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Research

The Prevalence of Pain in the First 24 Hours After Surgery: A Multicenter Study

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A B S T R A C T

Purpose: This study was conducted to determine the prevalence and severity of postoperative pain in the first 24 hours after surgery and to emphasize the importance of postoperative pain assessment.
Design: A descriptive study.
Methods: This study was carried out on May 21, 2019 with 898 patients who had completed the postoperative 24th hour in the surgical clinics of 10 training and research hospitals in Istanbul, the capital of Turkey. Point prevalence was used in the study. Data were collected using a questionnaire developed by the researchers and the Revised American Pain Society Patient Outcome Questionnaire. Descriptive statistics were presented as frequency, percentage, mean, and standard deviation. Nonparametric tests were used for data without normal distribution (Kolmogorov-Smirnov Test, $P < .05$). Two-group comparisons were performed using the Mann-Whitney U test. The Kruskal Wallis-H test was used for the comparison of three or more groups. Statistical significance was set as $P < .05$.
Findings: The three main types of surgery were general surgery with 31.8%, gynecologic surgery with 12.9%, and orthopedic surgery with 12.7%. The mean lowest level of pain felt by the patients included in the study in the first 24 hours was 3.90 ± 2.94, and the mean highest level of pain was 6.38 ± 4.45.
Conclusions: Postoperative pain is a subjective phenomenon and may be affected by factors such as type of surgery, previous experience of surgery, duration of surgery, the length of the surgical incision, the type of anesthesia, the quality of postoperative care, individual characteristics and experiences, and fear anxiety; thus, the experience of pain may vary from person to person.

The International Association for the Study of Pain (IASP) has defined pain as "a sensory and emotional experience accompanied by tissue damage or potential tissue damage or associated with such a damage process."[1] The perception of pain is unique to the individual and is affected by many factors, including age, gender, culture, individual psychological characteristics (introversion, extraversion), previous experiences of pain, depression, anxiety, and the support systems available.[2-5] Pain is a serious problem for individuals and if not treated, may create physiological and/or psychological dangers to the health of individuals.[5,6] If pain cannot be controlled, it prolongs hospital stay, increases mortality and morbidity rates, causes repeated hospitalizations, and leads to higher costs.[7-12]

Despite today's advanced technology, approximately three-quarters of patients who undergo surgery develop acute pain, and 80% of them have moderate and severe pain.[13,14] Surgery causes pain in individuals and if postoperative pain is not treated, it can affect body systems and lead to undesirable consequences. These may appear as tachycardia, hypertension, water retention, increased blood sugar, decreased gastrointestinal motility, and increased myocardial oxygen demand.[15,16] Pain in the first seven days after surgery is defined as

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acute pain; if pain continues after seven days, it is defined as prolonged pain; if it lasts more than three months, it is defined as chronic postoperative pain or intractable postoperative pain.[17] Pain can become chronic if it is not evaluated and treated using an appropriate pain assessment method.[5,7,8] Therefore, an effective assessment and treatment plan is required for postoperative pain.

This study was conducted to determine the prevalence and severity of postoperative pain and emphasize the importance of postoperative pain assessment. Despite previous studies on postoperative pain prevalence in Turkey, most of these studies have focused on a single type of surgery and the number of hospitals and patients has been limited.[18,19] Since this study examines the current data on the prevalence of postoperative pain and the factors affecting pain, it will provide an important resource in both the national and international literature about how to improve postoperative pain treatment and the quality of care, leading to greater patient satisfaction.

Methods

Study Design

This descriptive study was conducted using the point prevalence method to determine the prevalence and severity of postoperative pain experiences and to emphasize the importance of postoperative pain assessment.

Study Setting

This research was carried out on May 21, 2019 in the general surgery, thoracic surgery, orthopedics, cardiovascular surgery, plastic surgery, urology, neurosurgery, ophthalmology, otorhinolaryngology, and gynecology clinics of 10 training and research hospitals in Istanbul, a large metropolitan area which is the capital city of Turkey.

