

Assessment of patients' psychological state and self-efficacy associated with postoperative constipation after thoracolumbar fracture surgery

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Abstract

Objective: We aimed to explore the relationship among the duration of constipation at 30 days after thoracolumbar fracture surgery, self-efficacy, and anxiety or depression in patients with constipation after thoracolumbar fracture surgery.

Methods: In this descriptive correlational study, 108 patients with thoracolumbar fracture undergoing pedicle screw fixation surgery were recruited from January 2015 to May 2017 in our hospital. From the day of surgery, we conducted a 1-month follow-up investigation. We evaluated the pattern of defecation, stool consistency, and incidence of defecation-related problems using a structured interview. Clinical data were obtained using a patient intake form, and we applied the Health Behavior Self-Efficacy Scale (HBSES), and Hospital Anxiety and Depression Scale (HADS).

Results: Approximately 83.3% of patients experienced postoperative constipation, and most exhibited normal defecation by postoperative day 13. Self-efficacy and anxiety and depression were graded at a medium level in most patients. The average HBSES score was 74.39 ± 11.08 , and the mean HADS score was 7.97 ± 4.08 . The duration of postoperative constipation was negatively correlated with self-efficacy and positively associated with anxiety or depression.

Conclusions: Self-efficacy, anxiety, and depression are important sociopsychological factors associated with the duration of postoperative constipation.

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Keywords

Thoracolumbar fracture surgery, postoperative constipation, self-efficacy, anxiety, depression, Health Behavior Self-Efficacy Scale, Hospital Anxiety and Depression Scale

Date received: 15 December 2018; accepted: 4 June 2019

Introduction

Constipation is a great concern for patients as it can provoke multiple problems and lower patient quality of life.¹⁻³ It is estimated that constipation affects 14% of the total population, with a medical cost of more than \$250,000 annually. Therefore, constipation is a significant issue that, if ignored, can lead to both physical and psychological difficulties.⁴ Owing to discomfort, patients often use laxatives. Studies indicate that the incidence rate of constipation in the population is 3% to 27%,⁵ with a prevalence of 79% in hospital settings. However, this condition is often a neglected aspect of patient care in acute clinical practice.⁶ The parameter most often used to define constipation of “three bowel movements weekly” is not sufficiently sensitive. However, there is scant literature on the prevalence or incidence of constipation in acute care. Likewise, there are no published reports on the duration of constipation after thoracolumbar fracture surgery. At present, many physical factors are acknowledged as being associated with gastrointestinal disruption, including surgery, diet, immobilization, narcotic use, lack of privacy, and a change in the toileting routine. All these factors can lead to changes in defecation patterns. However, psychosocial factors are rarely considered. Nurses should be aware of not only physical factors that can affect the duration of postoperative constipation but also psychosocial factors.

Self-efficacy is defined as the individual’s belief in and perception of their capability

to perform a particular behavior. Beliefs about personal efficacy, therefore, are not dependent upon one’s wishes; achieving healthy behavior requires basic health knowledge, as well as volitional and motivational factors that can guide the self-regulatory process. Many people who have difficulty with defecation understand that they should consume a fiber-rich diet, drink sufficient water, engage in more physical activity, and stop their reliance on laxatives. Nevertheless, these individuals often continue to eat few fiber-rich foods, drink little water, engage in low levels of physical activity, and continue their use of laxatives. Previous studies⁷⁻⁹ show that perceived self-efficacy is important in each step of the process of health behavior change, including changes in the habits of diet and physical activity. Moreover, self-efficacious individuals are more confident about changing unhealthy behaviors and apply greater effort in maintaining the desired behavior. This study aimed to analyze the relationship between intention formation and actual behavior change when it comes to postoperative constipation.

Anxiety and depression are related to the occurrence of constipation; however, our understanding is limited to long-term constipation and little is known about postoperative constipation. The psychological effect of anxiety and depression owing to postoperative constipation has not been well characterized. Moreover, according to the Bandura’s theory of self-efficacy, involving four basic aspects of developing

self-efficacy, controlling psychological responses owing to emotional status is a central approach.⁹ In other words, anxiety and depression are typically functions of the confidence with which patients approach unhealthy behaviors.

