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Postoperative Constipation Risk Assessment in Turkish Orthopedic Patients

ABSTRACT

This descriptive, correlational study was conducted to describe constipation risk assessment and the affecting factors of constipation risk of patients who have undergone major orthopedic surgery. Data were collected using a patient information form and the Constipation Risk Assessment Scale (CRAS) on the second postoperative day. Data were analyzed using the SPSS version 11.5 for Windows. The mean age of the 83 patients studied was 53.75 ± 21.29 years. Subjects were hospitalized in the orthopedic wards for 14.39 ± 15.17 days, and their current bowel habit was 2.18 ± 1.80 stools per week. Of the sample, 63.9% were female, 69.9% of the patients had a history of previous surgery, 45.8% had hip/knee arthroplasty surgery, and 55.4% had bowel problems during the hospitalization period. Patients had a medium risk for constipation according to the CRAS subscale (gender, mobility, and pharmacological agents). Total CRAS score was 12.73 ± 4.75 (medium risk) on the second postoperative day. In addition, age, marital status, educational level, having a history of surgery, and bowel elimination problems did have a significant effect on constipation risk. On the basis of the findings from this study, nurses must learn the postoperative constipation risk of orthopedic patients to implement safe and effective interventions.

Constipation is a symptom and significant health hazard affecting individuals of all ages (Richmond & Wright, 2006; Stockert, 2009). Signs of constipation usually include infrequent bowel movements (less than every 3 days), difficulty passing stools, excessive straining while defecating, inability to defecate at will, and hard feces (Stockert, 2009).

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Background

To create a standard definition of *constipation*, the Roman Committee in 1989 created the Rome I criteria, the Rome II criteria in 1999, and finally in 2006, the Rome III criteria. The *Rome II criteria* was defined as the presence of two or more symptoms such as the following: difficulty in defecation in at least 3 months of the last year, straining to evacuate the stool at least one fourth of the time or more, complete obstruction, and a feeling of incomplete rectal emptying, need for manual evacuation of the rectal region, fewer than three bowel movements per week, and the inability to achieve a soft bowel movement. The Rome III criteria added that the complaints should have persisted over at least 6 months and have been experienced at least 10% of the last 3 months. The presence of three or more days of constipation symptoms is also necessary (Drossman, 2006).

Although constipation is a common condition in aging/older people, Watson (2001) argues that there are many causes and constipation is not entirely due to the process of aging. Other factors contributing to constipation include gender, improper diet, reduced fluid intake, lack of exercise, and certain medications (Keck & Baker, 2001; Stockert, 2009).

Constipation is also commonly known to be a problem for a range of orthopedic patients (Davis, 2005; De Souza, 2002; Hsieh, 2005). It is specifically a problem for patients who undergo after major orthopedic surgery (hip/knee arthroplasty, etc.) as these procedures frequently involve the use of opioid medications as well as cause pre- and postoperative disruptions in mobility and dietary intake (De Souza, 2002). In addition, orthopedic patients with reduced mobility and who have therapeutic interventions, reduced food or fluid intake, use opioid analgesic medications, use a bedpan in the early postoperative period, and are older than the average surgical patients are prone to constipation (Büyükyılmaz & Şendir, 2009; Davis, 2005; Keck & Baker, 2001).

De Souza (2002) established that 40% of immobilized adult orthopedic patients in his study experienced constipation and 18% of orthopedic patients experienced abdominal distention. Atabek (1994) also reported that 40% of patients with osteoporosis in Turkey have symptoms of constipation. In addition, constipation is not a physiological result of aging; many age-related problems (decreased mobility) may predispose the patient to constipation (Hsieh, 2005).

Nursing care involves treatments that assist in reducing the incidence and severity of constipation for patients. Nurses need to be very cognizant of constipation because reduced mobility and many medications interfere with nerve conduction and smooth muscle function of the colon (Davis, 2005; Hsieh, 2005). A nursing assessment based on bowel habits will establish any deviation from the individual's norm (Büyükyılmaz & Şendir, 2009; Davis, 2005). In addition, accurate assessment is essential to determine the cause of the symptoms experienced by the patient. This would indicate whether further referral is appropriate and would ensure that the most appropriate intervention is implemented.

It is the responsibility of all nurses to develop an understanding of constipation/risk to enable them to identify symptoms early and prevent further aggravation of the condition (Büyükyılmaz & Şendir, 2009; Potter, 2003; Wilson, 2005b). For this reason, Richmond and Wright (2006, 2008) suggest that nurses use a risk assessment tool for constipation. Using the assessment data, nurses should plan and implement nursing interventions according to patients' risk assessment score for constipation.

