The effect of different training programs on patients' anxiety and pain levels before total hip arthroplasty surgery

Miray Turkoglu[1], Aylin Aydın Sayılan[2]

[1]Kırklareli Üniversitesi Sağlık Bilimler Enstitüsü, Turkey
[2]Kırklareli Üniversitesi Sağlık Yüksekokulu, Hemşirelik Bölümü, Hemşirelik Bölümü, Turkey

Pielęgniarstwo Chirurgiczne i Angiologiczne 2021; 2: 94–102

Submitted: 2.06.2020; accepted: 15.12.2020

Address for correspondence:
Assistant Professor **Aylin Aydın Sayılan** RN, PhD, Kırklareli Üniversitesi Sağlık Yüksekokulu, Hemşirelik Bölümü, Turkey, e-mail: aylinay_85@msn.com, aylin.sayilan@klu.edu.tr

Summary

Aim of the study: Surgical procedure-specific pain and anxiety are frequently experienced. Patient training is reported to play an important role in reducing such pain and anxiety. Various methods are used to alleviate anxiety and pain, which are among the most common findings in patients undergoing surgical intervention. One particularly prominent method employed for many years involves informing and educating the patient about the prevention of surgical pain and anxiety, a subject of concern to both patients and healthcare professionals.

Material and methods: The research was planned as a randomized controlled quasi-experimental study intended to determine the effect of different training programs on pain and anxiety levels in patients. Data in this quasi-experimental study were collected using a questionnaire, the Visual Pain Rating Scale, and the State-Trait Anxiety Scale. The NCSS 2007 program, descriptive statistics, and parametric tests were used for statistical analysis in the data analysis process. p values < 0.05 were considered significant.

Results: Postoperative state anxiety scores ($p < 0.01$) and postoperative visual analogue scale scores ($p < 0.01$) were lower in the third (routine preoperative training + service training + operating room training) training group than in the first (routine preoperative training) and second (routine preoperative training + service training) groups.

Conclusions: The study findings show that anxiety and pain decreased as training increased. The results of this research show that routine instruction enriched with service and operating room training for patients scheduled for surgical procedures exhibited positive effects on pain and anxiety levels.

Key words: pain, anxiety, preoperative training, total hip arthroplasty surgery.

Introduction

Total hip arthroplasty operations are clinical procedures with a high rate of complications and bleeding. The aim of the operations is to restore lost mobility of the joint surface by restructuring it. These operations have been performed in the final stages of hip pathology since the 1960s and are regarded as an excellent and reliable treatment procedure yielding satisfactory results [1–3].

Fractures in the proximal femur that increase with age are usually caused by risk factors such as osteoporosis, general muscle weakness, impaired cognitive functions, impaired balance, and muscle atrophy. They are more common around the age of 80 years, and 75% occur in women [4].

Surgical procedures pose many different challenges to patients, from the moment they hear that surgery is required to the post-discharge period. The most common challenge is the anticipation and experience of pain and anxiety. As in all other surgical procedures, total hip arthroplasty operations result in pain due to surgical trauma. Illness, and hospitalization, and therapeutic surgical interventions can also be a distressing experience and lead to anxiety, affecting the patients and their relatives [5, 6].

Previous reports indicate that 30–70% of patients undergoing surgical interventions experienced moderate or severe pain [7, 8]. Amata *et al.* reported that 61% of patients described their pain as severe, 30% as moderate, and 9% as mild. Anxiety levels were higher in patients scheduled for surgery compared to other patients. While anxiety was reported in 10–30% of patients treated in the hospital for any reason, it was present in 92% of patients hospitalized in the surgical ward [7]. Various methods are used to alleviate

pain and anxiety, which are among the most common findings in patients undergoing surgical interventions. Informing and educating the patient about what to expect and ways to alleviate pain and anxiety has been a common approach for many years. Several studies have emphasized the importance of preoperative education of patients in terms of coping with anxiety and effective postoperative pain management [8, 9].

Nurses plan and implement patient care and treatment. They also play a greater role in patient training than other health care team members because they are in direct and continuous communication with the patient. It has therefore been suggested that education provided by nurses before surgical procedures is effective in ameliorating patient anxiety and pain by reducing fear of the unknown [8, 10]. However, there is no clear information about the amount and content of such training.

The purpose of this randomized controlled quasi-experimental study was to determine the effect of different preoperative training programs on anxiety and pain levels in patients scheduled for total hip arthroplasty.

Hypotheses

Hypothesis 1: State anxiety scores would be lower in the third training group than in the first and second training groups.

Hypothesis 2: Pain levels in the third training group would be lower than in the first and second training groups.

Material and methods

Design

This randomized controlled quasi-experimental study was performed to determine the effect of different training programs on pain and anxiety levels in patients hospitalized in an orthopaedic clinic for total hip arthroplasty and to provide a resource for nursing care planning in patients with total hip arthroplasty.

