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RESEARCH ARTICLE

PERCEIVED BARRIERS AND FACTORS AFFECTING POSTOPERATIVE MOBILIZATION AND RELATED OUTCOMES IN SURGICAL PATIENTS

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ABSTRACT

Purpose: Postoperative mobilization (including the patient's initial and early mobilization after surgery) is a cornerstone of postoperative care and an essential component of surgical nursing practice. However, various patient-, surgery-, and system-related factors may hinder effective mobilization after surgery. This study aimed to identify the perceived barriers to postoperative mobilization and to determine how patient- and surgery-related factors influence key mobilization outcomes.
Material and Methods: This cross-sectional study was conducted between July 2023-August 2024 with 229 surgical patients undergoing different types of surgery. Data were obtained through the Patient Data Form. The data were analyzed using descriptive, comparative, correlation, and regression tests.
Results: Severe pain (40.2%), fatigue (25.8%), the presence of drains or catheters (19.7%), feeling more comfortable at bed rest (19.2%), and fear or anxiety (18.8%) were identified as the most common perceived barriers to early mobilization. The mean time to first postoperative mobilization was 10.55±7.25 hours, which was later than recommended by current guidelines. A positive statistically significant correlations were observed between time to first mobilization and age, body mass index, preoperative fasting duration, and time to start postoperative oral intake, while a negative correlation was found with education level ($p<0.05$). Surgery duration and time to start postoperative oral intake significantly affected the timing of the first postoperative mobilization ($\beta=0.029$, 0.249, respectively, $p<.001$). Gender, preoperative hemoglobin level, postoperative fasting duration, and the use of walking aids significantly predicted patients' anxiety/fear before the first mobilization (Nagelkerke $R^2=0.329$, $p<0.05$).
Conclusion: Postoperative pain was identified as a significant barrier to mobilization. The delay in early mobilization suggests a need to strengthen patient education and pain management strategies to promote earlier mobilization in surgical nursing practice. The duration of surgery and postoperative fasting were identified as strong predictors of the time to first mobilization. Gender, preoperative hemoglobin level, postoperative fasting duration, and the use of walking aids were strong predictors of anxiety/fear experienced prior to first mobilization.

Keywords: Early mobilization, mobilization barriers, postoperative care, surgical nursing

INTRODUCTION

Postoperative care aims to support patients' physiological recovery, prevent complications, and facilitate a safe return to daily activities. Within this context, early mobilization is recognized as a cornerstone intervention in modern postoperative

care and an essential component of surgical nursing practice. Surgical nurses play a pivotal role in assessing patients' readiness for mobilization, providing education, implementing mobilization plans, and monitoring patients' responses throughout the recovery process (1-3).

Early postoperative mobilization has become a recommended practice due to studies conducted from the past to the present (4). Although there is no clear definition of mobilization today (5,6), it can generally be described as activities that include passive and active range of motion exercises, in-bed movements, exercises performed at the bedside, and walking (7,8). Early mobilization typically refers to initiating patient movement as soon as it is medically safe—often within the first 24 hours after surgery. However, the exact timing may vary depending on the type and extent of surgery, anesthesia method, and the patient's overall condition (5,9-11). Previous studies indicate that the timing of early postoperative mobilization may vary depending on the type and complexity of the surgery. For example, patients undergoing major surgeries often experience delayed mobilization compared to those undergoing less invasive procedures (12,13). Despite these variations, the fundamental principle of initiating movement as soon as medically safe is consistent across surgical specialties. Understanding both the similarities and differences in mobilization practices among diverse surgical populations is crucial for developing tailored interventions and identifying potential barriers to postoperative mobilization.

Failure to achieve early mobilization after surgery can lead to adverse outcomes (14,15), potentially prolonging patient recovery and extending hospital stays (9). Studies have shown that patients who are mobilized early and frequently after surgery experience shorter hospital stays (9,15,16), which in turn reduces healthcare and treatment costs (16). Prolonged bed rest can result in various adverse outcomes, affecting the gastrointestinal, cardiovascular, respiratory, urinary, endocrine, musculoskeletal, and nervous systems, and skin integrity (17,18). Extended immobility after surgery may also lead to diminished functional capacity and impair the ability to perform activities of daily living (19). In contrast, early mobilization allows patients to play a more active role in their postoperative recovery (20). Based on this data, early mobilization is considered one of the critical interventions for minimizing morbidity and mortality (9,17).

