The Effects of a Constipation Prevention Program on Incidence and Severity of Constipation in Hospitalized Elderly undergoing Hip Surgery *

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Abstract

Purpose: To examine the effects of constipation prevention program on incidence and severity of constipation in hospitalized elderly undergoing hip surgery.

Design: Quasi-experimental design.

Methods: The sample consisted of 60 hospitalized elderly undergoing hip surgery. The control group (n = 30) received usual care, whilst the experimental group (n = 30) participated in a constipation prevention program. Data were collected by the following instruments: the daily defecation record form, the bowel pattern assessment form, and the constipation risk assessment form. Constipation was evaluated by the frequency of defecation from the first to the fifth postoperative day, from 3 days before surgery to 5 days post operation, and the first day for defecation postoperatively, Data were analyzed by using descriptive statistics, Chi-square test, and Independent t-test.

Main findings: The elderly who participated in the experimental group had statistically significant lower incidence of constipation postoperatively and less severity of constipation than those in the control group ($p < .01$ and $p < .05$, respectively).

Conclusion and recommendations: The results indicated that the constipation prevention program for hospitalized elderly with hip surgery was effective in reducing the incidence and severity of constipation. The program should be recommended as a tool to improve quality of care for hospitalized elderly who are at risk of developing constipation.

Keywords: constipation prevention, hip surgery, hospitalized elderly

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ผลของโปรแกรมการป้องกันอาการท้องผูก ต่ออุบัติการณ์และระดับความรุนแรงของอาการท้องผูกในผู้สูงอายุที่เข้ารับการผ่าตัดกระดูกสะโพก *

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาประสิทธิผลของโปรแกรมการป้องกันอาการท้องผูก ต่ออุบัติการณ์และระดับความรุนแรงของอาการท้องผูกในผู้สูงอายุที่เข้ารับการผ่าตัดกระดูกสะโพก

รูปแบบการวิจัย: การวิจัยกึ่งทดลอง

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างคือผู้ป่วยสูงอายุที่เข้ารับการผ่าตัดกระดูกสะโพก เป็นกลุ่มควบคุม 30 ราย ที่ได้รับการพยาบาลแบบปกติ และกลุ่มทดลอง 30 ราย ที่ได้รับโปรแกรมการป้องกันอาการท้องผูกในผู้สูงอายุที่เข้ารับการผ่าตัดกระดูกสะโพก เก็บรวบรวมข้อมูลโดยใช้แบบบันทึกข้อมูลส่วนตัว แบบบันทึกการถ่ายอุจจาระประจำวัน แบบประเมินแบบแผนการขับถ่ายอุจจาระ แบบประเมินความเสี่ยงต่อการเกิดอาการท้องผูก วิเคราะห์ข้อมูลโดยใช้สถิติบรรยาย สถิติไคสแควร์ และสถิติที

ผลการวิจัย: ผู้ป่วยสูงอายุกลุ่มทดลอง มีอุบัติการณ์เกิดอาการท้องผูกหลังผ่าตัด และมีระดับความรุนแรงของการเกิดอาการท้องผูกน้อยกว่าผู้ป่วยสูงอายุกลุ่มควบคุม (ประเมินจากจำนวนครั้งในการถ่ายอุจจาระได้หลังผ่าตัดวันแรกจนถึงวันที่ 5 หลังผ่าตัด ตั้งแต่ 3 วันก่อนผ่าตัดจนถึงวันที่ 5 หลังการผ่าตัด และจำนวนวันที่สามารถถ่ายอุจจาระได้เป็นครั้งแรกหลังผ่าตัด) อย่างมีนัยสำคัญทางสถิติ ($p < .01$ และ $p < .05$ ตามลำดับ)

สรุปและข้อเสนอแนะ: โปรแกรมการป้องกันอาการท้องผูก สำหรับผู้สูงอายุที่เข้ารับการผ่าตัดกระดูกสะโพก ช่วยลดอุบัติการณ์อาการท้องผูก และลดความรุนแรงของอาการท้องผูกได้ จึงควรมีการนำไปใช้กับผู้ป่วยสูงอายุที่เข้ารับการผ่าตัดกระดูกสะโพก เพื่อพัฒนาคุณภาพการพยาบาลให้มีประสิทธิภาพดียิ่งขึ้น

คำสำคัญ : การป้องกันอาการท้องผูก ผู้สูงอายุที่เข้ารับการรักษาในโรงพยาบาล การผ่าตัดกระดูกสะโพก

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Introduction

Constipation is a common health problem and often found in the elderly and orthopaedic patients.[1] In Thailand, a national survey of health in people over 50 years of age showed chronic constipation to be among the top 20 health problems.[2] In Britain, three percent of young adults and 20 percent of older adults were regularly constipated while living at home, at work or in hospital.[3] According to the survey on orthopaedic patients in 50 hospitals in India, 40% of patients were constipated.[4]

