ORIGINAL ARTICLE

Bali Medical Journal (*Bali MedJ)* 2021, Volume 10, Number 3 Special Issue ICONURS: 1048-1052
P-ISSN.2089-1180, E-ISSN: 2302-2914

Bali Medical Journal
www.BaliMedicalJournal.org
Published by Bali Medical Journal

Chewing gum administration towards gastrointestinal motility on postoperative patients of PKU Muhammadiyah Gamping Hospital

Arianti[1*], Imam Ma'arif Annafi[1]

[1]Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia;

*Corresponding author:
Arianti;
Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia;
arianti@umy.ac.id

Received: 2021-10-22
Accepted: 2021-12-02
Published: 2021-12-28

ABSTRACT

Background: Surgical procedures involving anesthetics could cause a complication of the digestive tract called postoperative ileus (POI). POI complicates the patient's recovery and prolongs the stay period at the hospital. One of the most common interventions to prevent POI is early-postoperative feeding (EPF) to stimulate gastrointestinal motility that will prevent POI. Still, EPF is considered to be unsafe, according to several studies. Because of the disadvantage of EPF, some studies seek an alternative to EPF, one of which is postoperative chewing gum. The study aims to test the effectiveness of chewing gum to stimulate gastrointestinal motility in postoperative patients of PKU Muhammadiyah Gamping Hospital.
Methods: The research utilized a quasi-experimental design with the post-test control group. The research's samples are 30 postoperative patients of PKU Muhammadiyah Gamping Hospital. Samples were taken with probability sampling technique with purposive sampling approach. The effectiveness of chewing gum to stimulate gastrointestinal motility was determined by comparing the time record of the first bowel sound heard between the intervention and the control groups.
Results: The result shows that there is a significance of chewing gum intervention to stimulate gastrointestinal motility. The Meantime of the first bowel sound heard of the intervention group (2.00 ± 0.07) is shorter than the control group (2.36 ± 0.33). Comparison between the intervention and control groups shows significance with p-value = 0.02 ($p<0.05$ indicates importance).
Conclusion: Chewing gum intervention is effective in stimulating gastrointestinal motility in postoperative patients.

Keywords: *Chewing gum, Postoperative, Postoperative Illeus*.
Cite This Article: Arianti., Annafi, I.M. 2021. Chewing gum administration towards gastrointestinal motility on postoperative patients of PKU Muhammadiyah Gamping Hospital. *Bali Medical Journal* 10(3) Special Issue ICONURS: 1048-1052. DOI: 10.15562/bmj.v10i3.2823

INTRODUCTION

The postoperative period is a period after surgery has been performed on a surgical patient and counted from the moment a surgical patient is recovering in the recovery room.[1] During the postoperative period, many signs and symptoms appear due to surgery complications y and are influenced by types of surgery, length of surgery, dan types of anesthetics.[2] The most common signs and symptoms during the postoperative period include pain (65%), three surgical site infections (SSI) (31%), four postoperative ileuses (POI) (32%), five and other minor conditions such as fatigue, dizziness and headache (5-20%).[2]

The postoperative period requires systematic and well-documented nursing interventions to preserve patients' safety and ensure that the interventions effectively reduce or prevent postoperative complications.[1] Both pharmacological and non-pharmacological interventions for the most common sign and symptoms like pain and SSI have been well-researched, and there are several international guidelines readily available for it,[3,4] meanwhile the intervention to stimulate gastrointestinal (GI) motility during the postoperative period is still rarely researched and lacking any international policy. The most frequently used intervention for the lack of gastrointestinal motility is to wait for the natural body recovery from anesthetic, marked by flatus, bowel sound and defecation, before a postoperative patient was permitted to receive oral nutrition.[5] The delay in oral nutritional intake could increase patient morbidity.[6] Morbidity includes the appearance of POI, which could lead to paralytic ileus (PI), pain, nausea, vomiting, discomfort, increasing length of hospital stay and depression.[7]