Philichi and Yuwono (2010) suggest that effective primary care may possibly reduce healthcare costs. Stumm et al. (2001) and Kaçmaz and Kaşıkçı (2007) determined that food supplements such as fruit juices and bran have mixed results on affecting bowel movements of orthopedic patients. In a study by Gürol-Arslan and Eşer (2010), castor oil decreased the symptoms of constipation. Also, De Souza (2002) established that stool softeners or enemas are 100% effective. A review of the literature in Turkey shows that there were few studies about nursing interventions related to constipation (Gürol-Arslan & Eşer, 2010; Kaçmaz & Kaşıkçı, 2007; Yetkin & Kara, 1999). In addition, there have been no risk assessment studies of constipation.

Purpose of the Study

Based on our findings in the literature, the aim of this study was to describe the constipation risk assessment and contributing factors to constipation risk for patients who have undergone major orthopedic surgical procedures. The study also aimed to determine whether demographics or factors related to constipation affect the risk assessment score. The research questions were as follows:

- What are the contributing factors to the patients' constipation risk in the postoperative period?
- What are the patients' constipation risk assessment scores within the postoperative period?
- What is the relationship between the patients' demographic characteristics, factors related to constipation risk, and constipation risk assessment scores?

Methods

Design, Sample, and Criteria for Participation

This descriptive correlational study was conducted in an orthopedic ward of a university hospital in Turkey between April 2009 and September 2009. The study sample consisted of 83 patients who met the inclusion criteria and agreed to participate in the study. The inclusion criteria were the following: (1) 18 years of age or older; (2) ability to communicate; (3) ability to read and write Turkish; (4) admitted for a major surgical procedure to the ward where the research was being conducted (arthroplasty-hip and knee prosthesis, vertebral reconstruction, tumor resection-osteosarcoma, hemiarthroplasty); (5) no experience of complications during the perioperative period; (6) used the same analgesic medications during the postoperative period (nonopioid analgesic medications were administered intramuscularly); and (7) used the same mobilization procedures (mobilizations included sitting in bed and on the sides of the bed).

The exclusion criteria were (1) no cognitive, affective, or verbal impairments and (2) another acute illness that caused constipation. Permission to undertake this study was received from the hospital ethics committee. Patients who met the inclusion criteria were informed by the researchers about the purpose of the study and invited to take part as volunteers. Participants were assured of their right to refuse to participate or withdraw from the study at any time without detriment to their treatment and care. At the same time, they were told that the information they provided would be deidentified, their name would not be stored, and their identity would be kept confidential.

Data Collection Instruments

Data were collected by *using a patient information form* and the Constipation Risk Assessment Scale (CRAS). These instruments were administered by one researcher to all of the participants in face-to-face interviews at patients' bedsides.

Patient Information Form

The researchers developed the patient information form on the basis of the literature review. The form included eight questions about sociodemographics (age, gender, marital status, and educational level), previous surgeries, types of surgeries, and questions related to bowel elimination during the hospitalization period (Hicks, 2001; Kaçmaz & Kaşıkçı, 2007; Richmond & Wright, 2006, 2008).

Constipation Risk Assessment Scale

The CRAS (Figure 1) was designed for nurses to assess the patients' risk of constipation. It consists of subscales such as gender, mobility, fiber intake, fluid intake, personal beliefs, use of hospital toilets or commodes/bedpans, pathophysiological conditions, and pharmacological agents. Within each section, the subcategories were generally arranged in ascending numerical order to provide an overall picture of a higher score representing increased risk of constipation. The total that an individual obtains from a CRAS assessment results in a "high," "medium," or "low" risk of constipation score; based on the score, preventative interventions are specifically introduced to prevent the progression of constipation (Richmond & Wright, 2006, 2008).