Place and time of the research

The study was carried out at the Turkish Ministry of Health XXX Public Hospital Orthopaedic Clinic between April and December 2018.

Participants

When type 1(α) and type 2 (β) error probabilities of 0.05 (95% confidence level) and 0.20 (80% power level) were adopted, respectively, the delta value (Δ) was 3.33. When calculated using the formula, the effect size (d) was determined as 1.08, and the minimum sample size required was 20 members for each group. Considering the possibility of losses, we decided to conduct the study with at least 30 participants in each group (90 in total).

Randomization

For randomization, a computer programme (http://randomizer.org/form.htm) was used to produce random numbers: numbers 1 (routine preoperative training), 2 (routine preoperative training + service training), and 3 (routine preoperative training + service training + operating room training).

First group (routine preoperative training)

Second group (routine preoperative training + service training)

Third group (routine preoperative training + service training + operating room training)

The research population consisted of patients admitted to the Turkish Ministry of Health XXX Public Hospital Orthopaedic Clinic.

All individuals hospitalized in the orthopaedic clinic between April and December 2018, scheduled for total hip arthroplasty surgery, who volunteered to participate in the study, and who met the relevant criteria were included in the study.

Data collection

A questionnaire containing 8 questions was prepared by the researcher. Four questions involved patients' descriptive characteristics, and 4 related to previous surgical experiences and chronic diseases.

Following application of the questionnaire, the state-trait anxiety inventory (STAI) was used to determine patients' pre- and postoperative anxiety levels. The visual analogue scale (VAS) was used to determine pre- and postoperative pain levels.

The State-Trait Anxiety Inventory was adapted into Turkish (1977), and its validity and reliability were studied by Öner and Le Compte (1983). The coefficients reflecting internal consistency and test homogeneity were 83 and 92 for the state anxiety scale and 86 and 92 for the trait anxiety scale, respectively. The validity of the inventory was tested using construct and criterion validity techniques [6, 11].

The visual analogue scale was designed in the form of a 10 cm straight line, one end indicating no pain and the other the most severe pain possible. The visual comparison scale provides quick access to the results and is one of the most commonly used scales. In the evaluation of the scale, "0" indicates no pain, "1–3" mild, "4–6" moderate, and "7–10" severe pain. The VAS is reported to be more sensitive and reliable

in measuring pain severity than other one-dimensional scales. It has been used to determine the severity of pain in many previous studies [12, 13].

Data were obtained using the face-to-face interview method with no time limitation imposed. Mean data collection time ranged from 20 to 40 minutes. Preoperative data were obtained on the day before surgery, and postoperative data were obtained from all patients between 15 and 18 hours after surgery, ensuring that at least 2 hours had elapsed since the last analgesia application.

Data analysis

NCSS software (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) was used for statistical analyses. Descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum and maximum) were used to evaluate the study data.

Ethical considerations

Ethical approval was received from the Turkish XXX Ethics Committee and the Turkish Ministry of Health Public Hospitals Authority XXX Public Hospitals Union General Secretariat in line with the relevant rules.

Practice

Thirty patients who received routine preoperative training one day before surgery were included in the first training group, 30 patients who received routine preoperative and service training together formed the second training group, and the remaining 30 patients formed the third group and were given training about the operating room in addition to routine preoperative and service training. Mean training times for each patient were 20, 60, and 75 minutes in the first, second, and third training groups, respectively. The applied training is summarized below:

