge et al., 2015](#)). The most frequent discomfort felt by patients is abdominal distension, abdominal pain, nausea, and vomiting ([Atkinson et al., 2016](#)).

In addition to the discomfort felt by patients, there are many risks of complications that can occur if no immediate intervention is carried out to speed up the recovery of bowel sound after laparotomy surgery. The risks of such complications are such as the late discharge of flatus or faeces, late mobilization, delay in

getting oral nutrition, delayed wound healing, high risk of adhesion, high risk of nosocomial infections, high risk of lung complications, and high risk of postoperative ileus. Postoperative ileus is the most common complication, and it endangers post-laparotomy surgery patients. Patients can be said to experience postoperative ileus if the intestinal peristalsis does not improve until the third to fifth day after surgery ([Bashankaev et al., 2009](#)). Patients who experience postoperative ileus are mostly post-abdominal surgery patients, especially in the lower area ([Sjamsuhidajat & Wim, 2010](#)). According to [Vather et al. \(2013\)](#), it was noted that around 10% - 25% of patients after major abdominal surgery experience postoperative ileus problem.

As a result of these conditions, the period of in-patient care in the hospital can be longer so that the costs incurred by the patient and family also will be higher during the treatment process ([Atkinson et al., 2016](#)). According to [Iyer et al. \(2009\)](#), on average, in the United States, post-laparotomy surgery patients with postoperative ileus have to undergo hospital treatment for a total of 13.8 days.

Laparotomy is one of the major types of surgery that uses anaesthesia as a pain-relieving procedure during the surgery. The effect of giving anaesthetic is reducing the work of intestinal peristalsis so that when a physical examination of a postoperative patient is obtained, there will be weak bowel sound in the four abdominal quadrants. Post-surgery patients can be deemed as improved if there is an increase in bowel sound or intestinal peristalsis. Therefore, the patient's intestinal peristalsis after laparotomy surgery must return as soon as possible to prevent postoperative ileus complications that will endanger the patients themselves ([Sjamsuhidajat & Wim, 2010](#)).

The high number of post-surgery complications and deaths causes surgical action to be a concern for global health. Many medical interventions can be performed on patients after laparotomy surgery to accelerate the return of bowel sounds and prevent the occurrence of postoperative ileus complications, such as using prokinetic drugs which function is to make the muscle of the digestive organs return as quickly as possible so that patients can immediately eat orally ([Barletta & Senagore, 2014](#)). Many previous studies related to other non-pharmacological interventions that are more precise and safe to accelerate the return of bowel sound and prevent postoperative ileus complications in post-laparotomy surgery patients, such as early oral hydration, early mobilization techniques, and chewing gum ([De Almeida et al., 2017](#); [Liu et al., 2017](#); [Tazegül Pekin et al., 2015](#)). One of non-pharmacological interventions that can be used to make intestinal peristalsis of patients return quickly is early oral hydration. However, because of the condition of post-surgery patients who still often feel nauseous, sometimes accompanied by vomiting and discomfort in the stomach, other methods to restore the patients' digestive function under normal conditions as soon as possible are needed ([Liu et al., 2017](#)).

In addition to early oral hydration, the early mobilization technique is also one of the post-surgery recovery programs that aim to prevent the occurrence of post-surgery complications ([Kehlet, 2008](#)). In addition, post-laparotomy surgery patients are

encouraged to do early mobilization to improve blood circulation and restore physiological function so that the patient's recovery time will be faster ([Castelino et al., 2016](#)). Based on research by [De Almeida et al. \(2017\)](#), from 108 post-abdominal cancer surgery respondents who received early mobilization interventions twice a day with nurse assistance, the results showed that the recovery time of patients was much faster than respondents who did not receive intervention. This was evidenced by the existence of patients who had been able to carry out daily activities independently without assistance on the fifth day after surgery.

Seeing the high rate of laparotomy surgery and the late occurrence of returning bowel sound in patients after laparotomy surgery, thus it is felt that the best intervention in accelerating the return of bowel sound in post-surgery patients to prevent complications of postoperative ileus is needed. The intervention is in the form of suggestion to chew gum after surgery.