Barriers to postoperative mobilization can be influenced by various factors, including individual patient characteristics, institutional processes, and/or sociocultural aspects (21). One study identified age, gender, number of catheters, and education level as obstacles to early mobilization (9), while another study linked hematological values, surgery duration, and American Society of Anesthesiologists (ASA) score to the inability to achieve early mobilization (22). Early mobilization is an intervention that requires interdisciplinary collaboration in care management, with the participation of both the patient and their family members (21,23). Identifying barriers to postoperative mobilization and developing strategies targeting modifiable factors are crucial to integrating early mobilization into multidisciplinary enhanced recovery protocols (7,9). Literature includes limited studies on the barriers perceived by surgical patients during the postoperative period, as well as patient- and procedure-specific factors that may hinder mobilization (9,21,22,24). Therefore, this study aimed to identify the perceived barriers to postoperative mobilization among surgical patients and to determine how patient- and surgery-related factors influence key mobilization outcomes such as time to first mobilization, pain intensity, postoperative nausea and vomiting (PONV), and anxiety/fear during the first mobilization. Within the scope of the study, the research questions to be addressed are as follows:

1) What are the perceived barriers to early postoperative mobilization in surgical patients?

2) Which patient- and surgery-related factors affect (a) the time to first postoperative mobilization, (b) pain intensity and PONV before the first mobilization, and (c) anxiety/fear during the first mobilization?

3) How are patients' attitudes toward mobilization (e.g., prioritizing early mobilization as a primary goal) associated with their demographic and clinical characteristics?

MATERIAL AND METHODS

Study Design and Sampling

The study was planned and conducted as a descriptive and cross-sectional research. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines were followed for reporting the study. The data for the study were collected from inpatient surgical clinics (general surgery, orthopedics, urology, cardiovascular, gyneco-oncology, neurosurgery) of hospitals affiliated with a foundation university in Istanbul

Table 1. Demographic, clinical, and perioperative characteristics of patients (n=229)

Variables		Min-Max	Mean±SD
Age		19-83	47.16±15.51
Height		148-200	171.95±10.28
Weight		45-141	72.98±15.65
BMI		16.85-52.24	24.63±4.87
		n	**%**
Gender		97	42.4
Female			
	Male	132	57.6
Educational status	Literate	21	9.2
	Primary education	50	21.8
	High school	60	26.2
	University	79	34.5
	Postgraduate	19	8.3
Chronic diseases	No	126	55.0
	Yes	103	45.0
Regular exercise before surgery *(at least 3 days and 30 minutes a week)*			
	No	135	59.0
	Yes	94	41.0
Preoperative mobility level	Actively mobile	129	56.3
	Moderately mobile	72	31.4
	Sedentary-less mobile	28	12.2
Type of surgery - I	General surgery	71	31.0
	Orthopedic surgery	53	23.1
	Urological surgery	37	16.2
	Cardiovascular surgery	24	10.5
	Gyneco-oncologic surgery	24	10.5
	Neurosurgery	20	8.7
Type of surgery - II	Elective	206	90.0
	Emergency	23	10.0
Surgical technique	Minimally-invasive	133	58.1
	Open	96	41.9
ASA score	ASA I	102	44.5
	ASA II	100	43.7
	ASA III	27	11.8
Type of anesthesia	General	158	69.0
	Spinal	30	13.1
	Epidural	41	17.9
Catheters/devices that the patient had in the first 48 hours postoperatively*			
	Peripheral venous catheter	220	96.1
	Foley catheter	105	45.9
	Drain bag	41	17.9
	PCA device	32	14.0
	Central venous catheter	12	5.2
Pain management in the first 48 hours postoperatively*			
	NSAIDs/Paracetamol	222	96.9
	Intravenous opioid agents	52	22.7
	PCA	32	14.4
Early postoperative complications	No	157	68.6
	Yes	72	31.4
NRS-2002 scores	0 point	195	85.2
	1 point	26	11.4
	2 points	8	3.5
		Min-Max	**Mean±SD**
Preoperative fasting time (h)		4-24	8.51±3.03
Preoperative hemoglobin		8.5-17.5	13.01±1.39
Duration of surgery (min)		30-490	141.55±95.51
Time to start oral intake after surgery (h)		1-72	6.01±7.71

*Abbreviations: SD: Standard deviation, BMI: Body mass index, ASA: American Society of Anesthesiologists, PCA: Patient-controlled analgesia, NSAIDs: Non-steroidal anti-inflammatory drugs, NRS: Nutritional Risk Screening score, h: Hour, min: Minute. *Multiple responses were given to this question.*

between July 2023 and August 2024. The study population consisted of all patients who underwent surgical procedures at the designated hospital during the specified period. A power analysis was conducted using the G*Power v3.1 to determine the sample size. Based on the results obtained from a similar study (9), the power analysis, which used logistic regression and odds ratio as the basis for calculation, determined that a minimum sample size of 203 patients was required to complete the study with a power of 0.95 and an alpha error of 0.05. The study was completed with 229 patients using a non-probability sampling method.