Table 1. Training content by groups

1st training group
Routine preoperative training
Routine preoperative training included deep breathing and coughing exercises, date and time of surgery, preparation for surgery (the amount of time the patient will have to fast [go without food or drink] before surgery, skin preparation, intestinal preparation, removing nail polish, glasses, jewellery, etc.), the amount of time patient will have to fast after surgery, introduction to the ward (the location of the toilet and the nurses' room, the summoning system, meal and visiting times, accompaniment rules), and routine procedures performed before surgery (ECG, laboratory tests, etc.).
2nd training group
Routine preoperative training + service training
In addition to routine preoperative training, service training including the following headings was given to the patients in this group: the use of tri flow, the application and purpose of postural drainage, the appearance of the postoperative wound site and the application of wound care, the purpose of the use of intravenous catheters, their types, and the issues to be considered by the patient, food transition (liquid–semi-liquid–solid) in the postoperative period, raising the head while eating after the transition to feeding, the importance of abundant fluid and fibre intake, the postoperative hospitalization position that will be used in order to protect the prosthesis (where the legs are positioned apart from each other), in-bed exercises recommended for the post-operative period, how often and for what purpose post-operative life signs will be monitored, pain management, what to pay attention to when wearing and removing compression stockings, pressure wound prevention, the mobilization process, using ambulation assistive devices, and movements to avoid.
3rd training group
Routine preoperative training + service training + operating room training
In addition to the training given to the second group, operating room training concerning the following topics was given to the third group: how to reach the operating room from the ward; the clothing worn by the operating room staff; the fact that the patient may need to wait if the previous operation does not finish on time; the family being able to wait nearby while the patient is in the operating room (in the waiting room near the operating room); the operating room being cold, so the patient can request a blanket; the operating room staff wearing green clothing (the surgeon, anaesthesiologist, and nurses); operating room staff wearing masks and the use of masks potentially making speech difficult to understand, so the patient can request clarification of any issues; various sounds can be heard in the operating room because it is quite noisy; the patient may smell drugs and cleaning solutions in the operating room; the necessary precautions will be taken if the operating table is too narrow for the patient; the lighting in the operating room is very bright; if there is no vascular access, this will be opened, and the patient will be conscious during this procedure; the patient will be anaesthetized, and will not feel any pain during the operation; a tube will be inserted to allow the patient to continue breathing after being anaesthetized, and the anaesthesiologist will monitor the signs of life on a screen during the operation, and the tube will be removed after the operation has come to an end; the patient will start to wake up and will be taken on a gurney from the operating room to the recovery room; life signs will be monitored, and oxygen can be given if necessary; serum will be given when the patient has awakened; a bladder catheter may be required; the operation area will be bandaged; one or two drains may be seen in the surgical site; a nasogastric catheter may be present, and this catheter and the other tubes should not be pulled; the patient may feel pain after surgery for various reasons (such as a sore throat due to intubation, or a sensation of wishing to urinate due to the Foley catheter, etc.).

Results

Of the participants in this study 83.3% (n = 75) were older than 59 years, 52.2% (n = 47) were married, 61.1% (n = 55) had a history of previous surgery, and 82.2% (n = 74) had a chronic disease (Tab. 2).

There was no statistically significant difference between the groups in terms of age, gender, train-

Table 2. Distribution of the characteristics

				Group					
				1st training group (n = 30)		2nd training group (n = 30)		3rd training group (n = 30)	
		N	%	*N*	%	*N*	%	*N*	%
Age	18–29 years old	2	2.2	1	3.3	0	0	1	3.3
	30–39 years old	5	5.6	0	0	2	6.7	3	10.0
	40–49 years old	2	2.2	0	0	1	3.3	1	3.3
	50–59 years old	6	6.7	0	0	3	10.0	3	10.0
	> 59 years old	75	83.3	29	96.7	24	80.0	22	73.3
Gender	Woman	62	68.9	24	80.0	20	66.7	18	60.0
	Man	28	31.1	6	20.0	10	33.3	12	40.0
Marital status	Single	2	2.2	1	3.3	0	0	1	3.3
	Married	47	52.2	16	53.4	17	56.7	14	46.7
	Divorced/separated	2	2.2	0	0	0	0	2	6.7
	Widow(er)	39	43.3	13	43.3	13	43.3	13	43.3
Education status	Illiterate	5	5.6	4	13.3	0	0	1	3.3
	Primary school	79	87.8	25	83.3	29	96.7	25	83.3
	High school	6	6.7	1	3.3	1	3.3	4	13.3
Previous surgery	No	35	38.9	9	30.0	16	53.3	10	33.3
	Yes	55	61.1	21	70.0	14	46.7	20	66.7
Number of previous surgeries (n = 55)	1	32	58.2	12	57.1	8	57.1	12	60.0
	2	16	29.1	5	23.9	6	42.9	5	25.0
	≥ 3	7	12.7	4	19.0	0	0	3	15.0

		Group			*p*
		1st training group (n = 30)	2nd training group (n = 30)	3rd training group (n = 30)	
		N (%)	*n* (%)	*n* (%)	
Age	18–29 years old	1 (3.3)	0 (0)	1 (3.3)	[a]0.165
	30–39 years old	0 (0)	2 (6.7)	3 (10.0)	
	40–49 years old	0 (0)	1 (3.3)	1 (3.3)	
	50–59 years old	0 (0)	3 (10.0)	3 (10.0)	
	> 59 years old	29 (96.7)	24 (80.0)	22 (73.4)	
Gender	Female	24 (80.0)	20 (66.7)	18 (60.0)	[b]0.234
	Male	6 (20.0)	10 (33.3)	12 (40.0)	
Training status	Illiterate	4 (13.3)	0 (0)	1 (3.3)	[a]0.081
	Primary school	25 (83.4)	29 (96.7)	25 (83.4)	
	High school	1 (3.3)	1 (3.3)	4 (13.3)	
Previous surgery	No	9 (30.0)	16 (53.3)	10 (33.3)	[b]0.134
	Yes	21 (70.0)	14 (46.7)	20 (66.7)	
Chronic surgery	No	3 (10.0)	4 (13.3)	9 (30.0)	[a]0.095
	Yes	27 (90.0)	26 (86.7)	21 (70.0)	