Chewing gum is the same as the sham feeding technique, which is when the food given orally is not really digested by digestion, because in this technique the patient is usually told just to smell, taste, and chew food and then spit it out ([Liu et al., 2017](#)). Chewing gum can increase intestinal peristalsis by activating the cephalic-vagal pathway which will stimulate myoelectric intestinal activity and will counteract the effects of gastrointestinal opioid receptors, so the nervous system and hormones in the digestive tract will return to work ([Fanning & Valea, 2011](#)). Chewing gum is a cheap and safe method to restore intestinal peristalsis or bowel sound of post-laparotomy surgery patients immediately. If bowel sound can return quickly, postoperative ileus complications will not occur in patients ([Berghmans et al., 2012](#)). Based on the results of the study of [De Castro et al. \(2008\)](#), chewing gum after surgical abdominal colectomy can improve the patient's intestinal peristalsis and prevent the occurrence of postoperative ileus complications. [Ledari et al. \(2013\)](#) reported in his study that patients after cesarean section surgery who were given gum-chewing intervention experienced flatulence and increased intestinal peristalsis.

Unlike early mobilization interventions, chewing gum is still rarely used as an alternative intervention to accelerate the recovery of intestinal peristalsis and prevent complications of patients after laparotomy abdominal surgery. Based on the research of [Terzioglu et al. \(2013\)](#), the bowel sound in post-laparotomy surgery patients who were given early oral hydration intervention, early mobilization and chewing gum, patients would have a bowel sound return time around 2.5 hours to 9.5 hours after the implementation of the intervention. The weakness in this study was that there were too many non-pharmacological interventions applied to the post-laparotomy surgery patients.

Based on the results of these studies, it is necessary to do further research related to the effect of chewing gum on the difference of bowel sound return time in post-laparotomy surgery patients who are given gum-chewing interventions plus early mobilization and the post-laparotomy surgery patients that are only given early mobilization intervention.

All patients in this study will receive early mobilization intervention according to the standard operating procedures in the ward. Patients will get the same type of mobilization, which is left tilted and right tilted and in the same duration of time, which is 30 minutes. This early mobilization intervention was given in conjunction with the gum-chewing intervention in the intervention group. However, there are several studies that stated that the method of chewing gum does not have a significant effect in accelerating the return of bowel sound in post-laparotomy surgery patients. After an analysis was conducted to some of these studies, it was concluded that there were several factors that influenced the final results of research such as research principles, number of respondents, types of gum given, types of anaesthesia used, giving other interventions besides chewing gum, power research, and errors in making hypotheses ([Ge et al., 2015](#)).

Based on the previous research, it can be seen that there were significant differences in the final results of the implementation of gum chewing interventions, which can accelerate the return of bowel sound in post-laparotomy surgery patients. Therefore, in this study, researchers need to consider related factors that can influence the final results of the chewing gum intervention, so that later it can be seen whether the gum-chewing intervention has an influence on the return time of bowel sound of post-laparotomy surgery patients.

Nurses have an important role in providing the appropriate interventions to post-laparotomy surgery patients so that they can prevent post-surgery problems early, such as complications that will cause further harm to patients and families. One of the initial interventions that can be applied in restoring a patient's condition after a laparotomy surgery is to advise the patient to chew gum, which can improve the return time of bowel sound. Education and supervision in the provision of interventions are important tasks for nurses to do, such as giving directions regarding the duration and frequency of chewing, monitoring the level of patient's compliance when chewing, and seeing if there are problems during the chewing process. The objective of this study is to identify the difference of bowel sound return time between groups of intervention and control after being given chewing gum intervention among post-laparotomy surgery patients.

## **METHODS**

### **Study design**

The design of this study was a quasi-experiment post-test only control group.

### **Sample**

The population of this study was all post-laparotomy surgery patients. Samples were taken using purposive sampling technique. The criteria of respondents' inclusion were post-laparotomy surgery patients with general anaesthesia who underwent surgery for 60 minutes and were not inserted with NGT, so that a sample of 30 respondents was obtained.

### **Instrument**

The data were taken using an observation sheet instrument with measurements using a stethoscope and digital watch. The observation sheet contains the respondent's number, age, gender, weight, height, body mass index, medical diagnosis, type of anesthesia, length of surgery, hours when the patient is aware, hours of early intervention mobilization, hours of intervention for chewing gum, hours of measurement of bowel sounds and the amount of bowel sounds. According to [Van Bree et al. \(2014\)](#), bowel sounds will return within 24-48 hours after abdominal surgery with the use of general anaesthesia. If bowel sounds do not return to normal within 3-5 days after surgery, patients can be said to experience postoperative ileus ([Bashankaev et al., 2009](#)).