One of the emerging methods to stimulate GI motility during the postoperative period is early postoperative feeding (EPF). Early postoperative feeding could decrease the risk of SSI, acute pain and PI on the postoperative patients.[7] Unfortunately, EPF could trigger intolerance cases in the postoperative patient, which could cause nausea and vomiting,[7] therefore, increasing the delay of oral nutrition intake, which would cause cell destruction, the uncertainty of surgical wound recovery, SSI risk, dependence on intravenous (IV) nutritional intake, and increasing length of hospital stay as well as operational cost.[8] One of the alterations to EPF is using chewing gum (CG). Chewing gum is safer than EPF because it could stimulate gastrointestinal motility from the chewing activity without introducing

any solid nutrition to the GI tract, nine of which could trigger nausea or vomiting, as found in several cases with the standard EPF method.[7]

Chewing gum has been researched and documented to positively stimulate GI motility in the post-operative patients.[7] Chewing gum could stimulate the secretion of digestive hormones,[8] stimulate GI nerve,[9] and stimulate bowel motility[5] which could accelerate the recovery of GI motility function that would allow the postoperative patient to receive oral nutrition intake.[10] The faster healing of the GI tract is proven by the earlier sign of flatus, bowel sound and defecation time.[5,7–9,11]

During the literature review process, no scientific journal was found to research the effect of chewing to stimulate GI motility on post-operative patients in Indonesia. The many benefits and advantages of chewing gum should have become an improvement of the current postoperative nursing intervention especially related to GI motility recovery in Indonesia, which still utilize the wait-and-see method that relies on the recovering patient ability to report flatus, feeling to defecate and nurse's finding of bowel sound as it is practiced at PKU Muhammadiyah Gamping Hospital. The study aims to test the effectiveness of chewing gum to stimulate gastrointestinal motility in postoperative patients of PKU Muhammadiyah Gamping Hospital.

METHODS

Study Design

This research utilized a quasi-experimental design with the post-test control group. During the study, samples will be divided into the control group and the intervention group. The intervention group will receive the chewing gum intervention. The control group will receive the standard treatment as in the hospital treatment guidelines for the post-operative patient.

Sample Selection

The population of the research was 211 patients that were scheduled for surgery; from the population, 30 postoperative patients at PKU Muhammadiyah Gamping hospital were taken as the sample by probability sampling technique with purposive sampling approach. Inclusion criteria for sampling were a patient between 18-65 years old, conscious and able to chew after the surgery. Informed Consent and any information regarding the research process were provided before any surgical schedule was performed on the patient. To further protect the right and dignity of the research respondent, informed consent was given before respondents participated in their scheduled surgery, and the data were written in coded names of the respondent. Furthermore, if the selected respondent had a complication at the postoperative period that made the respondent unconscious or unable to chew, a new respondent was sought after to replace the respondent with difficulty to prevent potential harmful risk.

Assessment

The effectivity of chewing to stimulate GI motility was known by comparing the time of first bowel sound during the postoperative period of intervention and control group, which were recorded in a simple observation paper designed to record the first bowel sound. The first bowel sound was recorded as soon as the patients were discharged from the operation room in the conscious state and able to chew for the intervention group, or only aware for the control group. Any patient that came out from the surgical room unconscious, unable to chew and or to require further medical assistance due to severe postoperative complication were excluded from the list of the research sample, and a new model was then sought to provide us an unused substitute for the excluded patient.

Statistical Analysis

Data procession and analysis were done by inputting the data on SPSS v15.0. The data normality was then tested with the Shapiro-Wilk test, and further, the significance value of the data was discovered with the Mann-Whitney test. The first data will be about the population sample's demographic characteristics, including age range, gender, and the types of anesthetics used during the surgical process. The following data collected is about the time distribution between intervention and control group, including its min-max value and the mean and its std. deviation. From the time distribution, its mean value will be processed with the Shapiro-Wilk test, and its significance value will then be found with the Mann-Whitney test.

RESULTS

According to Table 1, the frequency distribution of respondents' sex shows that the majority of the intervention group is male, which consisted of 11 respondents (73.3%) meanwhile control group has a more balanced composition with 7 male (46.7%) and 8 females (53.3%). According to Table 1, respondents' age is dominated by the 36-65 age range. The youngest respondent is 19 years old, while the oldest respondent is 65 years old. Table 1 also shows that respondents' distribution according to the type of anesthetics is quite balanced, with 8 respondents receiving spinal anesthetic and 7 respondents receiving general anesthetic on both groups.