[a]Fisher Freeman Halton Test, [b]Pearson χ^2-Square Test

Table 3. Evaluation of visual analogue scale scores of the groups

VAS SCORE		Group			[c]p
		1st training group (*n* = 30)	2nd training group (*n* = 30)	3rd training group (*n* = 30)	
Pre-operation	Min–Max. (Median)	0–10 (1)	0–8 (4)	0–7 (2)	0.001**
	Mean ± S[d]	1.93 ± 2.19	4.47 ± 2.19	2.66 ± 2.25	
Post-operation	Min–Max (Median)	0–9 (6)	1–8 (4)	0–7 (1)	0.001**
	Mean ± S[d]	5.33 ± 2.44	4.20 ± 2.07	1.86 ± 1.38	
[d]p		0.001**	0.203	0.047*	
Difference between pre and post operation		–10–7 (4)	–2–2 (0)	–6–1 (–0.5)	0.001**
		3.40 ± 3.50	–0.27 ± 1.20	–0.80 ± 1.92	

*[c]Kruskall-Wallis Test, [d]Wilcoxon Signed Rank Test,*p < 0.05, **p < 0.01, VAS – visual analogue scale*

Table 4. Evaluation of state – anxiety scores

STATE ANXIETY SCORE		Groups			[e]p
		1st training group (*n* = 30)	2nd training group (*n* = 30)	3*rd* training group (*n* = 30)	
Pre-operation	Min.–Max. (Median)	25–56 (38)	27–73 (52)	29–61 (45)	0.001**
	Mean ± Sd	40.13 ± 7.82	52.97 ± 11.15	44.13 ± 9.32	
Post-operation	Min.–Max. (Median)	22–57 (43)	22–64 (43)	23–39 (29)	0.001**
	Mean ± Sd	42.40 ± 8.24	43.83 ± 8.99	29.77 ± 4.76	
[f]p		0.113	0.001**	0.001**	
Difference between pre and post operation		–27–17 (3)	–26–6 (–8)	–28–8 (–12.5)	[c]0.001**
		1.93 ± 8.21	–9.13 ± 8.43	–14.37 ± 8.62	

*[c]Kruskall-Wallis Test, [e]One-way ANOVA Test, [f]Paired Samples t-Test, **p < 0.01*

ing, previous surgery, or presence of chronic disease ($p > 0.05$) (Tab. 3).

In the routine preoperative training (first) group, the mean increase in postoperative VAS scores of 3.40 ± 3.50 compared to the preoperative level was statistically significant ($p < 0.01$). In the routine preoperative training + service training (second) group, the change in postoperative VAS scores compared to the preoperative level was not significant ($p > 0.05$). In the routine preoperative training + service training + operating room training (third) group, a statistically significant decrease of 0.80 ± 1.92 in postoperative VAS scores compared to the preoperative level was observed ($p < 0.05$).

There was no statistically significant difference in postoperative VAS scores between the groups ($p < 0.01$). Paired comparisons performed to determine from which group the significant difference originated revealed lower postoperative VAS scores in the routine preoperative training + service training + operating room training (third) group than in the routine preoperative training (first) and routine preoperative training + service training (second) groups ($p < 0.01$) (Tab. 4).

The change in postoperative state anxiety scores compared to preoperative levels in the routine preoperative training (first) group was not statistically significant ($p > 0.05$). However, the 9.13 ± 8.43 decrease in postoperative state anxiety scores compared to preoperative levels in the routine preoperative training + service training (second) group was statistically significant ($p < 0.01$). Similarly, the decrease of 14.37 ± 8.62 in postoperative state anxiety scores in the routine preoperative training + service training + operating room training (third) group compared to preoperative levels was also statistically significant ($p < 0.01$).

Postoperative state anxiety scores also differed significantly between the groups ($p < 0.01$). Paired comparisons performed to identify the source of the significant difference revealed that the postoperative state anxiety scores of the routine preoperative training + service training + operating room training (third) group were lower than in the routine preoperative training (first) and the routine preoperative training + service training (second) groups ($p < 0.01$) (Tab. 5).

A statistically significant positive correlation, at a level of 51.3%, was found in the routine preoperative training (first) group between the changes in VAS scores and the changes in state anxiety scores ($p < 0.01$). A statistically significant positive correlation was also determined between the changes in VAS scores and the state anxiety scores at a level of 75.0% in the routine preoperative training + service training (second) group ($p < 0.01$). Similarly, a statistically positive significant correlation was found between the changes in VAS scores and the state anxiety scores at a level of 50.9%

Table 5. The relationship between changes in visual analogue scale scores and state anxiety and trait anxiety scores

		Groups		
		1st training group (*n* = 30)	2nd training group (*n* = 30)	3rd training group (*n* = 30)
Difference VAS – Difference State Anxiety	*R*	0.513	0.750	0.509
	p	0.004**	0.001**	0.004**
Difference VAS – Difference Trait Anxiety	*R*	0.058	0.408	0.307
	p	0.761	0.025*	0.099

*r: Spearman's Correlation Coefficient, *p < 0.05, **p < 0.01, VAS – visual analogue scale*

in the routine preoperative training + service training + operating room training (third) group ($p < 0.01$) (Tab. 5).