Inclusion and Exclusion Criteria

The study included individuals who were 18 years or older, provided informed consent, had no diagnosed cognitive, psychiatric, or neurological disorders, were able to move independently in the preoperative period, and were undergoing surgery for the first time. Exclusion criteria were patients who, for any reason, had mobility impairments, had undergone nerve block procedures that could hinder mobilization, were at risk of major postoperative complications such as wound dehiscence or bleeding, required strict bed rest, needed continued postoperative monitoring, or had an ASA score above III.

Data Collection

In the study, data were obtained by using the “Patient Data Form” consisting of a total of 4 sections and 46 questions prepared by the researchers based on the relevant literatüre (22,24-26). After the development phase of the form, nine nursing scientists with expertise in postoperative care, enhanced recovery after surgery, and early mobilization checked the completeness and comprehensibility of the developed form. Data on some of the questions in the form (e.g., hemoglobin value, ASA score, duration of surgery, amount of blood lost) were obtained from patient records at the healthcare institution within the scope of personal health information privacy policies. The first part of the patient data form included five questions to determine the demographic data of the patients (age, gender, body mass index [BMI], chronic diseases, educational status); the second part included 11 questions to obtain information about the preoperative period of the patients (e.g., preoperative exercise, mobilization training, fasting time, Nutritional Risk Screening [NRS]-2002 score, preoperative mobility level); the third part included six questions to determine some characteristics of the patients related to the intraoperative period that may affect mobilization (e.g., type and urgency of surgery, anesthesia method, surgical approach, surgery duration); and the fourth part included 24 questions evaluating postoperative factors and perceived barriers to mobilization (e.g., presence of drains or catheters, pain, dizziness, fatigue, fear of falling, anxiety, inadequate information, and lack of assistance during mobilization). In this study, dependent variables included time to first postoperative mobilization, pain intensity before first mobilization, PONV severity, and anxiety/fear during first mobilization. Independent variables included patients’ sociodemographic, preoperative, intraoperative, and postoperative characteristics. Comparisons between these variables were conducted to determine factors influencing mobilization outcomes and perceived barriers.

The study was initiated after obtaining all necessary permissions. It took approximately 20-25 minutes for each patient to complete the questionnaire. The data collection phase did not interrupt the patient's treatment and care processes or disrupt the surgical clinic's workflow. In the study, “early mobilization” was defined as patients standing up and walking out of the bed in the postoperative period.

Data Analysis

The data obtained from the study were analyzed using the statistical program (IBM SPSS 25.0). The results were evaluated at a 95% confidence interval, and statistical significance was considered at $p<0.05$. In the study, the normality of continuous variables was evaluated by the Kolmogorov-Smirnov test, skewness, and kurtosis values. Descriptive statistical analyses such as number, percentage, mean, standard deviation, and minimum-maximum values were used to analyze the data. The chi-square test was used to compare categorical variables, and Pearson correlation tests were used for the correlational analysis of continuous variables. Multiple linear regression and logistic regression analyses were conducted to determine the effect of independent variables on dependent variables. Before multiple linear regression, it was confirmed that the normality, covariance, and multicollinearity assumptions were not breached. Ethical approval (Date: 14.04.2023, no: E.83321821-805.02.03-184) was granted by the Yeditepe University Non-Interventional Clinical Research Ethics Committee.

Table 2. Perioperative mobilization characteristics of patients and perceived barriers to postoperative mobilization (n=229)