### **Intervention**

Chewing gum will cause intestinal peristaltic due to activation of the cephalic-vagal pathway which stimulates the cerebral cortex and hypothalamus to secrete digestive enzymes so that later can stimulate myoelectric intestinal activity and will counteract the effects of gastrointestinal opioid receptors activation ([Hall & Guyton, 2011](#)). A good gum is a free-sugar type because it will prevent an increase in blood sugar for patients who have a history of diabetes mellitus. The taste of chewing gum can be adjusted to the desires of respondents in the intervention group ([Andersson et al., 2015](#)). The right time to give gum to patients after laparotomy surgery should be started when the patient is fully aware (more than 2 to 3 hours after surgery), and there are no contraindications ([Tazegül Pekin et al., 2015](#)). The duration of chewing gum is the best, according to [Choi et al. \(2014\)](#) is around 30-40 minutes. This time is considered most effective because it will not overload the patient in chewing gum for too long, so the patient will still be able to follow the treatment process properly.

### **Data collection**

The retrieval of data was carried out in July 2018 in a women's surgical ward in one of the hospitals in West Java. Data collection techniques used in this study were administrative techniques and intervention techniques. Administrative techniques started from taking care of ethical permits at the research location, providing explanations and equations of perceptions related to research procedures to trained surgical nurses in the research location, as well as determining prospective respondents both control and intervention groups. The second data collection technique was an intervention technique that began with the researchers introducing to prospective respondents and explaining the procedure for measuring bowel sounds. The researchers confirmed again before the surgery that prospective respondents were willing to take part in the research, and gave the opportunity for respondents to ask questions and filled out the consent sheet to take part in the informed consent before the surgery took place, the researcher had to wait for the respondent to arrive at the nursing room where the respondent had been in the recovery room for the recovery process, early mobilization which is the standard of care for post-operative patients at the study site and at the same time the researchers gave gum-chewing interventions in the intervention group after 30 minutes of respondents were inpatient room, gum-chewing intervention was given and periodic bowel measurements were measured.

**Data analysis**

The data were analyzed using frequency distribution and Mann Whitney.

**Ethical consideration**

This study has been approved by the Research Ethics Committee of Hasan Sadikin Hospital (Approval number: No. LB.04.01/A05/EC/132/V/2018). Before the research was conducted, the researchers asked the respondents for approval through an informed consent sheet. Respondents were given an explanation regarding the purpose, benefits, risks and inconveniences during the study, and the researcher gave the opportunity to the respondent to ask about the procedure that was felt to be less understood. If the respondent refused to be involved in the study, the researcher would not force and continue to respect the rights held by each respondent.

**RESULTS**

Table 1 showed the frequency distribution of post-laparotomy surgery patients as respondents based on age characteristics according to [Department of Health \(2009\)](#), sex, body mass index (BMI) according to [Department of Health \(2011\)](#), type of anaesthesia and length of time of surgery.

The frequency distribution of respondents based on age level is mostly 36-45 years old (Late Adult), which is as much as 12 (40.0%). All respondents were female. The frequency distribution of respondents based on body mass index (BMI) mostly had a body mass index (BMI) of 18.5 - 25.0 (Normal), which was 13 (43.3%). All of the respondents in this study used general anaesthesia during the surgery and had the same duration of surgery, which is 60 minutes.

**Table 1** The Characteristics of Post-Laparotomy Surgery Patients in a Women’s Surgical Ward in one of the Hospitals in West Java 2018 (n=30)

Respondents’ Characteristics	Respondents				Total	
	Intervention group		Control group		f	%
	f	%	f	%		
<b>Age</b>						
17 – 25 years old (Late adolescence)	6	40.0	3	20.0	9	30.0
26 – 35 years old (Early adulthood)	5	33.3	4	26.7	9	30.0
36 – 45 years old (Late adulthood)	4	26.7	8	53.3	12	40.0
<b>Sex</b>						
Male	0	0	0	0	0	0
Female	15	100.0	15	100.0	30	100.0
<b>Body Mass Index (BMI)</b>						
<17.0 (Heavily Underweight)	0	0	0	0	0	0
17.0 – 18.4 (Mildly underweight)	1	6.7	3	20.0	4	13.3
18.5 – 25.0 (Normal)	6	40.0	9	60.0	13	43.3
25.1 – 27.0 (Mildly Overweight)	3	20.0	1	6.7	4	13.3
>27.0 (Heavily overweight)	5	33.3	2	13.3	9	30.0
<b>Types of Anesthesia</b>						
General Anesthesia	15	100.0	15	100.0	30	100.0
<b>Duration of Surgery</b>						
60 Minutes	15	100.0	15	100.0	30	100.0