Before implementation of well-designed interventions in nursing practice, it is necessary to understand the duration of constipation and to obtain information about its related psychological factors in the first postoperative phase. No studies have been conducted investigating the association between duration of postoperative constipation and psychosocial factors. Therefore, in this study, we aimed to describe the duration of constipation at 30 days after thoracolumbar fracture surgery and to examine the relationships with self-efficacy and psychological factors, such as anxiety and depression.

Materials and methods

Study design

The present research was a descriptive correlational study in which a structured, guided interview was used. After the day on which patients underwent thoracolumbar fracture surgery, we conducted a 1-month follow-up investigation in which patients were interviewed to assess normal and actual defecation patterns, stool consistency, and problems with defecation. The interview was conducted before discharge and again by telephone at 1 month after surgery. Normal and abnormal defecation patterns, stool consistency, and problems with defecation were evaluated using the North American Nursing Diagnosis Association (NANDA) general definition of constipation. The follow-up outcome was a re-established defecation pattern at 30 days. Data on the incidence and duration of constipation in the first 30 days after thoracolumbar fracture surgery were

recorded on a data collection form developed for this study.

Participants

A convenience sample of patients was recruited from January 2015 to May 2017 at our hospital. The inclusion criteria were as follows: (1) age 18 to 65 years and voluntarily participating in the study; (2) diagnosed with thoracolumbar fracture and undergoing pedicle screw fixation surgery; (3) recovered mobilization (bedridden for at least 1 month); (4) able to speak and understand Chinese; (5) without severe neurological impairment. Exclusion criteria were as follows: (1) diagnosed with thoracolumbar fracture but receiving minimally invasive surgery; (2) organic or trauma-related cause of constipation; (3) cognitive impairment or communication disorder.

Definition

According to the Rome III criteria of 2006, the general definition of constipation is a chronic disorder. Therefore, these criteria cannot be applied to postoperative patients because the complaint of constipation symptoms must persist for at least 6 months and must be experienced at least 10% of the time during the previous 3 months. Instead, we adopted the NANDA general definition of constipation,¹⁰ which is the state in which an individual experiences or is at high risk of experiencing stasis of the large intestine, resulting in infrequent elimination (3 days or longer between bowel movements) and/or the inability to achieve a soft bowel movement, a feeling of incomplete rectal emptying, the need for manual evacuation of the rectal region, or straining to evacuate the stool. A re-established defecation pattern was defined as when the interval between each bowel movement is less than 3 days, without use of any laxative or

specific methods to facilitate evacuation. The duration of constipation was defined as time from the day of surgery to the day the defecation pattern was re-established.

Instruments

Sociodemographic and clinical data.

Sociodemographic data included sex, age, marital status, and education. Clinical data included vertebral fracture type (compression or burst) and degree of spinal cord injury.

Health behavior self-efficacy. The Health Behavior Self-Efficacy scale (HBSES), developed by Becker⁸ and amended and adapted to Chinese language, is a 5-point Likert-type self-evaluation scale that measures self-efficacy and includes items on nutrition, exercise, psychological well-being, and health responsibility. The HBSES consists of 26 items, and patients are asked to choose one of the following: (i) no confidence at all; (ii) little confidence; (iii) moderate confidence; (iv) high confidence; (v) complete confidence. The scale includes four subscales: (i) nutrition efficacy; (ii) physical activity efficacy; (iii) psychological well-being; (iv) health responsibility.

Because the HBSES includes 26 items in total, a minimum of 0 and a maximum of 104 points can be scored. The number of subscale items differ, so to comparatively evaluate the subscale scores, researchers adopt the index of total percent score, calculated using the following formula: the total percent score is the sum of the actual scores on each subscale/the maximum possible score $\times 100$. The reliability of the data collected from study participants was verified by analyzing the internal consistency. The Cronbach's alpha of the HBSES was found to be 0.933, and that of the four subscales was 0.752, 0.911, 0.819, and 0.877, respectively.

Anxiety and depression. The Hospital Anxiety and Depression scale (HADS) was

developed by Snaith¹¹ to screen psychological problems among patients in the hospital as well as in other medical settings. The HADS is short, simple, and has been validated in the general practice setting.¹² The HADS consists of 14 questions with two subscales including seven items each addressing symptoms of anxiety and depression. Each question is scored on a 4-point scale of 0 to 3; a minimum 0 and a maximum 21 points can be scored for anxiety and depression separately. The original HADS was designed for self-administration in English. We used the Chinese version of the HADS, which has been translated by a Hong Kong scholar.¹³ In a pilot test, the Cronbach's alpha of the HADS was found to be 0.852, and that of the two subscales was 0.786 and 0.771, respectively.