The study was conducted in Istanbul since it is the most cosmopolitan province in Turkey. People from every region of Turkey settle in Istanbul and people living all over Turkey choose to be admitted to hospitals in Istanbul to be treated. For this reason, it can be suggested that the patient profile of this study represents Turkey as a whole. The common characteristics of public hospitals located in Istanbul and affiliated to the Provincial Health Directorate are that they are full-fledged hospitals (serving all patient groups) which perform surgeries in all departments on a daily basis. An average of 100 surgeries is performed per day in each hospital.

Sample

The study sample consisted of 898 patients who agreed to participate in the study. Inclusion criteria in the study were being over the age 18 and completing the 24th hour after surgery.

Data collection

A questionnaire prepared by the researchers according to the literature was used in the study.[20-24] The questionnaire consisted of two parts. The first part consisted of 11 questions. The first four questions were about the sociodemographic characteristics of patients (age, gender, educational status, marital status) and the remaining seven questions were about the surgical characteristics of patients (diagnosis, previous surgery, surgical intervention, type of surgery, type of anesthesia, postoperative analgesic treatment, presence of a pain protocol in the hospital).

The second part was the Revised American Pain Society Patient Outcome Questionnaire, which consists of 12 questions. The questionnaire asks about the lowest and highest levels of pain experienced by patients in the first 24 hours after surgery, as well as about which activities are affected and how the mood and emotions are affected by the pain.

The Cronbach's alpha coefficient of the Revised American Pain Society Patient Outcome Questionnaire was calculated by Finch et al.[25] to assess its internal consistency and found to be 0.780 for the *pain severity and sleep interference* subscale, 0.811 for the *activity interference* subscale, 0.882 for the *affective* subscale, 0.499 for the *side effect (adverse event)* subscale, and 0.454 for the *perception of care* subscale. The Cronbach's alpha coefficient of the entire questionnaire was 0.791. The internal consistency level of the side effect subscale was found to be low. This finding is consistent with the results of the Turkish adaptation studies of the same questionnaire conducted by Erden et al. (Cronbach's alpha coefficient: 0.88) and Keskin et al.[26,27] (Cronbach's alpha coefficient: 0.91). In this study, the Cronbach's alpha coefficient of the Revised American Pain Society Patient Outcome Questionnaire was 0.79.

Intervention and Measures

In the preparatory stage, training nurses (10 nurses) in the hospitals where the study was to be conducted were informed about the research and how to fill in the research forms. At the end of the briefing, the questions raised by the nurses were answered by the researcher. These briefings took place the day before the study and were conducted in person by the researchers in the institutions where the nurses were employed. Nurses working in the clinics on the day of the study were then informed about how to fill in the research forms by the training nurses. Instruction in each clinic took 10 minutes on average. The questionnaire was filled in at 14:00 on May 21, 2019 by the nurses who had previously been trained to administer it. The face-to-face interview method was used and all patients who had agreed to participate in the study were interviewed in their rooms. Collecting data from the patient files took five minutes on average and the patient interviews took approximately 10 minutes. It took approximately 45 minutes for each nurse in each clinic to collect all the data.

Ethical Considerations

Ethical approval (numbered 10.10.2018-23) was received from the Ethics Committed of Ankara Yıldırım Beyazıt University. Written permission was obtained from the institutions where the study was conducted; written and verbal consent was obtained from the patients participating in the study.

Statistical Analysis

The data obtained from the patient files and questionnaires were transferred to the IBM SPSS version 23. Descriptive statistics were reported as frequency, percentage, mean and standard deviation.

The normal distribution of the data was evaluated using the Kolmogorov-Smirnov test.[28,29] Nonparametric tests were used for the data without normal distribution in the groups (Kolmogorov-Smirnov Test, $P < .05$). The Mann-Whitney U test was used for two-group comparisons and the Kruskal Wallis-H test was used for the comparison of three or more groups.[30] Statistical significance was established as $P < .05$.

Results

Table 1 shows the sociodemographic characteristics of the patients participating in the study and the type of surgical intervention. The mean age of the patients was 50.83 ± 17.66 (range: 18 to 91 years old). Of the patients included in the study, 54.7% were male; 77.5% had a partner; 40% were primary school graduates.