**Table 2** Comparison of the Bowel Sound Return Time of the Post-Laparotomy Surgery Patients in Women’s Surgical Ward in one of the Hospitals in West Java 2018 (n=30)

Respondent Group	Median (minutes)	Minimum (minutes)	Maximum (minutes)
Intervention Group	90	60	150
Control Group	150	90	150

Table 2 illustrates the bowel noise return time of post-laparotomy surgery patients in Women’s Surgical Ward in one of the Hospitals in West Java in a group given gum-chewing intervention with a median value of 90 minutes, a minimum value of 60 minutes and a maximum value of 150 minutes (more than

120 minutes). The control group that was not given gum-chewing intervention has a median value of 150 minutes (more than 120 minutes), a minimum value of 90 minutes and a maximum value of 150 minutes (more than 120 minutes).

**Table 3** Differences in the Bowel Sound Return Time of the Post-Laparotomy Surgery Patients (n=30)

	N	p-value
Bowel Sound Return Time of the Post-Laparotomy Surgery Patients (Intervention and control groups)	30	0.005

Before conducting a test to see if there is an effect of giving a gum-chewing intervention to the return time of bowel sounds of a patient after a laparotomy surgery, a normality test for the data was conducted first. The normality test used was Shapiro-Wilk because the number of respondents was less than 50. with sig value or *p*-value obtained was 0.019 (<0.05), which indicated that the data on the return time of bowel sound of post-laparotomy surgery patients in the intervention group was abnormally distributed. Meanwhile, the value of sig. or *p*-value in the control group was 0.000 (<0.05), which was also abnormally distributed.

The result of Mann Whitney test revealed that the *p*-value was 0.005 (<0.05), which indicated that there was a significant difference in the return time of bowel sound in post-laparotomy surgery patients between the intervention group and the control group (see Table 3).

## DISCUSSIONS

Based on the results of the study in table 2, it is seen that the respondents who did not get gum-chewing intervention and were only given standard care, namely early mobilization after laparotomy surgery (control group), had a bowel sound return time of 150 minutes (or more than 120 minutes) after early mobilization. Meanwhile, respondents in the intervention group who were given standard early mobilization interventions and additional intervention to chew gum after laparotomy surgery had 90 minutes return time of bowel noise after the intervention.

Findings also showed that there was a time difference in the return of bowel noise between the intervention and control groups in post-surgical laparotomy patients. The intervention group has a return time of bowel sound 90 minutes after the implementation of the gum-chewing intervention and early mobilization, while the control group's return time of bowel sound is around 150 minutes or more than 120 minutes after the intervention was given. This result was in line with the previous research conducted by [Bastiana \(2016\)](#) that patients after laparotomy surgery who were given standard intervention in the form of early mobilization had an average return of bowel sounds at 240 minutes after the intervention.

All respondents in this study received early mobilization interventions of the same type and duration. The implementation of early mobilization intervention in post-laparotomy surgery patients could improve blood circulation and accelerate the return of physiological functions, including the digestive system, namely intestinal peristalsis ([Castelino et al., 2016](#)).

The return of bowel sound in 90 minutes in the intervention group could be caused by a mechanism of action when chewing gum

where intestinal peristalsis will occur due to the activation of the cephalic-vagal pathway. The chewing movement will stimulate the cerebral cortex and hypothalamus to secrete digestive enzymes, which can later stimulate myoelectric intestinal activity and will counteract the effects of gastrointestinal opioid receptor activation ([Hall & Guyton, 2011](#)).

Free-sugar chewing gum with the brand Xylitol was chosen by researchers because it can prevent the risk of increasing blood sugar for patients who have a history of diabetes mellitus ([Andersson et al., 2015](#)). Before the research was conducted, the researchers checked the respondents whether they were allergic to gum with the type of Xylitol or not. In addition, monitoring for 30 minutes after observation of bowel sound for 120 minutes was also performed, and no problems or allergies were found in respondents who had been given an intervention to chew gum.