Discussion

Anxiety decreased in the group receiving routine preoperative training, service training, and operating room training in the present study. Examination of patient age distributions in similar studies showed that 25 (67.56%) of 37 patients in Bekar's study (2009) were women (2009), while 57 of 82 patients with an average age of 78.9 years were women in Aytekin's (2011) study [14, 15]. In the present study, 83.3% of the patients were over 59 years old, and 68.9% were female. It has been suggested that higher hip fracture rates in postmenopausal women may be associated with osteoporosis due to oestrogen deficiency.

Loss of bone tissue, osteoblastic activity, and balance occur with age, and the risk of falling also increases, resulting in a greater prevalence of hip fractures [16]. Aytekin (2011) reported that 35 of their patients had hypertension, 27 had heart disease, 13 had diabetes, and 7 had kidney disease. In the present study, hypertension was detected in 57 patients, heart disease in 17, diabetes in 25, and kidney disease in 1 [15]. Ekizler (2009) reported that 15 out of 30 patients were primary school graduates, and that 23 were married [17]. Of the 90 patients in the present study, 79 were primary school graduates, and 47 were married. The patient groups in the present study exhibited similar characteristics to other orthopaedic patient groups in previous research (Tab. 2).

Temiz and Özer (2015) compared postoperative pain severity using 4 different scales and found that patients experienced pain in the first 3 days after surgery according to all 4 scales [18]. Liu *et al.* (2012) investigated 897 orthopaedic patients and reported moderate and severe pain on the first day after surgery in 20% of patients at rest and 33% in motion [19]. Similarly, in a study by Acar *et al.* (2016) of 150 surgery patients, 77.3%, 29.3%, 38.7%, 6.7%, 2.0%, and 0.7% of patients described surgical, mild, disturbing, severe, very severe, or intolerable pain, respectively [20]. In the present study, postoperative mean pain scores were 5.33 ± 2.44 in the first training group, 4.20 ± 2.07 in the second group, and 1.86 ± 1.38 in the third. This indicated the presence of postoperative pain and is consistent with other studies (Tab. 4). This finding arises from the fact that surgical traumas cause damage to tissue and nerve endings in the acute period and occur in most patients [21].

Reaza-Alarcón and Rodríguez-Martín (2019) investigated the benefits of nursing educational interventions for the management of post-surgical pain and reported lower pain scores in 9 out of 12 studies involving training interventions [22]. Lee *et al.* (2018) investigated 90 patients scheduled for surgery in Taiwan, 45 in the control group and 45 in the intervention group [23]. Pain scores were recorded the day before surgery, 30 minutes before surgery, and the day after surgery, and were significantly lower in the intervention group than in the control group. In a quasi-randomized controlled trial by Van Dijk *et al.* (2015), 194 patients watched an educational film and 183 watched a control film before surgery [24]. Patients in the intervention group recorded lower pain scores than those in the control group. In their study of 96 patients undergoing surgical treatment, Grawe *et al.* (2014) observed lower postoperative pain scores in patients who received preoperative training than in those who did not [25]. Itisha and Manu (2016) demonstrated that patients who received structured, individualized, and detailed pre-operative training and counselling in their 302-participant study exhibited better ability to cope with postoperative pain in the short term [26]. O'Donnell (2015) evaluated the effectiveness of preoperative pain management and patient training intervention in improving the postoperative pain management outcomes of patients undergoing laparoscopic cholecystectomy [27]. Patients who received preoperative training intervention were reported to experience less severe pain during the first 24 hours and fewer painkiller side-effects, returned to normal activities earlier, and used more non-pharmacological pain management methods postoperatively than those without training intervention. McDonald *et al.*, (2014) examined 18 experiments involving a to-

tal of 1463 participants undergoing a total hip arthroplasty and/or knee arthroplasty and reported that the mean pain scores of the patients receiving information before surgery were 0.34 points lower than those with no such information [28]. In the present study, in the first training group, mean postoperative VAS scores increased statistically significantly by 3.40 ± 3.50 compared to the preoperative level ($p = 0.001$ and $p < 0.01$). In the second training group, the change in VAS scores was not statistically significant compared to the preoperative level ($p = 0.203$ and $p > 0.05$). In the third training group, a statistically significant decrease of 0.80 ± 1.92 was observed in postoperative VAS scores compared to the preoperative level ($p = 0.047$ and $p < 0.05$) (Tab. 4). The study findings suggest that possession of more detailed information including operating room training positively affects patients' postoperative pain scores. Most other studies have reached similar conclusions. In contrast, however, Louw *et al*. (2014) found no difference between the preoperative training program and normal preoperative care in findings measured using a numerical pain scale 1, 3, 6, and 12 months after surgery [29]. The authors attributed this to late postoperative pain measurements.