Table 1
Sociodemographic and Surgical Intervention Characteristics of the Patients

Sociodemographic Characteristics		n	%
Gender	Female	491	54.7
	Male	407	45.3
	Total	898	100.0
Age 50.83(±17.66)	Between the ages of 18-30	141	15.6
	Between 31-40 years	140	15.6
	Between 41-50 years	165	18.4
	Between 51-60 years	151	16.8
	Between 61-70 years	163	18.2
	Between 71-90 years	138	15.4
	Total	898	100.0
Marital status	In a relationship	696	77.5
	No relationship	202	22.5
	Total	898	100.0
Education status	Illiterate	104	11.6
	Primary school	359	40.0
	Middle School	124	13.8
	High school	187	20.8
	University	115	12.8
	Postgraduate	9	1.0
	Total	898	100.0
Surgery features		**n**	**%**
Previous surgery	Yes	478	53.2
	No	420	46.8
	Total	898	100.0
Surgical intervention applied	General surgery	286	31.8
	Gynecology surgery	116	12.9
	Orthopedics	114	12.7
	Urology	103	11.5
	Brain surgery	97	10.8
	Ear Nose Throat surgery	78	8.7
	Plastic surgery	38	4.2
	Eye surgery	36	4.0
	Thoracic surgery	15	1.7
	Cardiovascular surgery	15	1.7
	Total	898	100.0
Surgical intervention type	Open	569	63.4
	Closed	313	34.9
	Robotics	16	1.8
	Total	898	100.0
Anesthesia type	General anesthesia	724	80.6
	Local anesthesia	99	11.0
	Other	75	8.4
	Total	898	100.0
Pain protocol	Yes	616	68.6
	No	282	31.4
	Total	898	100.0
Preoperative pain presence	Yes	150	16.7
	No	748	83.3
	Total	898	100.0

Table 2
Descriptive Findings of the Revised American Pain Society Patient Outcomes Questionnaire

Patient Results Survey Statements	n	Mean	Sd.
1. The least pain level in the first 24 hours	898	3.90	2.94
2. The worst pain level in the first 24 hours	898	6.38	4.45
3. Time period of severe pain in the first 24 hours (%)	898	51.22	28.91
4. Activities prevented by pain and level of disability	**n**	**Mean**	**Sd.**
4a. Turning over, standing up, changing positions.	898	5.06	3.25
4b. Doing activities such as walking , sitting in a chair, standing at the sink.	898	4.48	3.37
4c. Falling asleep	898	3.63	3.33
4d. Maintaining sleep	898	3.47	3.25
5. Emotions and levels affected by pain	**n**	**Mean**	**Sd.**
5 a. Worried	898	3.70	3.23
5b. Depressed	898	2.71	3.10
5c. Scared	898	3.07	3.27
5 d. Helpless	898	2.47	3.12
6. Types and level of side effects	Status	**Mean**	**Sd**
	Yes	208	23.2
	No	690	76.8
	Total	898	100.0
	n	**Mean**	**Sd**
6a. Nausea	690	3.15	3.15
6b. Numbness	690	2.67	2.94
6c. Itching	690	1.03	2.04
6d. Dizziness	690	2.77	2.84
	n	**Mean**	**Sd**
7. The level of pain relief in the first 24 hours (%)	898	66.97	28.20
8. Level of involvement in decisions taken in pain treatment to the desired extent	898	6.43	3.57
9. Level of satisfaction with pain treatment in the hospital	898	8.17	3.25
10. Getting information about pain treatment options	Status	**n**	**%**
	No	302	33,6
	Yes	596	66,4
	Total	898	100,0
10a. Benefit level of information about pain treatment options	**n**	**Mean**	**Sd.**
	596	7.41	2.64
11. Use of nondrug methods in pain treatmen	Status	**n**	**%**
	No	464	51.7
	Yes	434	48.3
	Total	898	100.0
	frequency	**n**	**%**
12. Encouragement to use non-pharmacological by the doctor and nurse	Never	373	41.5
	Sometimes	325	36.2
	Often	200	22.3
	Total	898	100.0

The percentage of patients who had previous surgery was 53.2%. The three main types of surgery in this study were general surgery with 31.8%, gynecologic surgery with 12.9%, and orthopedic surgery with 12.7%. 63.4% of the surgeries were open surgery and 34.9% were laparoscopic. 80.6% of the surgeries were performed under general anesthesia. Only 16.7% of the patients had preoperative pain and 68.6% of the patients received a postoperative pain protocol (Table 1). Although not shown in the table, 70.8% of the patients were given paracetamol, 16.8% were given an NSAID, and 12.4% were given opioids for pain relief after surgery.