Constipation profoundly affects lifestyle and causes physical and psychological problems.[5] Constipation can cause uncomfortable feeling, abdominal cramps, vertigo, taste impairment, anorexia, nausea, fatigue and halitosis.[6] If constipation becomes chronic, it may lead to complications such as anal fissures, bleeding hemorrhoids, perianal abcess[7], fecal impaction, and rectal prolapse.[8] Importantly, it may create serious or life threatening consequences in cardiac or hypertensive patients because arterial pressure may rise with defecation.[9, 10] Although no economic loss from constipation was reported in Thailand, in the United States, it was reported that expenses of diagnosis and treatment of constipation in tertiary care settings cost an average of $2,752 per patient, per year.[11] Constipation also induces psychosocial problems such as anxiety, low self-esteem and emotional change which affect relationships, social life and a diminished quality of life.[12,13] Therefore, prevention and reduction of constipation risk is critical to reduce those effects.

The hospitalized elderly, especially with hip fractures are at-risk of constipation because of certain factors. With advancing age, the elderly tended to have deteriorating excretory organs, decreased intestinal movement, and reduction in abdominal muscles including diaphragm and pelvic floor muscles tone. These factors result in a decrease in intra-abdominal pressure while forcing bowel movements.[14] Immobilization is another factor causing constipation.[15] The elderly with hip fractures must be immobilized by traction in order to prevent bone displacement and reduce swelling of tissues. During the postoperative period, these patients received analgesic drugs such as morphine, other opioids and NSAID which could reduce bowel movement, leading to constipation.[16] The patients with hip fractures had to stay in bed for bowel evacuation due to immobilization. These patients may have difficulty with bowel movement in the supine position, leading to more constipation.[17]

Evidence suggested several therapy modalities for constipation. The most common therapy is laxatives or enemas. However, these methods, over long term use, will stimulate a bowel movement unnaturally, and cause irritation to the colonic wall and muscles.[18] Though laxatives expel all contents in the small and large intestine, there are various contraindications for using laxatives, and improper use may be harmful. Some bulk-forming laxatives contain dextrose that can induce hyperglycemia in diabetic patients.[19] Enemas eliminate only feces in the colon.[5] Routine enemas can be harmful. For instance, using a large quantity of liquid enema regularly may expand the large bowel and induce a loss of tone which can exacerbate constipation.

According to the previous studies, both medical and non-medical treatment for prevention and management of constipation were recommended. Concerning the quality of scientific evidence to improve its management and prevention, Sansuksawat and colleagues[20] synthesized evidence based knowledge aiming to develop and utilize a clinical nursing practice guideline for prevention and management of constipation in adults and the elderly. The nursing practice guideline developed by Sansuksawat and colleagues[20] has not been adopted in hospitalized older adults undergoing hip surgery. Thus, this present study was to evaluate the effect of this nursing practice guideline on incidence and severity of constipation in hospitalized elderly undergoing hip surgery.

Hypothesis

The hospitalized elderly in this study with hip surgery, who received a constipation prevention program, would have a lower incidence of constipation and less severity of constipation than those who received usual care.

Methods

Research Design and setting

A quasi-experimental research was employed to

compare the differences in the incidence and severity of constipation between the hospitalized elderly with hip surgery who received a constipation prevention program (an experimental group) and those who received usual care (a control group). The study was carried out at an orthopaedic ward in a university hospital located in Bangkok, Thailand.

Sample

Sixty elderly individuals who met the inclusion criteria were recruited for the study. The inclusion criteria included: aged 60 years or over; admitted for hip surgery; able to communicate in Thai; able to eat by mouth and have no any restriction of water intake; and not diagnosed with constipation related to any disease or abnormal digestive systems.

The participants were assigned to an experimental (n= 30) and a control group (n = 30) based on matching similar participants' characteristics as follows: age (not more than 5-year difference), ability to ambulate during the third or the fourth postoperative day following the total hip replacement pathway of the selected university hospital; and receiving pain killers such as morphine every 4 hours postoperatively and during the first postoperative day, or other analgesic drugs with similar effects to opioid such as levobupivacain. The criteria for termination were those who had any complication during peri-operative period requiring treatment in ICU; had acute confusion; and needed to receive re-operation due to implant failure.