CONSTIPATION RISK ASSESSMENT SCALE © Janice P Richmond (2001) Unpublished: University of Ulster

Circle risk factors in table and total

GENDER:
Male 1
Female 2

MOBILITY:
Independently mobile 0
Dependent on walking aids/assistance from others 1
Restricted to bed/chair 2
Spinal cord injury/spinal cord compression 3

FIBRE INTAKE:
5 pieces fruit/veg or more consumed daily 0
3 or 4 pieces fruit/veg consumed daily 1
2 pieces fruit/veg or less consumed daily 2

Bran products consumed daily Yes 0
No 2

FLUID INTAKE:
10 cups/glasses or more consumed daily 0
6 to 9 cups/glasses consumed daily 1
5 cups/glasses or less consumed daily 2

PERSONAL BELIEFS:
Does patient believe they are prone to constipation? Yes/No

Has laxatives ever been used for constipation? Yes/No____

Current bowel habit: ______________________

SECTION SUB TOTAL ☐

WARD PATIENTS ONLY:
Does patient have difficulty evacuating bowels in hospital toilets?
No 0
Yes 2

PATIENTS REQUIRING COMMODE/BEDPAN:
Does patient anticipate problems using a commode or bedpan?
No/Not applicable 0
Yes 2

SECTION SUB TOTAL ☐

Conditions which increase risk of constipation.

From medical notes, patient history and blood results, assess presence of the following:

PHYSIOLOGICAL CONDITIONS

Metabolic disorders:
Hypokalaemia/uraemia/lead poisoning 2

Pelvic conditions:
Hysterectomy/ovarian tumour/uterine prolapse/pregnancy 3

Neuromuscular disorders:
Parkinson's Disease/Multiple Sclerosis/Systemic Sclerosis/Hirschsprung's Disease/ Cerebrovascular Accident/Spina Bifida/Rheumatoid Arthritis/cerebral tumour 3

Endocrine disorders:
Diabetes Mellitus/hypothyroidism/ hypopituitarism/hypercalcaemia 3

Colorectal/abdominal disorders:
Irritable Bowel Syndrome/Crohn's disease/Diverticulitis/Ulcerative Colitis/colorectal tumour/anorectal stricture/anorectal fissure/anorectal prolapse/haemorrhoids/hernias 3

PSYCHOLOGICAL CONDITIONS

Psychiatric illness:
Depression/Anorexia Nervosa/Bulimia Nervosa 2

Learning disabilities or dementia
(as evidenced by lack of understanding of speech or situations) 2

SECTION SUB TOTAL ☐

Medications which increase risk of constipation.

Is patient presently taking any of the following medications on a regular basis?

Antiemetics 2
Calcium channel blockers 2
Iron supplements 2

Analgesics:
Non-opioid analgesia 3
OR continuous opioid therapy 5

Anticholinergic containing medication:
Anticonvulsants 2
Antidepressants 2
Antiparkinson drugs 2
Antispasmodics 2

Cytotoxic chemotherapy:
Cytotoxic chemotherapy 3
OR Vinca alkaloid agents 5

SECTION SUB TOTAL ☐

Low risk for constipation: score ≤ 10
Medium risk for constipation: score 11-15
High risk for constipation: score ≥ 16

TOTAL SCORE ☐

FIGURE 1. Constipation Risk Assessment Scale.

TABLE 1. Sample Characteristics (N = 83)

Characteristics	*n*	%
Gender		
Female	53	63.9
Male	30	36.1
Educational level		
Read and write	20	24.0
Primary school	27	32.6
High school	18	21.7
University	18	21.7
Marital status		
Married	41	49.4
Single	21	25.3
Divorced/widowed	21	25.3
Previous surgery history		
Yes	58	69.9
No	25	30.1
Type of surgery		
Total hip/knee arthroplasty	38	45.8
Hemiarthroplasty	26	31.3
Vertebrae reconstruction	14	16.9
Tumor resection	5	6.0

Richmond (2002) developed the original CRAS scale. For the Turkish version of CRAS, a reliability and validity study was conducted by Koca Kutlu, Yılmaz, Çeçen, and Eser (2009). In the original study, Cronbach's alpha value was calculated to be .50 (Richmond & Wright, 2006). In this study, the mean of Cronbach's alpha value was calculated to be .43, indicating a weak to moderate correlation. The CRAS was administered by one researcher to the patients who agreed to participate. Completion of the CRAS took 2–3 minutes and the measure was administered on the night of the second postoperative day.

Data Analysis

Data were analyzed by using the Statistical Package for Social Science for Windows (SPSS) (SPSS 11.5 for Windows-SPSS Inc., Chicago, IL), version 11.5, licensed to Istanbul University. Frequency and percentage values of the group variables, arithmetic means, and standard deviations of numeric variables were calculated. Student's t test was used to determine the difference between the two groups and differences among multiple groups were compared through one-way ANOVA. Relationships between the mean scores were determined by Pearson's correlation. In this study, a p value of less than .05 was considered statistically significant.