Variables	Min-Max	Mean±SD
Time to first postoperative mobilization (h)	1-48	10.54±7.25
PONV severity before first mobilization (NRS)	0-10	1.02±1.76
Pain severity before first mobilization (NRS)	0-10	4.66±2.29
	n	**%**
Receiving preoperative mobilization education		
No	152	66.4
Yes	77	33.6
Healthcare professional who provided preoperative mobilization education*		
Physician	42	18.3
Nurse	44	19.2
Physiotherapist	11	4.8
Early postoperative complications related to first mobilization*		
Increased pain level	98	42.8
Dizziness	55	24.0
Fatigue	47	20.5
Orthostatic intolerance	28	12.2
Increased PONV	24	10.5
Tachycardia	9	3.9
Headache	2	0.9
Receiving postoperative mobilization education		
No	53	23.1
Yes	176	76.9
Healthcare professional who provided postoperative mobilization education*		
Physician	70	30.6
Nurse	139	60.7
Physiotherapist	39	17.0
Having knowledge about the complications caused by postoperative immobilization		
No	87	38.0
Yes	142	62.0
Having knowledge about the benefits of postoperative early mobilization		
No	53	23.1
Yes	176	76.9
Using a walking-aid device during the first mobilization		
No	164	71.6
Yes	65	28.4
Did the use of walking-aid device reduce your anxiety? *(If the answer is yes)*		
No	5	2.2
Yes	49	21.4
Partially	11	4.8
Did the use of walking-aid device make mobilization easier? *(If the answer is yes)*		
No	2	0.9
Yes	59	25.8
Partially	4	1.7
Would you like to use a walking-aid device? *(If the answer is no)*		
No	58	25.3
Yes	28	12.2
Not sure	76	33.2
Was early mobilization your primary goal? No	70	30.6
Yes	159	69.4
Did you experience anxiety/fear during the first mobilization?		
No	81	35.4
Yes	148	64.6
If "Yes", what caused the anxiety/fear?*		
The pain will worsen	120	52.4
Fear of falling	58	25.3
My incision wound will be injured	42	18.3
Catheter/drain/probe etc. equipment may be displaced	37	16.2
A major complication such as bleeding may develop	30	13.1

Table 2. Continue

What were the most important factors that prevented you from early mobilization after surgery?*		
Severe pain experience	92	40.2
Fatigue	59	25.8
Presence of serum/drain/catheter/probe etc.	45	19.7
Feeling more comfortable at bed rest after surgery	44	19.2
Acute conditions such as dizziness	43	18.8
Fear/anxiety - Inability to take the courage	43	18.8
The idea that mobilization can be dangerous	36	15.7
Thinking that bed rest will accelerate recovery	25	10.9
Complication occurrence	12	5.2
Severe nausea and vomiting	9	3.9
Tachycardia	8	3.5
Respiratory distress/impairment	7	3.1
Lack of motivation	7	3.1
Family members insisting on bed rest for the recovery	6	2.6
Not being informed by the healthcare professional	5	2.2
Failure to mobilization accompanied by a health worker	5	2.2
Ignoring mobilization	4	1.7
Confusion	1	0.4

*Abbreviations: SD: Standard deviation, PONV: Postoperative nausea and vomiting, NRS: Numerical rating scale, h: Hour *Multiple responses were given to this question.*

Institutional approval was obtained from Yeditepe University Hospitals (Date: 16.05.2023, Approval no: E.11156775-806.01.03-2207). All patients who volunteered to participate in the study were informed about the study in detail and their verbal and written informed consents were obtained. All procedures involving human participants were conducted in accordance with institutional and/or national research committee ethical standards, as well as the Declaration of Helsinki and its subsequent amendments.

RESULTS

Demographic, Clinical, and Perioperative Characteristics of the Sample

The mean age of the patients was 47.16±15.51 years; 23.1% had undergone orthopedic surgery, 90% had elective surgeries, 69% underwent surgery under general anesthesia, and 68.6% did not experience early postoperative complications (Table 1). The mean time to first postoperative mobilization was 10.54±7.25 hours. 66.4% of the patients reported not being informed about mobilization in the preoperative period, and 23.1% had not received information regarding mobilization in the postoperative period. Increased pain intensity was the most frequently reported barrier and complication during the first mobilization (Table 2).

Comparison of Perceived Barriers to Mobilization with Patients' Characteristics

A statistically significant difference was observed between patients' experience of fear/anxiety before first mobilization and their gender, type of surgical intervention, the surgical method used, receipt of postoperative mobilization education, use of walking aids during the first postoperative mobilization, and knowledge about potential complications of postoperative immobilization and the benefits of early mobilization ($p<0.05$). Additionally, a statistically significant difference was found between the items regarding the prioritization of early mobilization as a primary goal for patients and their education level, receipt of pre- and postoperative mobilization education, type of surgical intervention, use of walking aids during the first postoperative mobilization, and knowledge about potential complications of postoperative immobilization and the benefits of early mobilization ($p<0.05$) (Table 3).

Correlations Between Mobilization Characteristics and Related Factors

Positive correlations were observed between time to first mobilization and age, BMI, preoperative fasting duration, and time to start postoperative oral intake, while a negative correlation was found with education level ($p<0.05$).