The intervention of chewing gum on the respondents was given after the patients were in the treatment room for 30 minutes, in which the patient had already been in the recovery room for postoperative recovery for two hours. According to the previous research ([Tazegül Pekin et al., 2015](#)), a gum-chewing intervention can be done after the patient is fully aware, i.e. more than 2 to 3 hours after surgery and no contraindications. Patients are encouraged to chew gum for only 30 minutes. This is because according to the research by [Choi et al. \(2014\)](#), the best duration of chewing gum is around 30 to 40 minutes. This is the most effective duration because it will not overload the patient in chewing gum for too long, so the patient will still be able to follow the treatment process properly.

Our findings were also in line with a previous study which proved that chewing gum could accelerate the return of bowel sound in patients after laparotomy surgery. Research by [Tazegül Pekin et al. \(2015\)](#) stated that chewing gum proved to be safe and well-tolerated in patients after gynaecological laparotomy pelvic surgery type to accelerate the occurrence of flatus, defecation, recovery of bowel sound, prevent vomiting, and shorten the hospital stay. Average bowel sound returns in the first four hours after patients were given intervention both in the form of chewing gum and early mobilization. Patients in the intervention group who were recommended to chew gum after laparotomy surgery proved that there were more people who had the bowel noise return in the first four hours compared to the control group. In addition, patients also had a faster time to discharge flatus, which were about 2.2 days in the intervention group and three days in the control group.

In addition, the findings also confirmed a previous research conducted by [Husslein et al. \(2013\)](#) who also stated that chewing gum could reverse the gastrointestinal function of patients after laparotomy surgery with gynaecological indications. The return

of bowel sound was heard earlier in the intervention group by chewing gum, which was about the hours after the patient was aware and immediately given the intervention, whereas, in the control group that was not given gum-chewing intervention, bowel sounds were heard only after five hours.

Another study also stated that, patients after laparotomy surgery with indications of prostatectomy without intestinal manipulation who were implemented with gum-chewing intervention after surgery also experienced a faster time of the return of bowel sound, which is about 46.1 hours after the implementation of chewing gum intervention compared to the group without the intervention of chewing gum who had a return of bowel noise of around 60.7 hours. This can shorten the treatment time of post-laparotomy surgery patients in hospitals ([Choi et al., 2014](#)). And [Terzioglu et al. \(2013\)](#) also reported that if post-laparotomy surgery patients in gynaecological cases were given an early mobilization and gum chewing intervention, the bowel sound would be heard more quickly, i.e. 2.5 hours to a maximum of 10 hours compared to if only one of the interventions were done.

This proves that the return of bowel noise in post-laparotomy surgery patients can be faster if early mobilization that has been done previously both abroad and in Indonesia as a method to accelerate the return of intestinal peristalsis in patients after laparotomy surgery can be combined with the intervention of giving chewing gum. That is because chewing gum has been proven to be safe, simple and can be applied either through single intervention or multi-model intervention to improve bowel sound and prevent complications after laparotomy surgery.

The difference in the return time of bowel sound in the intervention and control groups can be attributed to several factors. If seen from the results of the study in table 1, it shows that the average of age of respondents was between 36 and 45 years old, which were most likely in 12 respondents (40.0%). According to [Kozier et al. \(2010\)](#), respondents in adulthood to the elderly age have a longer time in recovering intestinal peristalsis postoperative with general anaesthesia and are more at risk of experiencing the delayed return of bowel sound after surgery if no proper treatment is done. This is because the body's physiology has decreased with age, and one of them has an impact on the digestive system, such as intestinal peristalsis in postoperative patients. According to the results of [Bastiana \(2016\)](#), it was reported that the longest process of restoring bowel sound after the laparotomy surgery was around 240 minutes - 480 minutes after the intervention of early mobilization occurred on average in late adult patients, elderly and old age.

All respondents in this study were female which amounted to 30 people and were divided into two groups namely intervention and control groups. All respondents were women because this study was conducted in a women's surgical ward in one of the hospitals in West Java which was the place of care for female surgical patients with obstetric and gynecological indications. The overall sex of the female respondent was also associated with the influence of the return of bowel noise, because physiologically women will be more at risk of experiencing delayed postoperative bowel noise due to hormonal activity in women such as

menstruation, pregnancy, contraceptive use and menopause ([Hall & Guyton, 2011](#)). Therefore, it is necessary to have appropriate intervention to accelerate the return of bowel sound in women after laparotomy surgery under general anesthesia.