Ethics statement. The study procedures were approved by the ethics committee of our hospital. Enrolled patients were informed by researchers about the purpose of this study and were invited to voluntarily participate. Patients were informed that they could refuse to participate or withdraw from the study at any time and that their personal information was de-identified and would be kept confidential. Written informed consent was obtained from all participating patients.

Statistical analysis. The data were analyzed using SPSS 17.0 (SPSS Inc., Chicago, IL, USA). Patient characteristics were described using mean \pm standard deviation (SD). To test for significance between the frequency of constipation at admission, the day of surgery, and 30 days after surgery, the chi-squared test was used. Associations of the constipation duration in the first 30 days after thoracolumbar fracture surgery with self-efficacy and psychological factors (anxiety and depression) were examined using Pearson correlation

analysis. *P*-values <0.05 were considered statistically significant.

Results

Baseline data

A total of 165 patients were admitted for thoracolumbar fracture surgery and were consecutively recruited. Of these, 10 patients refused to participate in the study, 7 did not speak or understand Chinese, 32 chose minimally invasive treatment, 5 had gastrointestinal disorders, and 3 patients were lost owing to logistic reasons. Finally, 108 patients participated in the study. Participants were aged 18 to 65 years (mean age 43.25 ± 6.34) and included 72 males and 36 females, with a ratio of 2:1. Patients' demographic and baseline data are illustrated in Table 1.

Incidence and duration of constipation in the first 30 days after thoracolumbar fracture surgery

We determined the frequency of dry and hard stools, and prolonged and difficult

evacuation, assessed upon admission, on the day of surgery, and 30 days after surgery, illustrated in Table 2. From admission to the surgery day, there was a high percentage of patients who experienced hard or dry stools. After surgery, this frequency was significantly increased. By 30 days after surgery, the number of patients reporting hard or dry stools had decreased significantly ($P<0.01$).

Both men and women reported that they had their first bowel movement within 2 to 30 days (median 7 days) after surgery without the use of any laxatives or other methods to facilitate evacuation. In most patients, a normal defecation pattern was re-established within 13 days after surgery, with a range 2 to 30 days. At the end of follow-up, there were still 10 (9.3%) patients reporting that their normal defecation pattern was still not re-established.

Status of patients' health behavior self-efficacy, anxiety, and depression

HBSES scores for all 108 patients, as well as scores for the four subscales, are given in Table 3; HADS scores for anxiety and

Table 1. Baseline data of enrolled patients.

Personal characteristics	Range	Mean \pm SD, n (%)
Age, y	18–65	43.25 \pm 6.34
Sex	Male	72 (66.7%)
	Female	36 (33.3%)
Marital status	Married	95 (88%)
	Single	13 (12%)
Educational background	Illiterate	6 (5.6%)
	Primary school	53 (49.1%)
	Junior or senior high school	45 (41.7%)
	University	4 (3.7%)
Vertebral fracture type	Compression	31 (28.7%)
	Burst	77 (71.3%)
Degree of spinal cord injury	Complete paralysis	5 (4.6%)
	Incomplete paralysis	36 (33.3%)
	No damage	67 (62.1%)

SD, standard deviation.

Table 2. Frequency of dry and hard stools, and prolonged and difficult evacuation, assessed upon admission, on the day of surgery, and 30 days after surgery.

	Constipation (n)	Normal (n)	χ^2	P
Admission	69 (63.9%)	39 (36.1%)		
Surgery day	89 (82.4%)	19 (17.6%)	9.43	<0.01
30 days postoperatively	10 (9.3%)	98 (90.7%)	116.38	<0.01

Table 3. Patient scores for the Health Behavior Self-Efficacy scale (HBSES), its four subscales, and the Hospital Anxiety and Depression scale (HADS).