Taşdemir *et al.* included 107 patients in their 2013 study titled ''Comparison of Preoperative and Postoperative Anxiety Levels with STAI Test in Preoperatively Informed Patients'' and reported mean preoperative anxiety scores of 40.6 ± 11.23 [5]. Karayağız *et al.* (2011) investigated the distribution of anxiety among patients hospitalized on the surgical ward of the third General Surgery Department of İzmir Tepecik Training and Research Hospital, Turkey [7]. The authors retrospectively examined the records of 43 patients and determined 30–80% anxiety in the preoperative period. Muluqeta *et al*. (2018) investigated 353 patients scheduled for surgery to evaluate preoperative anxiety and related factors among adult surgical patients in Northwest Ethiopia and reported significantly high preoperative anxiety levels in 61% (95% CI: 55.5–65.7) of patients [30]. Fındık and Topçu (2012) investigated the preoperative surgical anxiety status of patients in planned and outpatient surgical procedures and reported preoperative anxiety values of 23.76 ± 7.12 in planned surgery, 28.55 ± 7.15 in emergency surgery, and 28.03 ± 8.20 in outpatient surgery [31]. In the present study, median preoperative state anxiety scores were 38 in the first group who received routine preoperative training, 52 in the second group given service training, and 45 in the third group given service + operating room training (Tab. 5). Waiting for surgery in the preoperative period causes stress resulting in the development of neuroendocrine response and leads to surgical intervention-related anxiety in almost all patients [32].

Biro *et al.* (2019) observed a greater reduction in pain and anxiety scores in a patient group receiving a three-dimensional model compared to the group receiving standard training [33]. Çakır and Özbayır (2018) investigated the effect of preoperative training on anxiety levels of patients undergoing planned surgery and reported that preoperative training reduced anxiety levels in the postoperative period [34]. Chuang *et al*. (2016) applied a new integrated training model to 32 patients undergoing cervical disc herniation surgery and compared these 32 patients to a control group receiving standard model training [35]. The authors concluded that this new integrated training model was more effective in reducing patient anxiety and uncertainty than the traditional model. Kesanen *et al*. (2017) included 50 patients in an intervention group and 50 in a control group [36]. While both received routine preoperative patient training, the intervention group also received a feedback session based on an information test. A significant decrease in anxiety was observed in the intervention group after the intervention, whereas in the control group anxiety only decreased after the operation. Guo *et al*. (2012) investigated 153 patients undergoing cardiac surgery in a randomized controlled trial [37]. Seventy-seven patients received regular random care, while the other 76 attended preoperative training. Participants receiving preoperative training experienced a greater decrease in anxiety scores (mean difference 3.6 points) ($p < 0.001$). Ramesh *et al*. (2017) examined the effect of preoperative training intervention on postoperative results and suggested that preoperative training reduces anxiety scores in patients [38]. In the present study, paired comparisons analysis, performed to identify the group responsible for significant differences, revealed lower postoperative status anxiety scores in the third training group than in the first ($p = 0.001$) and second training groups ($p = 0.001$) (Tab. 5). The results were consistent with the results of other studies.

Robleda *et al.* (2014) performed an observational retrospective study of 127 adult patients undergoing orthopaedic and trauma surgery. Preoperative anxiety was identified as a good predictive parameter for postoperative pain [39]. Taşdemir *et al.* (2013) reported correlation between STAI and VAS scores, with low preoperative pain levels being observed in patients with low anxiety levels [5]. Achmet *et al.* (2014) compared the effect of preoperative anxiety on postoperative pain control and recovery from anaesthesia in patients exposed to surgical interventions [40]. The authors found that high preoperative anxiety levels adversely affected postoperative pain control. In Arı and Yılmaz's study (2016) of 167 surgical patients investigating the effect of preoperative anxiety on postoperative constipation, a weak positive relationship was found between STAI score and postoperative pain severity ($r = 0.219$, $p < 0.01$) [41]. Weisensee *et al.* (2012) investigated the relationship between anxiety and pain perception in patients undergoing surgical interventions and

observed an almost significant correlation between anticipated pain levels and preoperative anxiety ($r = 0.19$), pain peak and duration of pain ($r = 0.79$), and preoperative anxiety and pain duration ($r = 0.18$) [42]. In the present study, a statistically significant positive correlation was found between changes in VAS scores and state anxiety scores (Tab. 5). To summarize, anxiety levels have been found to affect pain perception, and patients with high levels of anxiety experience high levels of pain. Anxiety has also been identified as a factor that lowers the pain threshold by facilitating the perception of pain severity as excessive and facilitating the activation of the entorhinal cortex of the hippocampal formation [43].

Study Limitations

The principal limitations of this study are that it was performed in a single hospital, and with orthopaedic patients only.