Table 2 shows the distribution of the evaluations for the Revised American Pain Society Patient Outcomes Questionnaire. The mean lowest level of pain felt by the patients included in the study in the first 24 hours was 3.90 ± 2.94 and the mean highest level of pain was 6.38 ± 4.45. Moreover, 51.22 ± 29.91% of the patients included in the study had severe pain in of the first 24 hours. Patients stated that activities such as “turning over, straightening up, changing position in bed” (5.06 ± 3.25), “walking outside the bed, sitting on a chair, standing by the sink “(4.48 ± 3.37), “falling asleep” (3.63 ± 3.33), and “staying asleep” (3.47 ± 3.25) were affected by pain. Furthermore, patients stated that they felt anxiety (3.70 ± 3.33), a depressed mood (2.71 ± 3.10), fear (3.07 ± 3.27), and despair (2.47 ± 3.12) due to pain. Patients also stated that they were experiencing pain-related side effects (76.8%). These side effects were nausea (3.15 ± 3.15), drowsiness (2.67 ± 2.94), itching (1.03 ± 2.04), and dizziness (2.77 ± 2.84) (Table 2).

Results showed that pain had diminished in 66.97% of the patients in the first 24 hours. Patients' mean rate of participation in pain treatment was 6.43 ± 3.57, and their mean rate of satisfaction with pain treatment was 8.17 ± 3.25. 66.4% of patients had received information about pain treatment options, with a usefulness rating of 7.41 ± 2.64. 48.3% of the patients stated that they had used non-pharmacological methods in pain treatment, but that they had not been encouraged to use non-pharmacological methods by physicians and nurses (41.5%) (Table 2). Of the patients using non-pharmacological methods, 43% (n = 186) preferred to use distraction, 39% (n = 169) preferred deep breathing, and 39.3% (n = 170) preferred praying.

Table 3 shows the distribution of factors affecting the severity of the pain seen in the first 24 hours. The lowest level of pain felt by the patients in the first 24 hours differed significantly by gender (U: 89920.00, $P = .009$), previous surgery (U: 84683.00, $P < .001$), surgery site (X^2: 52.639, $P < .001$), the type of surgery (X^2: 47.235, $P < .001$), and the type of anesthesia (X^2: 21.894, $P < .001$). Pain levels were lower in males, patients with no previous history of surgery, and patients with eye surgery, laparoscopic surgery, or had local anesthesia (Table 3).

Additionally, the highest level of pain felt by the patients in the first 24 hours differed significantly by gender (U: 88835.00, $P = .004$). The highest level of pain felt by female patients (6.47 ± 3.04) was significantly higher than that of male patients (6.26 ± 5.61). When the highest level of pain was evaluated according to age, marital status, and educational status, no statistically significant difference was found ($P > .05$).Furthermore, the highest level of pain felt by the patients in the first 24 hours differed significantly in those with a previous history of surgery (U: 87315.50, $P =< .001$). Pain in the first 24 hours was significantly higher in patients with a history of surgery (6.64 ± 4.20) than in patients without a history of surgery (6.07 ± 4.70). The highest level of pain felt by the patients in the first 24 hours also differed significantly by type of surgery (X^2: 100.778 $P < .001$). The highest level of pain felt in the first 24 hours was significantly higher in general surgery, thoracic surgery, orthopedic surgery, and neurosurgery patients (Table 5, $P < .001$).