Scale or subscale	Mean \pm SD	Total percent score
Health behavior self-efficacy	74.39 \pm 11.08	71.54%
Nutrition efficacy	13.22 \pm 2.28	66.11%
Physical activity efficacy	19.37 \pm 4.36	69.18%
Psychological well-being	19.58 \pm 3.36	69.94%
Health responsibility	22.22 \pm 3.42	79.37%
Anxiety and depression	7.97 \pm 4.08	18.98%
Anxiety	4.31 \pm 2.13	20.55%
Depression	3.66 \pm 2.26	17.42%

depression among patients are also provided in the table. Among the four subscales, the highest scores were for health responsibility, followed by psychological well-being and physical activity efficacy; the lowest scores were for nutrition efficacy. Most patients' self-efficacy was at a medium level, with only a small percentage of patients exhibiting higher self-efficacy (70.4% and 29.6%, respectively). Based on the HADS, 31.5% of patients had suspected anxiety or depression and 18.98% had confirmed anxiety or depression. Scores for anxiety were higher than scores for depression.

Association of constipation duration 30 days after thoracolumbar fracture surgery with self-efficacy and psychological factors

The results of Pearson correlation analysis for the included variables are presented in

Table 4. Correlation coefficients were computed for the duration of constipation and health behavior self-efficacy, anxiety, depression, as well as the four HBSES subscale variables (n = 108). Results of the analyses revealed that there were significant associations among the duration of constipation in the first 30 days after thoracolumbar fracture surgery and health behavior self-efficacy, anxiety, and depression. There was a negative correlation between duration of constipation and health behavior self-efficacy and variables of the four subscales. On the contrary, the duration of constipation was positively correlated with anxiety and depression. Health behavior self-efficacy and anxiety or depression showed a significantly negative correlation.

Discussion

The results of international studies have demonstrated that anxiety and depression are associated with the incidence of constipation,^{14,15} but there are no reports on the association of anxiety and depression and the duration of postoperative constipation. The current findings provide new and valuable information about the relationship between self-efficacy and the incidence of postoperative constipation.¹⁶ This is the first study to date reporting the duration of constipation in the first 30 days after thoracolumbar fracture surgery, and examining the relationships with self-efficacy and psychological factors (anxiety and depression). The two main findings of this study were that 89% of our postoperative patients

Table 4. Pearson correlation for health behavior self-efficacy, its four subscales, anxiety, depression, and duration of constipation.

Variables	Anxiety	Depression	Duration of constipation
Health behavior self-efficacy	−0.291**	−0.364**	−0.368**
Nutrition efficacy	−0.200*	−0.208*	−0.301**
Physical activity efficacy	−0.232*	−0.358**	−0.293**
Psychological well-being	−0.225*	−0.263**	−0.256**
Health responsibility	−0.276**	−0.320**	−0.300**
Anxiety	—	0.626**	0.286**
Depression	—	—	0.418**

*Correlation significant at the 0.05 level (two-tailed).

**Correlation significant at the 0.01 level (two-tailed).

had dry or hard stools or difficulty evacuating during the first several postoperative days, and a normal defecation pattern was re-established in most patients by approximately 13 days after surgery. The frequency of postoperative constipation was higher than that in previous reports, which may be because other studies did not report the use of measures to facilitate defecation (laxatives, digital stimulation, irrigation, and enemas). From our research, we could clarify the difference in duration of postoperative constipation and incidence of constipation. A large proportion (63.9%) of our patients who underwent thoracolumbar fracture surgery reported constipation at hospital admission. With prolonged hospitalization prior to surgery, the frequency of constipation increased; however, in the first 3 postoperative days, the frequency of constipation remained high and then declined. By 30 days after surgery, 9.3% of patients had not yet re-established a normal defecation pattern. Therefore, the duration of postoperative constipation can more precisely reflect patients' gastrointestinal function than the incidence of constipation.

In the present study, patients demonstrated medium to high levels of self-efficacy, perhaps because most patients were middle-aged adults. In this study,

patients who attained higher health behavior self-efficacy had shorter durations of postoperative constipation. Abusabha¹⁷ claimed that among the aspects of self-efficacy, self-esteem, outcome expectancy, health values, self-control, self-efficacy can predict and explain more than 50% of health behavior variation. The incidence and duration of constipation, however, depends largely on a proper diet (increased fruit, vegetable, and water consumption), physical activity level, and use of narcotics. Patients with high self-efficacy may tend to consume more fruits, vegetables, and water, exercise more, and use narcotics as little as possible. In addition, patients with high self-efficacy are less likely to use laxatives and more likely to rely on other measures to promote gastrointestinal function. These patients have more confidence in fighting constipation. This result further supports Bandura's viewpoint that efficacy beliefs play a central role in regulating health behavior.