Results

The mean age of the 83 patients studied was 53.75 ± 21.29 (range 19–86) years; they were hospitalized in the orthopedic wards for 14.39 ± 15.17 days, and their current bowel habit was 2.18 ± 1.80 stools per week. Of the sample, 63.9% were female, 32.6% were primary school graduates, 69.9% had a history of previous surgery, 45.8% had total hip/knee arthroplastic surgery, 44.6% had bowel problems (such as hard, dry stools; abdominal distention), and 41.3% were administered medications (such as softeners—lactulose—orally) because of bowel problems during the hospitalization period (Table 1 and Figures 2 and 3). In addition, the majority of the patients were restricted to bed (41%), dependent on walking aids/assistance from others (37.3%), consumed three or four pieces of fruit/vegetables (48.2%), did not consume bran products (44%), and consumed six to nine cups/glasses of fluid daily (32%). Most of the patients (71%) were also administered analgesic medications, and 20.5% had

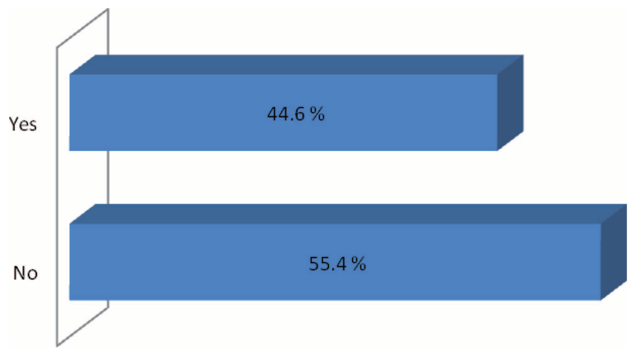

FIGURE 2. Bowel elimination problems during hospitalization period (N = 83).

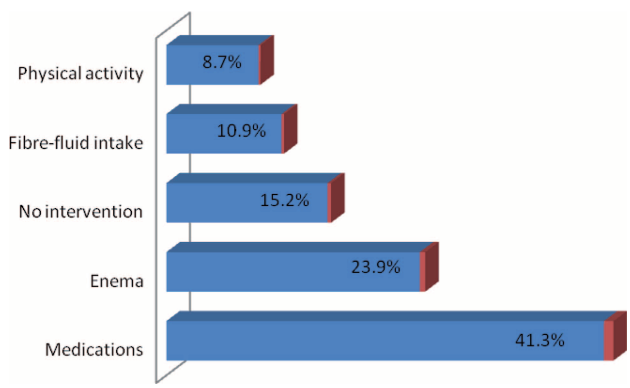

FIGURE 3. Interventions toward bowel problems during hospitalization period (N = 37).

endocrine disorders such as diabetes mellitus (Table 2). The mean scores and standard deviations of the patients' CRAS scores are reflected in Table 3. In addition, the first (such as gender, mobility) and fourth (such as pharmacological agents) CRAS subscales showed that patients were of high risk for constipation.

Table 4 portrays the impact of demographic variables and contributing factors on the constipation risk assessment score. Hospitalization days, gender, and type of surgery did not influence constipation risk; however, age did have a significant effect (positive correlation) on the constipation risk assessment scores. When age was higher, the risk of constipation increased. In addition, marital status was a factor in the constipation risk assessment scores: single and widowed/divorced individuals had higher scores than married individuals. Educational level was also a factor in the constipation risk assessment scores such that individuals with low

TABLE 2. Patients' Constipation Risk Assessment (N = 83)

Characteristics		*n*	%
Subscale (1)	Mobility		
	Independently mobile	17	20.5
	Dependent on walking aids/assistance from others	31	37.3
	Restricted to bed/chair	34	41.0
	Spinal cord injury/spinal cord compression	1	1.2
	Fiber intake		
	Five pieces of fruit/vegetables or more consumed daily	8	9.6
	Three or 4 pieces of fruit/vegetables consumed daily	40	48.2
	Two pieces of fruit/vegetables or less consumed daily	35	42.2
	Bran products consumed daily		
	Yes	39	47.0
	No	44	53.0
	Fluid intake		
	Ten cups/glasses or more consumed daily	22	26.5
	Six to 9 cups/glasses consumed daily	32	38.6
	Five cups/glasses or less consumed daily	29	34.9
	Personal beliefs		
	Prone to constipation		
	Yes	30	36.1
	No	53	63.9
	Used laxatives for constipation		
	Yes	24	28.9
	No	59	71.1
Sub-Scale (2)	Had difficulty evacuating bowels in hospital toilets		
	Yes	24	28.9
	No	59	71.1
	Anticipated problems using a commode or bedpan		
	Yes	29	34.9
	No	54	65.1
Subscale (3)	Physiological conditions		
	Metabolic disorders	2	2.4
	Pelvic conditions	7	8.4
	Neuromuscular disorders	6	7.2
	Endocrine disorders	17	20.5
	Colorectal/abdominal disorders	9	10.8
	Psychological conditions (psychiatric illness)	15	18.1
Subscale (4)	Medications[a]		
	Calcium channel blockers	20	24.1
	Anticholinergic-containing medication	15	18.1
	Analgesics	59	71.1
	Cytotoxic chemotherapy	2	2.4