Table 3. Comparison of perceived barriers to mobilization with demographic, clinical, and perioperative characteristics of patients (n=229)

	Was early mobilization your primary goal?				X^2	Did you experience anxiety/fear during the first mobilization?				X^2
	No		Yes		p	No		Yes		p
Gender	n	%	n	%		n	%	n	%	
Female	36	51.4	61	38.3	3.397	18	22.2	79	53.4	20.813
Male	34	48.6	98	61.7	0.065	63	77.8	69	46.6	**<.001***
Chronic diseases										
No	34	48.6	92	57.9	1.695	46	56.8	80	54.0	0.158
Yes	36	51.4	67	42.1	0.193	35	43.2	68	46.0	0.691
Educational status										
Literate	9	12.86	12	7.55		7	8.64	14	9.46	
Primary education	14	20.00	36	22.64	10.466	19	23.46	31	20.95	1.795
High school	26	37.14	34	21.39	**0.033***	19	23.46	41	27.70	0.777
University	18	25.71	61	38.36		27	33.33	52	35.14	
Postgraduate	3	4.29	16	10.06		9	11.11	10	6.75	
Regular exercise before surgery										
No	47	67.14	88	55.35	2.795	46	56.79	89	60.14	0.242
Yes	23	32.86	71	44.65	0.095	35	43.21	59	39.86	0.623
Receiving preoperative mobilization education										
No	60	85.71	92	57.86	16.894	52	64.20	100	67.57	0.266
Yes	10	14.29	67	42.14	**<.001***	29	35.80	48	32.43	0.606
ASA score										
ASA I	30	42.86	72	45.28	0.617	42	51.85	60	40.54	3.055
ASA II	33	47.14	67	42.14	0.735	32	39.51	68	45.95	0.217
ASA III	7	10.00	20	12.58		7	8.64	20	13.51	
Type of surgery - I										
General surgery	37	52.86	34	21.38		34	41.98	37	25.00	
Orthopedic surgery	5	7.14	48	30.19		13	16.05	40	27.03	
Urological surgery	13	18.57	24	15.09	40.961	20	24.69	17	11.49	26.332
Cardiovascular surgery	2	2.86	22	13.84	**<.001***	8	9.88	16	10.81	**<.001***
Gyneco-oncologic surgery	10	14.29	14	8.81		4	4.94	20	13.51	
Neurosurgery	3	4.29	17	10.69		2	2.47	18	12.16	
Type of surgery - II										
Elective	64	91.43	142	89.31	0.242	80	98.77	126	85.14	10.765
Emergency	6	8.57	17	10.69	0.623	1	1.23	22	14.86	**0.001***

Table 3. Continue

Surgical technique									
Minimally-invasive	45	64.29	88	55.35	1.595	60	74.07	73	49.32	13.170
Open	25	35.71	71	44.65	0.207	21	25.93	75	50.68	**<.001***
Type of anesthesia									
General	51	70.83	107	68.15		52	63.41	106	72.11	
Spinal	11	15.28	19	12.10	1.452	14	17.07	16	10.88	2.915
Epidural	10	13.89	31	19.75	0.704	16	19.51	25	17.01	0.401
Receiving postoperative mobilization education									
No	28	40.00	25	15.72	16.104	27	33.33	26	17.57	7.315
Yes	42	60.00	134	84.28	**<.001***	54	66.67	122	82.43	**0.007***
Having knowledge about the complications caused by postoperative immobilization									
No	44	63.77	43	26.88	27.523	47	58.02	40	27.03	19.774
Yes	25	36.23	117	73.13	**<.001***	34	41.98	108	72.97	**<.001***
Having knowledge about the benefits of postoperative early mobilization									
No	30	42.86	23	14.47	22.026	30	37.04	23	15.54	13.600
Yes	40	57.14	136	85.53	**<.001***	51	62.96	125	84.46	**<.001***
Using a walking-aid device during the first mobilization									
No	63	90.00	101	63.52	17.408	66	81.48	98	66.22	6.485
Yes	7	10.00	58	36.48	**<.001***	15	18.52	50	33.78	**0.011***

Abbreviations: ASA: American Society of Anesthesiologists, X^2: Chi-square, *p<0.05 *Statistical significant values appear in bold.