The significance value for the respondent's characteristics according to sex, age, and type of anesthetics towards the first bowel time is not significant. Therefore, from such a significance value, the respondent's features did not influence the time of the first bowel sound.

Table 2 shows the result of the first appearance of bowel sound on the respondent, measured in hours. The mean of the first bowel sound for the intervention group is 2.00 hours with a standard deviation of 0.07; meanwhile, in the control group, the norm for the first bowel sound is 2.36 hours with a standard deviation of 0.33. The result could be concluded that the mean of the intervention group's first bowel sound is earlier than the control group. The earliest time for bowel sound in the intervention group is 1.93 hours, while the latest is 2.20 hours. Meanwhile, the earliest time on the control group is 1.95 hours, with the latest time of 3.08 hours.

As shown in Table 3, the Mann-Whitney test shows that the significance value is 0.002 (<0.05), which means there is a significant impact of chewing gum toward GI motility recovery of the postoperative patient according to the time of appearance of the first bowel sound. The result is further supported by

Table 1. Respondent characteristics according to sex, age and type of anesthetics (N = 30).

Demographics	Intervention Group F (%)	Control Group F (%)	P-value
Age			
≤ 25	3 (20%)	1 (6.66%)	
26 – 35	0 (0%)	3 (20%)	.827
36 – 45	4 (26.66%)	4 (26.6%)	
46 – 55	4 (26.66%)	3 (20%)	
56 – 65	4 (26.66%)	4 (26.6%)	
Gender			
Female	4 (26.6%)	8 (53.3%)	.710
Male	11 (73.3%)	7 (46.6%)	
Type of Anesthetics			
Spinal	8 (53.3%)	8 (53.3%)	.911
General	7 (46.6%)	7 (46.6%)	

Table 2. Distribution of the time (in an hour) of first bowel sound on intervention and control group (N=30).

Group	Min-Max	Mean	Std. Deviation
Intervention	1.93-2.20	2.00	0.07
Control	1.95-3.08	2.36	0.33

Table 3. The result statistic test of Mann-Whitney for the time of first bowel sound on intervention and control group.

	Intervention Group Mean	Control Group Mean	T	P-value
Time of first bowel sound	2.00 ± 0.07	2.36 ± 0.33	.002	.001

the intervention, 2.00 ± 0.07 hours, which is earlier than the control group's mean of 2.36 ± 0.33 hours. The result has proven an accelerated recovery time of GI motility by chewing gum on the intervention group.

DISCUSSION

As shown in Table 1, there is no significant value between the respondent gender toward the time of the first bowel sound. In their study, multiple references involving different genders also showed no significant value of gender characteristics toward GI motility recovery time.[7,12–16] According to Table 1, there is also no significant value between the age of respondents towards the time of the first bowel sound. This finding is also being supported by similar references that include age characteristics in their study.[5,8,13,14,17,18] In this research, only two kinds of anesthetics were given to the research respondents, spinal and general. Just as the data provided in Table 1, there was no significant value related to the type of anesthetics toward the first bowel sound. This finding is by another reference that is being used for this research.[18]

The result shown in Table 2 shows that the average time of the intervention group is shorter than the average time of the control group. The minimum and maximum time of the first bowel sound is also at a closer range on the intervention group than the control group's minimum and full time. A direct comparison means that the intervention group was faster at recovering the GI motility, as shown by the sign of the first bowel sound.[7] This finding is by the proposed theory that an early oral nutrition introduction would have helped the recovery of GI motility much earlier compared to the conventional method of waiting until the patient reported signs such as flatus or a felt sensation to defecate and the nurse confirmed that bowel sound was also heard.[5,7] The latter method was implemented to assume that introduction to oral nutrition before signs of GI motility appeared could trigger nausea and vomiting on the recovering patient.[7] Although in the latest study that supports EPF, it has been found that early introduction to oral nutrition intake is pretty safe.[6,7,19–21]