Measurement

Constipation Risk Assessment Form consisted of two parts: Part 1 consisted of participants' history concerning defecation, dietary and water intake, physical activity, mental status, drugs and laxative use, and surgery affecting intestinal tract; and Part 2 included a physical examination including abdominal palpation, bowel sound evaluation, and a per rectal examination for patients who had defecation 3 days and over. Not all items were given scores to calculate risk for constipation. For items, which were used to calculate risk for constipation, scores for each item ranged from -2 to +2. The total scores of less than or equivalent to – 19 indicated no risk for constipation; -18 to -6 indicated low risk for constipation; -5 to +7 indicated moderate risk for constipation; and higher than or equivalent to +8 indicated high risk for constipation.[20]

The Daily Defecation Record Form was developed by the researchers. The form was used to record defecation each day. It is a 3 open-ended item including frequency of defecation from the first to the fifth postoperative day, frequency of defecation from 3 day before surgery to 5 days post-operation, and the first day for defecation postoperatively. The high frequency of defecation, and few days of the first day for defecation postoperatively, indicated less severity of constipation.

Bowel Elimination Assessment Form was used to assess constipation after defecation.[20] The form consisted of two parts: the first part consisted of 10 items asking about constipation history. One point was given to each answer indicating constipation. The total scores which more than 5 indicated constipation; and the second part, which included two items asking patients' perception whether they were constipated and what symptoms led to the perceived constipated. The second part of this tool was omitted because data were not calculated to assess the constipation in this study.

Intervention: Constipation Prevention Program

The intervention program consisted of: a) health education program related to prevention of constipation, a-30 minute bedside teaching; b) dietary intake program; c) water intake program consisting of drinking water of 1,500-2,000 milliliters a day; d) physical activity and exercise program, a-30 minute abdominal massage from the right side to under the navel through the left side before habitual defecation practice every day, as well as abdominal muscle and pelvic muscle exercise in the morning and afternoon; and e) habitual defecation practice program, training for habitual defecation for 5-15 minutes every day especially after breakfast. The participants who were no risk for constipation at baseline received only the health education program. For participants who were low, moderate, and high risk for developing constipation, they received all programs, but there were differences in details of dietary intake program designed specifically for each risk group. For example, the participants who were low, moderate, and high risk for developing constipation received dietary fibers containing less than 4 grams dietary fiber per 100 grams, 4-14 grams per 100 grams, and 19-28 grams per 100 grams, respectively.

Procedures and data collection

The study was reviewed and approved by the local review board (IRB). To avoid cross-contamination on intervention effects, the intervention was implemented after data collection in the control group was completed. Participants in both groups were approached once during the first day of their admission to inform them about study procedure and ask for their cooperation. The baseline data was collected by using the demographic record form and constipation risk assessment form. Then, participants in the control group had defecation assessed every day from 3 days before surgery to 5 days post-operation, by using the daily defecation record and the bowel elimination assessment forms. The hospitalized elderly undergoing hip surgery in this group received usual care.

For the experimental group, after baseline assessment was collected, the constipation prevention program in accordance with level of constipation risk was individually implemented. Then, the participants were recorded and defecation assessed every day from 3 days before surgery to 5 days post-operation, by using the daily defecation record form and the bowel elimination assessment form. The term 'constipation' used in this study refers to defecation within 3 days or changed frequency of defecation: dry, hard, granular stool; abnormal control of defecation or excessive forcing of bowel movement. Participants in both groups who did not have defecation more than 3 days continuously were consulted for further evaluation and treatment.

Data analyses

Data were analyzed by using SPSS Software. Descriptive statistics, number and percentage was used to describe the demographic characteristics and incidence of constipation; while range, mean, and standard deviation were used to describe age and severity of constipation. A Chi-square test was employed to compare differences in demographic characteristics and the incidence of constipation between groups. An independent t-test, on the other hand, was used to compare the difference in severity of constipation between groups after the Kolmogorov-Smirnov Test was used to assess the normal distribution of the data.

Findings

Initially, 63 participants met inclusion criteria. Three participants were excluded from the study because they had surgery cancellation due to their high risk for surgery. There were 60 participants in this study (n = 30 for each group). Most participants were female consisting of 23 persons in the control group (76.7%) and 20 participants in the experimental group (66.7%). There were no significant differences in participants' characteristics between groups in age, risk for constipation, or types of painkillers.

Table 1 showed that there was no significant difference in incidence between groups before surgery assessment. After the surgery, participants in the experimental group had a significantly lower incidence of constipation (n = 8; 26.7%) than did the control group (n = 23; 76.7%).

Table 1 Differences between groups in the incidence of constipation pre/post operation

Incidence of constipation	Control group (N = 30)	Experimental group (N = 30)	
	n (%)	n (%)	χ^2
Pre-operation			1.875
no constipation	17(56.7)	23(76.7)	
constipation	13(43.3)	7(23.3)	
Post operation			13.081*
no constipation	7(23.3)	22(73.3)	
constipation	23(76.7)	8(26.7)	

*$p < .05$

In relation to severity of constipation, the frequency of defecation from the first to the fifth postoperative day, from three days before surgery to five days post-operation, and the numbers of days for the first defecation, postoperatively, were examined. The mean frequency of defecation from the first to the fifth postoperative day was 1.37 times in the control group and 2.33 times in the experimental group. Using an independent t-test, the result showed that there was a significant difference in frequency of defecation from the first to the fifth postoperative day between the two groups ($p < .05$). Similar findings were found for the frequency of defecation from three days before surgery to five days post-operation, and the numbers of days for the first defecation postoperatively as demonstrated in Table 2.