A significant difference was also found in the highest level of pain felt by the patients in the first 24 hours according to the type of surgery (X^2: 26.042, $P = .001$). The highest level of pain in the first 24 hours was significantly higher in patients who had undergone open surgery (6.74 ± 4.24) compared to those who had undergone

Table 3
Evaluation of the Least Pain Level in the First 24 Hours According to Sociodemographic and Surgical Intervention Features

Sociodemographic Characteristics		n	Mean	Sd.	U/X^2	*P*	
Gender	Female	491	4.13	2.94	89920.00^{U}	**.009**	
	Male	407	3.63	2.92			
	Total	898					
Age 50.83(± 17.66)	Between the ages of 18-30	141	4.64	3.05	5.274^{X2}	.383	
	Between 31-40 years	140	3.90	2.94			
	Between 41-50 years	165	4.00	3.14			
	Between 51-60 years	151	3.78	2.84			
	Between 61-70 years	163	3.37	2.65			
	Between 71-90 years	138	3.44	2.92			
	Total	898	3.90	2.94			
Marital status	In a relationship	696	3.89	2.91	69952.50^{U}	.915	
	No relationship	202	3.93	3.03			
	Total	898					
Education status	Illiterate	104	4.64	3.05	9.729^{X2}	.083	
	Primary school	359	3.90	2.94			
	Middle school	124	4.00	3.14			
	High school	187	3.78	2.84			
	University	115	3.37	2.65			
	Postgraduate	9	3.44	2.92			
	Total	898	3.90	2.94			
			Mean	**Sd.**	**U/X^2**	***P***	**Post Hoc**†
Surgery features previous surgery	Yes	478	4.26	2.91	84683.00^{U}	**<.001**	-
	No	420	3.50	2.92			
	Total	898					
Surgical intervention applied	(1) General surgery	286	4.01	2.80	52.639^{X2}	**<.001**	10>8**
	(2) Thoracic surgery	15	3.40	2.29			1>8***
	(3) Orthopedics	114	4.84	3.17			7>8***
	(4) Cardiovascular surgery	15	2.13	2.85			3>8***
	(5) Plastic surgery	38	4.65	2.61			5>8***
	(6) Urology	103	3.30	2.98			
	(7) Brain surgery	97	4.44	3.02			
	(8) Eye surgery	36	2.05	2.99			
	(9) Ear Nose Throat surgery	78	3.15	2.27			
	(10) Gynecology surgery	116	3.93	2.98			
	Total	898	3.90	2.94			
Preoperative pain presence	Yes	150	3.60	3.14	51413.50^{U}	.104	-
	No	748	3.96	2.89			
	Total	898					
Surgical intervention type	(1) Open	569	4.40	2.93	47.235^{X2}	**<.001**	1>2***
	(2) Closed	313	3.05	2.76			
	(3) Robotics	16	2.93	2.64			
	Total	898	3.90	2.94			
Anesthesia type	(1) General anesthesia	724	4.01	2.87	21.894^{X2}	**<.001**	1>2***
	(2) Local anesthesia	99	2.68	2.81			3>2***
	(3) Others	75	4.48	3.30			
	Total	898					
Pain control	Yes	616	3.92	3.04	86165.50^{U}	0.847	-
	No	282	3.86	2.70			
	Total	898					

U: Mann-Whitney U Test, **X^2:** Kruskal Wallis-H Test,
***$P < .001$.
**$P < .01$.
*$P < .05$.
†Post-hoc analysis result.

laparoscopic surgery (5.81 ± 4.80) (P <0.001). Moreover, the highest level of pain in the first 24 hours was significantly higher in patients who had undergone laparoscopic surgery (5.81±4.80) than in those who had undergone robotic surgery (4.62 ± 3.09) (P = .030). Likewise, a significant difference was found in the highest level of pain felt by the patients in the first 24 hours according to the type of anesthesia (X^2: 26.530, P = .001). The highest level of pain in the first 24 hours was significantly lower in patients who had local anesthesia (4.55 ± 3.47) compared to those who had had other types of anesthesia (6.57 ± 2.82) and general anesthesia (6.61 ± 4.65) (P < .001). However, no significant difference was found in the highest level of pain felt by the patients in the first 24 hours in terms of the presence of preoperative pain and the use of a pain protocol (Table 5, P > .05). No statistically significant difference was found in the lowest (Table 4) and the highest (Table 6) level of pain felt by the patients in the first 24 hours in terms of the medications used in the postoperative period (P > .05).