Conclusions

The results of this research show that routine instruction enriched with service and operating room training for patients scheduled for surgical procedures exhibited positive effects on pain and anxiety levels. Comprehensive service training in addition to routine patient information led to a decrease in state anxiety and pain scores, although more successful results were obtained when information concerning the operating room was added. In future studies, it may be recommended that training content be adjusted to the surgical procedure to be performed, and that such training should be administered to patients scheduled for different types of procedure.

Acknowledgments

The authors are most grateful to all the study participants for answering the questionnaire, as well as the nurses in the orthopaedic unit for their recruitment efforts.

The authors declare no conflict of interest.

References

1. Büyükyılmaz F, Ozdemir NG. New lıfe wıth total hıp and knee replacement: key concepts in patient education. İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksekokulu Dergisi 2018; 6: 86-96.
2. Güner Ö, Kaya Z, Süren M, Tapar H. An evaluation of spinal and general anesthesia in total hip prosthesis. Bozok Tıp Dergisi 2012; 3: 22-28.
3. Karachalios T, Komnos G, Koutalos A. Total hip arthroplasty survival and modes of failure. Efort Open Rev 2018; 3: 232-239.
4. Keklikçi K, Çilli F, Pehlivan Ö, Kuşkucu M. Fractures of the femoral neck. Türk Ortopedi ve Travmatoloji Birliği Derneği Dergisi 2009; 8: 1-5.
5. Taşdemir A, Erakgün A, Deniz MN, Çertuğ A. A comparison using the State Trait Anxiety Inventory Test of anxiety levels before and after surgery in patients given preoperative information. Turk J Anaesth Rean 2013; 9: 41-44.
6. Aydın A. Determination of the relationship between pre-procedural anxiety levels and conscious sedation administration in patients scheduled for esophagogastroduodenoscopy. T.C. İstanbul Üniversitesi Sağlık Bilimleri Enstitüsü Cerrahi Hastalıkları Hemşireliği Anabilim Dalı Yüksek lisans Tezi, İstanbul 2011.
7. Karayağız F, Altuntaş M, Güçlü YA, Yılmazer TT, Öngel K. Cerrahi servisinde yatan hastalarda görülen anksiyete dağılımı anxiety distribution observed at surgery patients. Smyrna Tıp Dergisi. 2011: 22-25.
8. Ingadottir B, Zoega S. Role of patient education in postoperative pain management. Nurs Stand 2017; 32: 50-63.
9. Lemos MF, Lemos-Neto SV, Barrucand L, Verçosa N, Tibirica E. Preoperative education reduces preoperative anxiety in cancer patients undergoing surgery: usefulness of the self-reported beck anxiety inventory. Rev Bras Anestesiol 2019; 69: 1-6.
10. Alacadag M, Cilingir D. Presurgery anxiety and day surgery patients' need for information. J Perianesth Nurs 2018; 33: 658-668.
11. Öner N, Lecompte A. Discontinuous State. Trait Anxiety Inventory Handbook, Boğaziçi Üniversitesi Yayınları, İstanbul 2018.
12. Glennon C, McElroy SF, Connelly LM, et al. Use of virtual reality to distract from pain and anxiety. Oncol Nurs Forum 2018; 45: 545-552.
13. Aslan FE. A Comparison of the sensitivity and selectivity of visual comparison and simple descriptive scales in the assessment of postoperative pain. VI Ulusal Hemşirelik Kongresi, Ankara 1998, 178-186.
14. Bekar Ç. Our mid-term results for total hip arthroplasty in coxarthrosis cases. T.C. Sağlık Bakanlığı Haseki Eğitim ve Araştırma Hastanesi Ortopedi ve Travmatoloji Kliniği Uzmanlık Tezi, İstanbul 2009.
15. Aytekin MN. A functional evaluation of partial prosthesis application results in hip fractures. Fatih University Specialization Thesis, Ankara 2011.
16. Koyuncu B. Structural changes in the femoral head in osteoporotic proximal femur fractures. T.C. Zonguldak Karaelmas Üniversitesi Tıp Fakültesi Ortopedi Ve Travmatoloji Anabilim Dalı Tıpta Uzmanlık Tezi, Zonguldak 2010.
17. Ekizler, S. An examination of the effectiveness of the late period home exercise program in patients receiving total hip replacement. T.C Dokuz Eylül Üniversitesi Sağlık Bilimleri Enstitüsü Fizik Tedavi Ve Rehabilitasyon Anabilim Dalı, Yüksek Lisans Tezi, İzmir 2009.
18. Temiz Z, Özer N. A comparison of postoperative pain severity using four different pain scales. Anadolu Hemşirelik Sağlık Bilimleri Dergisi 2015; 18: 245-251.
19. Liu SS, Buvanendran A, Rathmell JP, et al. Predictors for moderate to severe acute postoperative pain after total hip and knee replacement. İnt Orthop 2012; 36: 2261-2267.
20. Acar K, Acar H, Demir F, Aslan FE. Determination of pain incidence and analgesic use after surgery. Acıbadem Üniversitesi Sağlık Bilimleri Dergisi 2016; 2: 85-91.
21. Aslan FE. Cerrahi bakım vaka analizleri ile birlikte. Akademisyen Tıp Kitabevi, Ankara 2017.
22. Reaza-Alarcón A, Rodríguez-Martín B. Effectiveness of nursing traiingal interventions in managing post-surgical pain. Systematic review. Invest Educ Enferm 2019; 37: e10.
23. Lee CH, Liu JT, Lin SC, Hsu TY, Lin CY, Lin LY. Effects of trainingal intervention on state anxiety and pain in people undergoing spinal surgery: a randomized controlled trial. Pain Manag Nurs 2018; 19: 163-171.
24. Van Dijk JFM, van Wijck AJM, Kappen TH, Peelen LM, Kalkman CJ, Schuurmans MJ. The effect of a preoperative educational film on patients' postoperative pain in relation to their request for opioids. Pain Manag Nurs 2015; 16: 137-145.
25. Grawe JS, Mirow L, Bouchard R, Lindig M, Hüppe M. Impact of preoperative patient training on postoperative pain in consideration of the individual coping style. Schmerz 2010; 24: 575-586.