The basic for EPF is that an early presence of masticating secretion and the activity of masticating itself would have stimulated the works of both sympathetic and parasympathetic nerves. The work between those two nerval systems would trigger the myenteric nerve along the GI tract, triggering bowel motility to reactivate and activate the secretion of digestive hormones and enzymes along the wall of the gastric, pancreas, and large intestines.[7,22] From such physiological feedback, an earlier recovery time for GI motility during the postoperative period would be possible.[7] Chewing gum which is a form of EPF that utilizes sham feeding to stimulate the same physiological feedback as EPF without carrying the risk of EPF of nausea and vomiting on the recovering patient, has been proven to be effective to stimulate GI motility, as shown by the presence of a much earlier bowel sound finding on the respondents. The earlier time of intervention group compared to control group is also supported by the finding of several studies that implemented chewing gum and the similar result of faster recovery time of intervention group as compared to the control group.[5,8,12–14,18]

The significance test results in Table 3 can conclude a significant relationship between chewing gum toward the time of first bowel sound on a postoperative patient that signifies an earlier recovery of GI motility along the GI tract during

the postoperative period. This finding is by several references used in this research.[5,8,12,14,17,18] From the result of this research, it can be suggested that an EPF in the form of chewing gum can be implemented as an improved method of nursing intervention for recovering the GI motility of postoperative patients during the postoperative period. Furthermore, this research can serve as a reference for further research involving chewing gum to recover GI motility in the postoperative patient.

CONCLUSION

This research showed a significant relationship between chewing gum administration and GI motility recovery time on postoperative patients, which means that chewing gum is effective in helping postoperative patient recover their GI motility function after surgery.

CONFLICT OF INTEREST

The researchers declared that there is no conflict of interest involved in this research.

ETHICAL CLEARANCE

The ethical commission of FKIK UMY passed the ethical clearance for this research after an ethical review with ethical number 263/EP-FKIK-UMY/V/2018.

FUNDING

The researchers declared that there is no funding involved in this research.

AUTHOR CONTRIBUTION

All authors searched for journals included journal analysis, journal selection, and synthesizing the data.