The present study results demonstrated that the duration of postoperative constipation was positively correlated with anxiety and depression, which means that anxiety and depression in these patients becomes more serious the longer postoperative constipation persists. Recently, mental disorders have been recognized as one of the

most important factors causing constipation, which has become the focus of much research. In humans, there is a well-recognized association between emotional or psychological factors (including anxiety and depression) and gastrointestinal function. Emmanuel¹⁸ reported that psychological factors probably affect gut function through the autonomic efferent neural pathway. In countries that attach little importance to psychology, like China,^{19,20} there are very few reports with important results regarding the relationship between constipation and psychological factors. However, in patients with thoracolumbar fractures, postoperative anxiety or depression may be caused by many factors, such as economic issues, the condition of postoperative recovery, loss of work time, and limited social activity. These factors can increase patients' anxiety or depression such that their postoperative constipation syndrome becomes more severe.

The results of this study support that psychological factors are closely related to self-efficacy levels. In our patients with postoperative constipation after thoracolumbar fracture surgery, those with higher levels of self-efficacy had lower levels of anxiety and depression. This coincides with previous findings regarding the close relationship between individual self-efficacy and mental health, as well as Bandura's theory regarding self-efficacy. Generally, individuals with higher self-efficacy have more confidence in overcoming difficulties. Such people will actively seek methods to solve their problems and will apply greater effort in doing so. These individuals are also more skilled at controlling the development of a situation. In contrast, individuals with lower self-efficacy are prone to developing anxiety or depression when faced with difficulties. These individuals behave more negatively and doubt their own abilities, often giving up efforts to cope with the situation.

A recent study²¹ showed that self-efficacy can moderate the association between subjective physical health and depressive symptoms. When self-efficacy is low, physical health is more negatively correlated with depressive symptoms. Based on the results of the present study, the duration of postoperative constipation was negatively correlated with self-efficacy and anxiety or depression negatively related to self-efficacy. Therefore, we can speculate that self-efficacy might be a mediator between postoperative constipation and anxiety or depression. Thus, to shorten the duration of postoperative constipation, self-efficacy should be increased, to alleviate postoperative emotions of anxiety or depression.

Based on Bandura's theory of self-efficacy,⁹ expectations of personal efficacy depend upon four main sources of information: vicarious experiences, verbal persuasion, performance accomplishments, and physiological states. We can help patients to attain the greater self-efficacy using these four sources.

With respect to performance accomplishments, strong efficacy expectations can be established via repeated successes, thereby reducing the negative effect of occasional failures.²²⁻²⁵ Nursing staff can assist patients to set goals according to individuals' levels of dietary intake, physical activity, and painkiller use rate. For example, nurses can help patients who eat fewer fiber-rich foods to adopt a certain level of intake of fiber-rich foods every day. In patients with extended hospitalization time, the quantity of fiber-rich foods can be increased gradually, thereby improving their experience of success and promoting improvement in their self-efficacy. Many expectations are derived from vicarious experiences. Patients watch others perform activities that have positive consequences, which can generate the expectation that the patient can also succeed, if they persist. Patients with postoperative constipation

can learn from the experiences of other postoperative patients who have normal defecation patterns. Verbal persuasion is widely used to influence human behavior because this method is very easy to implement. Nursing staff can explain methods to relieve constipation using verbal persuasion in the form of health education. Topics to address can include eating more fiber-rich fruits and vegetables, drinking more water, engaging in more physical activity, using fewer painkillers, and training in how to toilet in bed, prior to surgery. As for physiological states, individuals partly rely on physiological arousal in evaluating their anxiety and vulnerability to stress. As high levels of arousal can weaken performance, individuals can expect greater success when they are not experiencing high arousal levels, as compared with when they are irritated and agitated. In assessing the defecation pattern of patients, psychological states must also be assessed, to guarantee that patients can maintain low levels of anxiety or depression, thus improving their self-efficacy.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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