Table 4
Evaluation of the Least Pain Level in the First 24 Hours According to the Drugs Used in the Postoperative Period

Drugs Used in the Postoperative Period		n	Mean	Sd.	X^2	P
Drug name	Opioid	111	3.63	3.13	2.059	.357
	NSAID	151	3.77	2.69		
	Paracetamol	635	3.99	2.96		
	Total	897	3.91	2.94		

Table 5
Evaluation of the Least Perceived Level in the First 24 Hours According to Sociodemographic and Surgical Intervention Features

Sociodemographic Characteristics		n	Mean	Sd.	U/X^2	P	
Gender	Female	491	6.47	3.04	88835.00^{U}		**.004**
	Male	407	6.26	5.71			
	Total	898					
Age	Between the ages of 18-30	141	6.15	2.88	10.677^{X2}		.058
50.83 (± 17.66)	Between 31-40 years	140	6.51	6.92			
	Between 41-50 years	165	6.72	2.90			
	Between 51-60 years	151	6.93	5.91			
	Between 61-70 years	163	6.23	3.17			
	Between 71 and 90 years	138	5.63	3.36			
	Total	898	6.38	4.45			
Marital status	In a relationship	696	6.35	3.86	68733.00^{U}		.628
	No relationship	202	6.46	6.07			
	Total	898					
Education status	Illiterate	104	6.81	3.05	7.795^{X2}		.168
	Primary school	359	6.42	4.57			
	Middle school	124	6.12	3.03			
	High school	187	6.38	6.18			
	University	115	6.19	2.91			
	Postgraduate	9	5.44	2.92			
	Total	898	6.38	4.45			
Surgery features		**n**	**Mean**	**Sd.**	**U/X^2**	***P***	**Post Hoc**[†]
Previous surgery	Yes	478	6.64	4.20	87315.50^{U}	**.001**	-
	No	420	6.07	4.70			
	Total	898					
Surgical intervention applied	(1) General surgery	286	7.03	2.58	100.778^{X2}	**<.001**	1>6***
	(2) Thoracic surgery	15	10.46	16.66			1>8***
	(3) Orthopedics	114	7.07	2.93			1>9***
	(4) Cardiovascular surgery	15	3.73	3.88			1>4***
	(5) Plastic surgery	38	5.63	2.86			2>8***
	(6) Urology	103	5.27	3.13			3>6***
	(7) Brain surgery	97	7.14	8.02			3>4***
	(8) Eye surgery	36	2.55	3.33			7>4***
	(9) Ear Nose Throat surgery	78	4.93	2.78			7>8***
	(10) Gynecology surgery	116	6.64	2.80			7>9***
	Total	898					6>8***
							9>8***
							10>8***
							10>9***
Preoperative pain presence	Yes	150	6.24	3.05	56055.50^{U}	.988	-
	No	748	6.40	4.68			
	Total	898					
Surgical intervention type	(1) Open	569	6.74	4.24	26.042^{X2}	**.001**	2>3**
	(2) Closed	313	5.81	4.80			1>2***
	(3) Robotics	16	4.62	3.09			
	Total	898					
Anesthesia type	(1) General anesthesia	724	6.61	4.65	26.530^{X2}	**.001**	1>2***
	(2) Local anesthesia	99	4.55	3.47			3>2***
	(3) Other	75	6.57	2.82			
	Total	898	6.38	4.45			
Pain protocol	Yes	616	6.23	4.28	80945.00^{U}	.099	-
	No	282	6.70	4.80			
	Total	898					

U: Mann-Whitney U Test, **X^2:** Kruskal Wallis-H Test.
***P < .001.
**P < .01.
*P < .05.
[†]Post-hoc analysis result.

Table 6
Evaluation of the Worst Pain Level in the First 24 Hours According to the Drugs Used in the Postoperative Period

Drugs Used in the Postoperative Period		n	Mean	Sd.	X^2	*P*
Drugs	Opioid	111	6.86	9.85	3.340	.188
	NSAID	151	6.17	2.90		
	Paracetamol	635	6.34	3.02		
	Total	897	6.37	4.45		

Discussion

Postoperative pain is a surgical complication with a high prevalence. Previous studies have reported that 30 to 90% of patients experience postoperative pain in the first 24 hours.[31,32] If postoperative pain is not controlled, it not only leads to systemic complications, but also affects the quality of life and patient comfort, and may become chronic.[8,11,12] Therefore, effective pain control is important. However, a number of studies have shown that pain control is not effective enough.[33-35] Postoperative pain differs according to multifactorial characteristics and requires individual-oriented care. For this reason, understanding the sociodemographic issues, surgical intervention characteristics, and the analgesic drugs that may affect pain is important.