REFERENCES

1. Serra MAA de O, Silva Filho FF da, Albuquerque ADO, Santos CAA dos, Carvalho Junior JF de, Silva RDA e. Nursing care in the immediate postoperative period: a cross-sectional study. Online Brazilian J Nurs. 2015;14(2):161. Available from: http://dx.doi.org/10.17665/1676-4285.20155082
2. Berg K, Årestedt K, Kjellgren K. Postoperative recovery from the perspective of day surgery patients: A phenomenographic study. Int J Nurs Stud. 2013;50(12):1630–8. Available from: http://dx.doi.org/10.1016/j.ijnurstu.2013.05.002
3. Meissner W, Coluzzi F, Fletcher D, Huygen F, Morlion B, Neugebauer E, et al. Improving the management of post-operative acute pain: priorities for change. Curr Med Res Opin. 2015;31(11):2131–43. Available from: http://dx.doi.org/10.1185/03007995.2015.1092122
4. A T, H A, F Z. A Systemic Review on Surgical Site Infections: Classification, Risk Factors, Treatment Complexities, Economical and Clinical Scenarios. J Bioequiv Availab. 2016;09(01). Available from: http://dx.doi.org/10.4172/jbb.1000321
5. Mansour SE, Elnegeri MA, Ibrahim AA. Chewing Gum after Cesarean Section : It's Effect on Regaining Intestinal Function. IOSR J Nurs Heal Sci. 2016;5(6):75–83.
6. Lewis SJ, Egger M, Sylvester PA, Thomas S. Early enteral feeding versus "nil by mouth" after gastrointestinal surgery: systematic review and meta-analysis of controlled trials. BMJ. 2001;323(7316):773–6. Available from: https://pubmed.ncbi.nlm.nih.gov/11588077
7. Short V, Herbert G, Perry R, Lewis SJ, Atkinson C, Ness AR, et al. Chewing gum for postoperative recovery of gastrointestinal function. In: Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2014. Available from: http://dx.doi.org/10.1002/14651858.cd006506.pub2
8. Ledari FM, Barat S, Delavar MA. Chewing gums has stimulatory effects on bowel function in patients undergoing cesarean section: a randomized controlled trial. Bosn J basic Med Sci. 2012;12(4):265–8. Available from: https://pubmed.ncbi.nlm.nih.gov/23198943
9. Craciunas L, Sajid MS, Ahmed AS. Chewing gum in preventing postoperative ileus in women undergoing caesarean section: a systematic review and meta-analysis of randomised controlled trials. BJOG An Int J Obstet Gynaecol. 2014;121(7):793–800. Available from: http://dx.doi.org/10.1111/1471-0528.12696
10. Huang H-P, He M. Usefulness of chewing gum for recovering intestinal function after cesarean delivery: A systematic review and meta-analysis of randomized controlled trials. Taiwan J Obstet Gynecol. 2015;54(2):116–21. Available from: http://dx.doi.org/10.1016/j.tjog.2014.10.004
11. Zhu Y-P, Wang W-J, Zhang S-L, Dai B, Ye D-W. Effects of gum chewing on postoperative bowel motility after caesarean section: a meta-analysis of randomised controlled trials. BJOG An Int J Obstet Gynaecol. 2014;121(7):787–92. Available from: http://dx.doi.org/10.1111/1471-0528.12662
12. Abdollahi AA, Yazdi K, Behnampour N, Niazi M. Effect of Gum-chewing on the Movement of Intestines after Abdominal Resection and Length of Hospital Stay. Int J Hosp Res. 2013;2(3):127–32.
13. Mahmoud MH, Mohammad SH. Chewing gum for declining ileus and accelerating gastrointestinal recovery after appendectomy. Front Nurs. 2018;5(4):277–84. Available from: http://dx.doi.org/10.1515/fon-2018-0038
14. Nimarta N, Singh NV, Shruti Shruti,, Gupta R. Effectiveness Of Chewing Gum On Bowel Molitity Among The Patients Who Have Undergone Abdominal Surgery . Nurs Midwifery Res Journal,. 2013; Available from: http://dx.doi.org/10.33698/nrf0159
15. Ge W, Chen G, Ding Y-T. Effect of chewing gum on the postoperative recovery of gastrointestinal function. Int J Clin Exp Med. 2015;8(8):11936–42. Available from: https://pubmed.ncbi.nlm.nih.gov/26550107
16. Wen Z-J, Wang W-T, Mei B-B, Wu C, Shen M-F. Gum chewing for promoting intestinal function recovery after colorectal cancer surgery: A meta-analysis. World Chinese J Dig. 2017;25(2):147. Available from: http://dx.doi.org/10.11569/wcjd.v25.i2.147
17. Hanham A, Addy M. The effect of chewing sugar-free gum on plaque regrowth at smooth and occlusal surfaces. J Clin Periodontol. 2001;28(3):255–7. Available from: http://dx.doi.org/10.1034/j.1600-051x.2001.028003255.x
18. Rashad W. Effect of sugarless gum chewing on intestinal movement after cesarean section. Life Sci J. 2013;10:3275.
19. Dag A, Colak T, Turkmenoglu O, Gundogdu R, Aydin S. A randomized controlled trial evaluating early versus traditional oral feeding after colorectal surgery. Clinics (Sao Paulo). 2011;66(12):2001–5. Available from: https://pubmed.ncbi.nlm.nih.gov/22189721

20. Anita Nelson FK. Simple Steps to Hasten Post-Operative Recovery. J Women's Heal Care. 2013;02(04). Available from: http://dx.doi.org/10.4172/2167-0420.1000137
21. Lee HS, Shim H, Jang JY, Lee H, Lee JG. Early feeding is feasible after emergency gastrointestinal surgery. Yonsei Med J. 2014;55(2):395–400. Available from: https://pubmed.ncbi.nlm.nih.gov/24532509
22. Hall JE, Guyton AC. Membrane physiology, nerve, and muscle [Internet]. Guyton and Hall Physiology Review. Elsevier; 2011. p. 5–22. Available from: http://dx.doi.org/10.1016/b978-1-4160-5452-8.00011-1