Table 4. Correlation between mobilization and related factors

Variables		First mobilization time	Pain severity before first mobilization	PONV severity before first mobilization
Age	r	**.226****	.066	.042
	p	**.001**	.319	.524
Educational status	r	**-.239****	-.098	-.079
	p	**<.001**	.139	.233
BMI	r	**.233****	.004	-.015
	p	**<.001**	.951	.818
Preoperative fasting time	r	**.304****	.055	.012
	p	**<.001**	.408	.854
Preoperative hemoglobin	r	-.128	-.023	-.068
	p	.053	.729	.308
Time to start postoperative oral intake	r	**.487****	.042	.046
	p	**<.001**	.527	.485
Pain severity before first mobilization	r	**.180****	1	**.253****
	p	**.006**	-	**<.001**
PONV severity before first mobilization	r	**-.147***	**.253****	1
	p	**.026**	**<.001**	-

*Abbreviations: BMI: Body mass index, PONV: Postoperative nausea and vomiting *p<.05 **p<.01. Statistical significant values appear in bold.*

Additionally, positive correlations were observed between time to first mobilization and pain intensity before first mobilization, and a negative correlation with the severity of PONV before first mobilization (p<0.05). A positive correlation found between pain intensity and PONV severity before the first mobilization (p<.001) (Table 4).

Factors Affecting the First Postoperative Mobilization Time and Patients' Experience of Anxiety/Fear During the First Postoperative Mobilization

A multiple linear regression model applied to evaluate the factors that could affect the timing of first postoperative mobilization was statistically significant (F=18.419, p<.001). The model explained 43% of the variance in the dependent variable (R^2=0.431), indicating a moderate level of variance explained. Accordingly, surgery duration and time to start postoperative oral intake significantly affected the timing of the first postoperative mobilization (β=0.029, 0.249, respectively, p<.001). The logistic regression model applied to determine the factors that could affect the patient's experience of anxiety/fear during the first postoperative mobilization explained 32% of the effect of the independent variables on the dependent variable (Nagelkerke R^2=0.329). According to this, gender, preoperative hemoglobin level, time to start postoperative oral intake, and the use of a walking aid during the first mobilization were found to have a significant effect on the patient's experience of anxiety/fear during their first postoperative mobilization (Table 5).

DISCUSSION

This study aimed to identify the perceived barriers to postoperative mobilization and examine the influence of patient- and surgery-related factors on mobilization outcomes. The findings provide insight into the factors delaying early mobilization and the patients' experiences of anxiety/fear, aligning with the study objectives and research questions. Investigating and considering barriers to postoperative mobilization is crucial for developing new practices to improve patients' mobilization experiences (27,28).

Ensuring early postoperative mobilization is essential for surgical patients' physical and functional recovery (15). The study found that the most significant barrier to early mobilization is severe pain, with the most common complication during the first mobilization being the intensification of pain. As pain severity increases, the timing of first mobilization is delayed.

Table 5. Predictive factors of the postoperative first mobilization time and experiencing fear/anxiety during the first mobilization

Variables	F	p	R^2	Adj R^2	β	t	p
Constant	18.419	<.001	0.431	0.407		2.640	0.09
Age					.052	1.451	.148
Gender					-1.046	-1.148	.252
BMI					.083	.957	.339
Chronic disease					-.727	-.706	.481
Educational status					-.752	-1.919	.056
Preoperative fasting time					.045	.314	.753
Preoperative hemoglobin					-.499	-1.529	.128
Duration of surgery					.029	5.625	**<.001**
Time to start postoperative oral intake					.249	4.220	**<.001**

Dependent variable: Postoperative first mobilization time. Independent variables: Age, gender, BMI, chronic disease, educational status, preoperative fasting time, preoperative hemoglobin, duration of surgery, time to start oral intake VIF=1.319-2.281, p<.05

Variables	p	Cox & Snell R^2	Nagelkerke R^2	β	Exp	p
Constant	**<.001**	0.240	0.329		.003	.019
Age				.014	1.014	.389
Gender (Male)				2.310	1.078	**<.001**
Chronic disease				-.051	.950	.914
BMI				-.037	.964	.396
Receiving preoperative mobilization education (None)				.133	1.142	.751
Educational status						.585
Educational status (1)				.065	1.067	.943
Educational status (2)				.105	1.111	.891
Educational status (3)				.788	2.199	.280
Educational status (4)				.239	1.270	.715
Preoperative fasting time				-.064	.938	.368
Preoperative hemoglobin				.354	1.424	**.017**
Time to start postoperative oral intake				.179	1.195	**<.001**
Using a walking-aid device during the first mobilization (None)				1.180	3.255	**.003**

Dependent variable: Experiencing anxiety/fear during the first mobilization. Independent variables: Age, gender, chronic disease, BMI, receiving preoperative mobilization education, educational status, preoperative fasting time, preoperative hemoglobin, time to start postoperative oral intake, using a walking-aid device during the first mobilization. p<.05