[a]More than one medication that increases the risk of constipation.

TABLE 3. Mean Scores for Constipation Risk Assessment Scale

Variables	Scale	Min–Max	Mean ± SD
Subscale (1)	0–11	1–11	6.17 ± 1.89
Subscale (2)	0–4	0–4	1.35 ± 1.57
Subscale (3)	0–18	0–8	1.84 ± 2.15
Subscale (4)	0–30	0–9	3.37 ± 2.16
Total score	**0–63**	**1–23**	**12.73 ± 4.75**

educational levels had higher constipation risks. Having a history of surgery and bowel elimination problems also had a significant effect on constipation risk.

Discussion

This study looked into the CRAS as well as the factors that affect the constipation risk of patients who have undergone major orthopedic surgery. The study also determined whether demographics and other factors related to constipation risk affect the constipation risk assessment score. As it is known that constipation is a common problem for orthopedic patients, specific features of orthopedic surgical interventions and treatment procedures can lead to an increased risk of constipation (Davis, 2005; De Souza, 2002; Hsieh, 2005).

Kaçmaz and Kaşıkçı (2007) established that 50% of orthopedic patients had to force their defecation. In addition, a study by Gürol-Arslan and Eşer (2010) reported that older patients in rest homes "always" experienced hard feces (51.4%). They noted that laxatives and cathartics were used to soften the stool and promote peristalsis. When used correctly, laxatives and cathartics safely maintain normal bowel patterns. Enema is also commonly used for the temporary relief of constipation (Klingman, 2009). De Souza (2002) established that stool softeners or enemas are 100% effective. Hicks (2001) reported that laxatives are the most common treatment of constipation. The bowel elimination problems and the

TABLE 4. The Impact of Patients' Characteristics on CRAS Mean Scores

Characteristics	CRAS, Mean ± SD	Statistical Test and *p*
Age (53.75 ± 21.29)	12.73 ± 4.75	$r = .33$ $p = .002$*
Hospitalization days (14.39 ± 15.17)		$r = -.15$ $p = .18$
Gender		
Female	13.26 ± 4.73	$t = 1.35$
Male	11.80 ± 4.73	$p = .18$
Educational level		
Read and write	11.85 ± 5.07	
Primary school	13.96 ± 4.52	$F = 3.85$
High school	14.50 ± 4.61	$p = .013$**
University	10.11 ± 3.72	
Marital status		
Married	10.10 ± 3.74	
Single	13.63 ± 4.68	$F = 4.73$
Divorced/widowed	13.62 ± 5.00	$p = .01$*
Previous surgery history		
Yes	13.79 ± 4.78	$t = 3.58$
No	10.28 ± 3.77	$p = .001$*
Type of surgery		
Total hip/knee arthroplasty	13.32 ± 4.31	
Hemiarthroplasty	12.96 ± 5.19	$F = 0.82$
Vertebrae reconstruction	11.36 ± 5.44	$p = .49$
Tumor resection	11.00 ± 5.53	
Bowel elimination problems		
Yes	15.49 ± 3.90	$t = 5.51$
No	10.52 ± 4.21	$p = .000$***

Note. CRAS = Constipation Risk Assessment Scale.
*$p < .01$. **$p < .05$. ***$p < .001$.

implemented interventions in our study were similar to those in previous studies.