This study investigated current data on the prevalence of postoperative pain and the factors affecting it. The lowest and highest levels of pain felt by the patients in the postoperative first 24 hours were 3.9 and 6.38, respectively. Patients experienced difficulties in changing position, turning over, and straightening up in bed due to pain, and that they felt anxiety and fear. Nausea was the most frequent experience caused by pain. Nearly half of the patients (48.3%) used non-pharmacological pain control methods with the main three methods being distraction, deep breathing, and praying. Patients who were female, had previous surgery, or had undergone open surgery felt more pain, whereas patients who had undergone eye surgery or had local anesthesia felt less pain.

Strohbuecker et al.[35] conducted a study on the prevalence of pain in the first 24 hours and similarly found that 42% of the patients had mild pain (Numerical Rating Scales (NRS): 0 to 4.4 cm), 22% had moderate pain (4.5 to 6.4 cm), and 36% had severe pain(6.5 cm and over). Batoz et al. reported that patients experienced postoperative pain (VAS: 3 cm) in the first 24 hours and Sommer et al. reported that 41% of the patients had moderate (VAS >4 cm) or severe pain in the first 24 hours.[33,36] Patients who had undergone abdominal surgery were reported to have had severe pain. Salomon et al. reported the mean severity of pain as 6 cm,[37] Strohbuecker et al. as 5 cm,[35] and Chia et al. as 4.3 cm over 10 cm.[34] The mean highest level of pain reported by the patients participating in our study was 6.38 cm. Similar to the literature, this study also revealed that patients had mild and moderate pain (VAS min:3.9 cm; max:6.38 cm) in the postoperative first 24 hours.

The severity of postoperative pain felt by the patients differs across the literature. It has been suggested that differences in pain severity are caused by sociodemographic characteristics, gender, previous pain-related experiences, surgical procedures, health, individual characteristics, and different pain control protocols. In the present study, the lowest and highest levels of pain felt in the first 24 hours were higher in female patients than in male patients and the difference was statistically significant ($P = .009$; $P = .004$). No statistically significant difference was found in terms of age, marital status, or educational status ($P > 0.05$). Likewise, Aubrun et al. and Fillingim et al. (2009)[38,39] reported that women had higher pain severity and had a greater need for analgesics. These studies explained the reason for the higher severity of pain in women as due to women's low pain tolerance, high levels of inflammation, and psychological states such as depression and anxiety. Acar et al. also found that there was no statistically significant difference between age and pain, whereas Çelik[18,40] found that severe pain was more common in those aged from 68 to 87 years old. Although educational level has been reported to be another factor affecting pain, contrasting results are found in the literature. For example, Çelik found that the severity of pain was high in illiterate people, while Kırdemir & Özorak [40,41] reported that the level of pain increased as the educational level increased.

According to the gate control theory developed by Melzack and Wall, if the patient has previously experienced extreme pain, the fibers A and C do not send signals to the substantia gelatinosa and the individual experiences pain more severely.[42] For this reason, individuals are questioned about their past experiences of pain. The fact that the level of pain was higher in patients who had previously had surgery ($P = .001$) in the current study suggests that they did not have previous experiences in dealing successfully with pain and that their pain was not sufficiently controlled.