Laparotomy surgery is not only performed on women but also on men. According to the results of a study conducted by [Bastiana \(2016\)](#), the most widely performed laparotomy surgery in men is laparotomy open prostatectomy and herniopathy. The majority of the respondents in this study had a body mass index in the normal range of 18.5 - 25.0 as many as 13 people (43.3%). The difference in the time of the return of bowel sound in post-laparotomy surgery patients between the intervention and control groups could also be due to body mass index. Someone with an excess body mass index will have a greater risk of delaying the return of bowel sounds after surgery because the gastrointestinal tract is coated with fat so that the digestive system's work process is blocked, one of which is the intestinal peristalsis ([Kozier et al., 2010](#)). Based on the previous research, patients with laparotomy under general anaesthesia who have a normal body mass index have an average return of bowel sounds in 240 minutes after the implementation of early mobilization interventions ([Bastiana, 2016](#)).

The type of anaesthesia used by all respondents in this study is general anaesthesia. This can also be attributed as a factor that influences the difference in the time of the return of bowel noise between the intervention and control groups in post-laparotomy surgery patients. The use of general anaesthesia on surgery has more effect on decreasing intestinal peristalsis compared to regional anaesthesia, because the use of general anaesthesia will stimulate non-cholinergic non-adrenergic, thus blocking the neurotransmitter in the myenteric plexus or aurbach in the abdominal smooth muscle, namely the muscular externa. The myenteric plexus or aurbach is a part of the nervous system located between the circular and longitudinal external muscular which functions to regulate movement in the intestinal wall ([Hall & Guyton, 2011](#)). Therefore, laparotomy surgery patients with general anaesthesia will have a higher risk of experiencing a the return of bowel sound after surgery.

All respondents had the same duration of surgery, namely 60 minutes. The duration of surgery can also be a factor that causes differences in the return of bowel noise between the intervention and control groups in post-laparotomy surgery patients. The longer the surgery takes place, the higher the dose of the anaesthetic used in the patient. High-dose anaesthesia will extend the duration of post-surgery and increase the risk of delayed recovery of intestinal peristalsis ([Sjamsuhidajat & Wim, 2010](#)).

One of the nursing implications in this study is related to the caregiver who applies Betty Neuman's model theory to patients post laparotomy surgery. The role of caregiver in this study is to deal with the stressors faced by patients with primary intervention. The primary intervention included an initial assessment of bowel sounds and the implementation of non-pharmacological interventions to chew gum to accelerate recovery of intestinal noise in patients post laparotomy ([Kozier et al., 2010](#)). In addition, the importance of the role of nurses as

educators in providing education and direction to patients after laparotomy surgery is related to the compliance that must be followed by patients and families on the rules of postoperative feeding and drinking. Nurses must also teach patients how to chew gum correctly and explain the purpose and benefits of applying non-pharmacological interventions for the healing process (Kozier et al., 2010). It is expected that with the application of the role of nurses based on the Betty Neuman model theory, it can accelerate the recovery time of bowel sounds and prevent further problems from occurring.

## CONCLUSION

Our findings found that there was a difference in the return time of bowel sound between the intervention and control groups. The intervention group that received standard early mobilization coupled with gum-chewing intervention had a return time of bowel sound around 90 minutes, while the control group that only received standard intervention in the form of early mobilization had a return time of bowel sound more than 120 minutes. This proved that chewing gum has an influence in accelerating the return of bowel sound in post-laparotomy surgery patients, preventing the risk of postoperative ileus complications and shortening the length of hospital stay. A recommendation for future research is to observe more complete bowel sounds in patients after laparotomy surgery so that it can help reducing the risk of postoperative ileus complications. The study can be replicated in a larger sample in different settings so that the findings can be generalized to a larger population.

## DECLARATION OF CONFLICTING INTEREST

The authors declare that there is no conflict of interest.

## FUNDING

This research was conducted under self-funded.

## ACKNOWLEDGMENT

We thank Universitas Padjadjaran for supporting the research.

## AUTHOR CONTRIBUTION

All authors have contributed in the preparation of the manuscript. WMA provided article development and ideas, reviewed theories and literatures, analyzed, interpreted data, and drafted manuscript. CI and RM criticized and analyzed the manuscript. All authors made final approval of the manuscript.

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**Cite this article as:** Amanda, W. M., Isabella H. P. C., Mirwanti, R. (2019). Difference of bowel sound return time among post-laparotomy surgery patients after chewing gum. *Belitung Nursing Journal*.5(5), 204-211. <https://doi.org/10.33546/bnj.826>