Table 2 Differences in severity of constipation between two groups

Frequency of defecation	Control group (n = 30)	Experimental group (n = 30)	
	M ± SD	M ± SD	t
Frequency of defecation from the 1st to 5th postoperative day	1.37 ± 1.43	2.33 ± 1.54	-2.524*
Frequency of defecation from 3 days before surgery to 5 days post-operation	2.00 ± 1.64	4.07 ± 2.20	-4.130*
Numbers of days for the 1st defecation postoperatively	3.53 ± 1.93	2.40 ±1.96	2.261*

* $p < .05$

Discussion

The constipation prevention program demonstrated the effects in lowering the incidence and severity of constipation in hospitalized elderly with hip surgery. The finding that there was no significant difference in incidence between the two groups before surgery may be due to the experimental group received the constipation prevention program for a short period before the surgery. In addition, both groups have a similar level of risk for developing constipation at baseline assessment. These may result in the difference in incidence of constipation not being observed before the surgery period. However, the participants in the experimental group had a significantly lower incidence, and less severity of constipation, than the control group after operation. These findings were in accordance with the previous studies, which revealed an increase in defecation frequency, a decrease in the use of laxative medication, and a reduction of the incidence of constipation among immobile vascular surgery patients[17] and nursing home participants.[21] Not surprisingly, the constipation prevention program for the experimental group revealed a positive effect on participants in the experimental group. Some possible reasons could be that in the dietary program, dietary fibers were provided for participants on the basis of risk for developing constipation. The fiber supplemented dietary absorbs and retains large amount of water increasing the fecal water content and weight while passing through the intestine. Fecal volume and softened the feces increase frequency of defecation and causes easier elimination.[22, 23] That is supported by another study that older participants who had more dietary fiber intake were using less laxatives.[24] Another reason is that as dietary fiber and defecation stimulus food needs water to maximize their effects, the water intake program, then, could not only soften the feces, but also stimulate intestinal motility which, in turn, decreases transit time through large intestine.[23] The experimental group recommended water intake of 1,500-2,000 milliliters (6-8 glasses). This amount of water, together with taking 20-35 grams of dietary fiber per day, was effective in decreasing severity of constipation and maintaining normal bowel function as well as preventing further constipation.[8]

In relation to the program of physical activity and exercise, exercise not only promotes strength of abdominal muscles, diaphragm, and pelvic floor muscles but also increases intestinal motility and peristalsis wave pressure in the large intestine resulting in a shorter colonic transit time, which reduces

constipation.[25] Also, abdominal massage was another factor which may impact ease of constipation as reported by a previous study.[26] The other explanation may be due to the habitual defecation practice program. The experimental group practiced for 5-15 minutes every day. This is based on gastrocolic reflex which is the motility reflex of large intestine activated when food enters into stomach. The gastrocolic reflex normally occurs 15 minutes after having breakfast or first meal of the day.[8] This practice, therefore led to achieve regular defecation.

In addition, some participants in the experimental group still constipated (n = 7; 23.3% and n = 8; 26.7% before and after the surgery, respectively). A possible reason may be that six patients felt nausea after the surgery resulting in drinking and eating less than intervention recommendations. This was supported by another study which found that having dietary fibers of less than 20 grams per day, together with less than 1,500 cc per day of water intake, would indicate constipation.[27] Five patients felt uncomfortable and shy trying to eliminate in bed using a bedpan. Normally, sitting position contributed to comfortable bowel movement. The participants who used a bedpan, therefore, might feel uncomfortable and a lack of environmental privacy, which might make them ignore their bowel movement urge leading to constipation.[6]

This study was limited in the participants with a low or moderate level of risk for developing constipation; the effectiveness of this intervention program for a high risk group could not be detected. Also, dietary fibers were prepared by the nutrition unit of the hospital setting for patients individually, so these findings may not be replicable in other hospitals with different systems.

Conclusion

The constipation prevention program designed for hospitalized elderly undergoing hip surgery was effective in reducing the incidence and severity of constipation among the experimental group. Since nausea was one factor related to less dietary and water intake, proper management of this problem would help achieve prevention or reduction of incidence and severity of constipation in hospitalized elderly undergoing hip surgery. Environment privacy for defecation should be of more concern.

Based on the limitations, we suggest that a further study should be conducted in hospitalized elderly with hip surgery who are at high risk for developing constipation. As we did not evaluate cost-effectiveness of the intervention program, a further study should highlight this issue.

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