In the study, the lowest level of pain was found in patients who had undergone eye surgery and the highest level of pain was found in those who had undergone thoracic surgery, open surgery, and general anesthesia ($P < .05$). Similarly, Chia et al.[34] found the VAS pain score to be 5.6 in thoracic and orthopedic surgery. In the present study, the lowest VAS pain score was for thoracic and orthopedic surgery (3.4 to 4.8), and the highest VAS pain score was 7.0 to 10.4, respectively. In contrast to the study conducted by Acar et al., in the current study the level of pain was high in patients who had undergone open surgery and low in patients who had undergone robotic surgery, similar to the study conducted by Harel et al.. The difference in the severity of pain between the types of surgery is thought to be due to individual characteristics, previous experiences, and different pain protocols.[18,43] Surgical incision is also one of the most important factors affecting postoperative pain. It creates a stress response, and the subsequent inflammation can also be a source of pain. In this regard, the Enhanced Recovery After Surgery (ERAS) guidelines recommend short incisions in surgery.[44] Having a small incision site in laparoscopic and robotic surgery is associated with reduced pain; however, it has been suggested that the level of pain in patients undergoing open surgery is high because of the increased stress response due to long incision sites.[45] Similar to surgical incision, general anesthesia also affects the severity and duration of pain.[11] The present study found that the level of pain of those receiving general anesthesia was high in the first 24 hours ($P < .05$).

Increased severity of pain can also inhibit daily activities. Roykulcharoen and Good[46] found that patients' pain was at its greatest during mobilization. Yılmaz and Gürler[47] reported that coughing (96.4%) was the activity that was most restricted due to pain, and Özer and Bölükbaş[48] found that pain limited breathing the most. In the current study, it was found that the severity of pain increased most in cases of mobilization (VAS: 4.4 cm) and changing position (VAS: 5 cm) and that this prevented these activities from being performed. The emotions that were affected by pain the most were anxiety and fear (3.70 ± 3.23; 3.07 ± 3.27).

Granor and Ferber[49] found that fear and anxiety increased the severity of pain. If patients believe that they will experience more pain, their anxiety and the severity of the pain increase. In the literature, it is stated that informing the patient about the surgical procedure and the pain to be expected reduces anxiety and analgesic use.[50-52] It is thus important that the patient is well informed, especially by the nurse in charge. More than half of the patients (66.4%) in the current study stated that they had received information about pain and were satisfied with it.

In pain control, the participation of the patient in their treatment and care is important for increasing both pain control and self-esteem. Idvall et al.[53] reported the rate of participation in treatment

as 3.4 out of 5 in their study in which the patients chose their own pain control methods. Similar to the study conducted by Idvall et al.,[53] the rate of participation in treatment for pain control in the present study was 6.4 out of 10. Moreover, pain was relieved in 66.9% of the patients within 24 hours and their level of satisfaction with this treatment was found to be high.

Another important method in pain control is the use of non-pharmacological methods. Ay and Alpar [54] reported that one of the reasons for inadequate pain control was the insufficient use of non-pharmacological methods. Midilli et al.[55] conducted a study with surgical nurses and reported that 92.9% of the nurses primarily chose a pharmacological method to control pain, while only 47% of the nurses used non-pharmacological methods. Similar to these studies, it was found that 48.3% of the nurses participating in the current study used a non-pharmacological method for pain control, and that nurses and physicians did not encourage patients to use non-pharmacological methods. The fact that non-pharmacological methods are not more frequently recommended by health personnel in Turkey is an obstacle to pain control.

Post-operation pain is a subjective phenomenon and is affected by operation type and duration, individual characteristic and experiences, type of anaesthesia, feelings such as fear and anxiety; and thus varies from person to person.

It is a well-known fact that pain control is one of the most critical factors that determines the quality of the perioperative care. Most of the patients associate surgery process with pain. Therefore, accurate diagnosis and individual management of the pain can be remarkably effective.

Limitations

The results of this study cannot be generalized since it was conducted only in 10 full-fledged hospitals in one province.

Conclusions

Postoperative pain is a subjective phenomenon and can be affected by factors such as type of surgery, duration, the length of the surgical incision, the quality of postoperative care, individual characteristics and experiences, the type of anesthesia, fear, and anxiety; thus, it varies from person to person. In this study, the lowest and highest levels of pain felt by the patients in the first 24 hours after surgery was determined to be mild and moderate pain respectively. Gender had an effect on the experience of pain, whereas age, educational level, and marital status did not affect levels of pain. Moreover, previous experience of surgery, the type of surgery, and the type of anesthesia were found to affect the severity of pain. Physiological, educational and behavioral factors, as well as institutional policies, all play a role in pain control, in addition to the interventions, procedures, and care applied.[56] The results of this study demonstrate that it is necessary to observe the causes of the differences in patients' levels of pain and to examine them further through qualitative studies.

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