Studies on the subject have indicated that patients with lower postoperative pain intensity (Visual Analog Scale [VAS]≤3) are 4.035 times more likely to complete early mobilization, and pain is identified as one of the most critical determinants of early mobilization in patients undergoing colorectal cancer surgery (29). Postoperative pain has been found to have the strongest correlation with immobility duration, with a 5-unit increase in pain level corresponding to a 2-hour increase in immobile time (30). Similarly, during postoperative days 2-7, pain hindering patient mobilization (26). Another study reported that postoperative pain, particularly on the first day, was a significant barrier to mobilization, diminishing its impact on subsequent days (27). Additional studies have also demonstrated that pain is the primary factor limiting patients' mobilization levels, with inadequate pain control delaying postoperative mobilization (22,31-33). These findings suggest that ineffective pain management is one of the most significant barriers to early mobilization. Pain not only hinders physical mobilization but also instills a fear of experiencing more pain after surgery, which decreases patient motivation (34). For these reasons, applying multimodal analgesia methods, as recommended by Enhanced Recovery After Surgery (ERAS) and other guidelines, and focusing on interventions that minimize pain should be a priority in the postoperative period. This approach can facilitate early mobilization, prevent complications associated with immobility, and improve patient outcomes (17,35,36).

In this study, it was observed that the rate of patients receiving preoperative mobilization education was relatively low, while the rate of those receiving postoperative mobilization education was higher. Moreover, a high percentage of patients reported being aware of the harms of immobility and the benefits of mobilization. Those with such knowledge significantly identified early postoperative mobilization as a priority goal. However, despite receiving mobilization education and recognizing its priority, one remarkable result was that patients' high awareness did not prevent them from experiencing fear/anxiety during postoperative mobilization. A study highlighted that health beliefs could influence early mobilization in surgical patients, and those with higher levels of personal health belief were more likely to grasp the importance and benefits of early mobilization and incorporate it into their practices (29). The same study reported that health belief was the most potent independent factor affecting the time to first mobilization out-of-bed, followed by mobilization knowledge (29). In a different qualitative study, patients' expressed that by developing a positive attitude toward postoperative mobilization, they regained control and autonomy over their symptoms, thus improving their adherence to mobilization. They also stated that perception, attitude, and motivation guided their mobilization practices (37). Similarly, another study indicated that patients' positive attitudes toward early mobilization stemmed from their clear understanding of its benefits. This perceived advantage was identified as a facilitator of early mobilization (21). Notably, the ERAS guidelines emphasize the importance of starting patient education about the perioperative process in the preoperative period to better prepare patients for surgery (17). The results of this study may have stemmed from personal health beliefs (such as misconceptions) or insufficient comprehension of the risks and benefits, as well as inadequate preoperative mobilization education. Additionally, severe pain experienced postoperatively may have hindered surgical patients from adequately understanding the education provided during this period. Including patients undergoing their first surgical experience in the study could also contribute to this result. Nevertheless, this finding underscores the importance of preoperative patient preparation and education. Surgical team members should encourage patients to adopt accurate beliefs and perceptions about early mobilization throughout the perioperative process, which can be achieved through timely and effective patient education (29).

In the literature, many factors are associated with the postoperative mobilization time of surgical patients. As a result of this study, it was observed that as age, BMI, preoperative fasting duration, and time to start postoperative oral intake increased, the first mobilization was delayed. As the educational level increased, the first mobilization was performed earlier. In previous studies, age (9,15,25,38), low educational level (9), and BMI (29) were found to be factors associated with failure to achieve early mobilization. Some studies have also reported that the severity of PONV prevents early mobilization (22,32,39). This study determined that when the first postoperative mobilization was performed earlier, the severity of PONV in the patients increased, which would mean a negative relationship between the time of first mobilization and the severity of PONV.

Although the benefits of early mobilization are widely reported in the literature, this result suggests that accelerated mobilization may be associated with adverse symptoms such as PONV. When planning postoperative mobilization, it is essential to consider this and prioritize balancing the benefits and risks for surgical patients. Additionally, in this study, the most commonly reported barriers to mobilization following pain were fatigue and the presence of drains/catheters. The literature similarly indicates that fatigue and the presence of catheters or drains are frequently reported barriers to mobilization after pain (9,21,24,26,30,31,33). Providing patients with information that standing or walking does not pose a risk or restriction related to drains or catheters and ensuring their safety could serve as another means of motivating patients to mobilize. Furthermore, as ERAS guidelines recommend, removing all catheters without ongoing indication in the postoperative period may help prepare patients to mobilize functionally and psychologically (17).