The mean scores and standard deviations for patients' constipation risk assessment are provided in Table 3. In this study, the CRAS total score indicated a medium constipation risk (12.73 ± 4.75) on the second postoperative day. The reason for this may be explained by the following: the majority of patients were females (63.9%) who were restricted to bed (41%) and dependent on walking aids/assistance from others (37.3%). These patients consumed insufficient fiber (48.2%) and fluid (38.6%) and did not consume bran products daily (44%). They also had endocrine disorders (20.5%) and were administered analgesic medications (71%) in this study. For these reasons, the patients were considered to be at medium risk according to the CRAS subscales such as gender, mobility, fiber/fluid intake, and pharmacological agents.

Hicks (2001) explained that constipation may also arise as a result of orthopedic surgery and treatment options undertaken by patients. In a small sample study (n = 28) by Madsen, Magor, and Parker (2010), the decreased bowel movements and associated abdominal symptoms (such as flatus, pain, and nausea) were recorded daily from first day after orthopedic surgery. McCerea et al. (2009) reported that women experience a number of constipation symptoms and have abnormal bowel habits more frequently than men. In addition, McCerea et al. (2009) reported that women were more likely than men to have infrequent bowel movements, abnormal stool consistency, and a longer duration of constipation symptoms. McCrea (2008) and Wilson (2005a) also determined that hospitalized women were at increased risk for constipation.

Dukas, Willett, and Giovannucci (2003) showed that women in the highest quintile of dietary fiber intake were less likely to experience constipation than men in the lowest quintile. As Davis (2005) pointed out, immobility or reduction in fluid and fiber intake could occur as a result of treatment options such as traction and bed rest. A study by Hanlon et al. (1997) showed that adverse drug events (e.g., opioid/nonopioid analgesics) have been linked to preventable problems in elderly patients such as constipation or immobility. In this study, the following were thought to increase the risk of constipation: the majority of patients were female, mobilized in bed with nurse and device assistance, ate hospital meals (not food based on individual requirements), had endocrine disorders (especially diabetes mellitus), and were administered analgesic drugs.

In this study, increased age did have a significant effect on the risk of constipation (Table 4). In the literature, constipation/risk is not a physiologic consequence of normal aging. Many age-related problems (e.g., decreased mobility, comorbid medical conditions, increased use of medications with a side effect profile that includes constipation, and changes in diet) may contribute to the increased prevalence of constipation in older adults (Hicks, 2001; Hsieh, 2005). Wilson (2005a) reported that the prevalence of constipation is between 10% and 20%, with a higher incidence in the female population and in older people. Similarly, McCrea (2008) determined that younger patients experienced relatively fewer symptoms of constipation and had fewer abnormal bowel habits than middle-aged or older patients. In addition, marital status was a factor in constipation risk assessment scores such that single and widowed/divorced individuals had higher scores than the married individuals.

In this study, we demonstrated that patients who had low educational attainment had higher constipation risk. Ross and Wu (1995) established that the well-educated people reported a greater sense of control over their lives and health and had higher levels of social support. In addition, the study by Sandler, Jordan, and Shelton (1990) reported that constipation was more prevalent in Americans who were women and middle-aged and had low education attainment.

In this study, having a history of surgery (especially general surgery), and having bowel elimination problems during the hospitalization period, did have a significant effect on constipation risk (Table 4). This may be because these patients had hospitalization experiences due to their past surgeries and bed rest, which, in turn, could lead to bowel elimination problems.

Past surgical procedures may also lead to higher risks of constipation. Klingman (2009) suggested that chronic illness (such as rheumatoid arthritis) and lengthy bed rest could lead to individuals' bowel elimination problems. Wilson (2005a) also explained that hard, dry lumpy stools and abdominal pain-distention could exist post surgery and with bed rest due to the weakness of the sphincter and pelvic floor muscles.

Limitations

In examining the data from this study, the limitations of a descriptive correlational design must be recognized. This design identifies only the interrelationships between variables. In addition, the sample was small and nonrandomized and focused on a specific patient population. As a result, our findings may not be generalizable to all surgical patients. Time was another limitation as constipation risk assessment was evaluated on the second postoperative day. Patients were on bed rest the first and second postoperative days. Because we needed to learn about the postoperative constipation risk of Turkish orthopedic patients, we collected our data on the second postoperative day with the CRAS (including overall constipation risk factors). In addition, this study is limited by a reliance on patients' self-reported measures regarding constipation risk factors.

Conclusion

This study measured the postoperative constipation risk assessment of Turkish orthopedic patients on their second postoperative day. We found that these patients were at moderate risk for constipation. Nurses should be attuned to routinely assessing the postoperative constipation risk of orthopedic patients as well as other similar patient populations to implement safe and effective interventions.

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