Another significant result was the strong correlation between perioperative fasting duration and early mobilization. However, no studies directly link these parameters to early mobilization. Regression analysis also revealed that the time to initiate postoperative oral intake is a highly predictive factor for determining the timing of first mobilization. This result is thought to be related to the emphasis in ERAS guidelines on shortening perioperative fasting duration, which can help preserve muscle strength and reduce the effects of surgical stress responses in patients (17). A recent systematic review and meta-analysis also highlighted that early initiation of nutrition following gastrointestinal surgery can reduce hospital length of stay, lead to better patient outcomes, shorten recovery time, and result in fewer complications (40). Early mobilization is considered to play a critical role in achieving these outcomes. In this study, the duration of surgery was also identified as a significant predictive factor in determining the timing of first mobilization. A study conducted with patients undergoing major abdominal cancer surgery found that longer surgery duration was associated with lower postoperative physical activity (15). Similarly, in another study involving geriatric patients who underwent surgery for hip fracture, surgery duration was identified as an independent factor with a significant impact on postoperative mobilization parameters (25). Another study on abdominal surgery patients reported that surgery duration was an independent factor hindering postoperative mobilization (22). This can be explained by the mechanism whereby longer surgery duration extends the effects of the surgical stress response, making mobilization more difficult (17,22). Therefore, patients who undergo longer surgeries should be monitored more closely in the postoperative period and encouraged with supportive interventions to facilitate early mobilization.

Factors affecting anxiety and fear related to early postoperative mobilization can vary because individual characteristics may influence the experience of anxiety/fear. In this study, gender, preoperative hemoglobin level, postoperative time to oral intake, and use of walking aids were found to be independent determinants of anxiety/fear experienced during the first mobilization. These findings indicate that both clinical and demographic characteristics can impact patients' mobilization-related anxiety. Previous studies have reported that preoperative anemia is effective in postoperative mobilization (22,25,41), and it is thought that this may be related to the patients' physical well-being, thereby increasing anxiety during mobilization.

CONCLUSION

This study highlights the key barriers and influencing factors related to early and initial postoperative mobilization in surgical patients. Severe pain, fatigue, the presence of drains or catheters, and fear or anxiety were identified as the most common perceived barriers, while delays in early mobilization were significantly associated with older age, higher BMI, longer preoperative fasting, longer surgery duration, and delayed postoperative oral intake. Educational level was associated with earlier mobilization, and patients' anxiety/fear during the first mobilization was significantly influenced by gender, preoperative hemoglobin level, postoperative oral intake timing, and the use of walking aids. These findings underscore the importance of comprehensive pre- and postoperative education, effective pain management, and tailored nursing interventions to promote timely mobilization and reduce anxiety or fear. Early identification of patients at risk of delayed mobilization or increased anxiety allows healthcare providers to implement individualized strategies, thereby enhancing recovery, reducing complications, and supporting optimal postoperative outcomes.

Limitations: However, there are several limitations to consider. Since this study was conducted at a single center, the generalizability of the results is limited. In the study, data on oncologic treatment, albumin levels, and blood loss during surgery, three critical parameters that may affect patients' mobilization, were unavailable and could not be included in the results. In addition, although not included in the study results, it was observed that most patients mobilized without the help of a healthcare professional, which may have caused mobilization anxiety/fear.

Based on the findings of this study, it is recommended that surgical teams minimize operative duration when feasible and adhere to early postoperative oral intake protocols to facilitate timely mobilization. Surgical nurses should provide individualized pre- and postoperative education, ensure safe and supportive mobilization environments, and closely monitor patients at higher risk of delayed mobilization or increased anxiety (e.g., older patients, those with higher BMI, or using walking aids). These measures may enhance early mobilization, reduce patient anxiety, and improve overall postoperative outcomes. Future studies could investigate targeted interventions to reduce pain and anxiety, and assess their impact on the timing of early postoperative mobilization.

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Ethical approval: Before starting the current study, ethics committee approval (Date: 14.04.2023, Approval no: E.83321821-805.02.03-184) was granted by the Yeditepe University Non-Interventional Clinical Research Ethics Committee and institutional approval (Date: 16.05.2023, Approval no: E.11156775-806.01.03-2207) was obtained from Yeditepe University Hospitals. All patients who volunteered to participate in the study were informed about the study in detail and their verbal and written informed consents were obtained. All procedures involving human participants were conducted in accordance with institutional and/or national research committee ethical standards, as well as the 1964 Declaration of Helsinki and its subsequent amendments.

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