26. Itısha C, Manu S. Study on the effect of pre-operative patient training on post-operative outcomes. *World* Acad Sci Eng Technol Int J Med Health Sci 2016; 10: 285-293.
27. O'Donnell KF. Preoperative pain management training: a quality improvement project. J Perianesth Nurs 2015; 30: 221-227.
28. McDonald S, Page MC, Beringer K, Wasiak J, Sprowson A. Preoperative training for hip or knee replacement. Cochrane Database Syst Rev 2014; 13: CD003526.
29. Louw A, Diener I, Landers MR, Puentedura EJ. Preoperative pain neuroscience training for lumbar radiculopathy: A multicenter randomized controlled trial with 1-year follow-up. Spine (Phila PA 1976) 2014; 39: 1449-1457.
30. Muluqeta H, Ayana M, Sinteyahu M, Dessie G, Zewdu T. Preoperative anxiety and associated factors among adult surgical patients in Debre Markos and FelegeHiwot referral hospitals, Northwest Ethiopia. BMC Anesthesiol 2018; 18: 155.
31. Fındık ÜY, Topçu SY. The effect of the way of surgical intervention on preoperative anxiety level. Sağlık Bilimleri Fakültesi Hemşirelik Dergisi 2012: 22-23.
32. Kumar A, Dubey PK, Ranjan A. Assessment of anxiety in surgical patients: an observational study. Anesth Essays Res 2019; 13: 503-508.
33. Biro M, Kim I, Huynh A, Fu P, Mann M, Popkin DL. The use of 3-dimensionally printed models to optimize patient training and alleviate perioperative anxiety in Mohs micrographic surgery: a randomized controlled trial. J Am Acad Dermato 2019; 81: 1339-1345.
34. Çakır SK, Özbayır T. Assessment of patient anxiety levels before and after stoma surgery. Turk J Colorect Dis 2018; 28: 159-163.
35. Chuang MF, Tung HH, Clinciu DL, et al. The effect of an integrated training model on anxiety and uncertainty in patients undergoing cervical disc herniation surgery. Computer Method Progr Biomed 2016; 133: 17-23.
36. Kesanen J, Leino-Kilpi H, Lund T, Montin L, Puukka P, Valkeapaa K. Increased preoperative knowledge reduces surgery-related anxiety: a randomised clinical trial in 100 spinal stenosis patients. Eur Spine J 2017; 26: 2520-2528.
37. Guo P, East L, Arthur A. A preoperative training intervention to reduce anxiety and improve recovery among Chinese cardiac patients: a randomized controlled trial. Inter J Nurs Stud 2012; 49: 129-137.
38. Ramesh C, Nayak BS, Pai VB, et al. Effect of preoperative training on postoperative outcomes among patients undergoing cardiac surgery: a systematic review and meta-analysis. J Perianesth Nurs 2017; 32: 518-529.
39. Robleda G, Sillero A, Puig T, Gich I, Banos JE. Influence of preoperative emotional state on postoperative pain following orthopedic and trauma surgery. Rev Latinoam Enfermage 2014; 22: 785-791.
40. Achmet A, Altun D, Oğuz BH, İlhan M, Demircan F, Koltka K. The effect of preoperative anxiety on postoperative analgesia and anesthesia recovery in patients undergoing laparascopic cholecystectomy. J Anesth 2014; 28: 222-227.
41. Arı M, Yılmaz E. Impact of pre-operative anxiety on post-operative constipation. Turk J Colorect Dis 2016; 26: 39-46.
42. Weisensee W, Scheer M, Müller L, et al. Impact of anxiety parameters on prospective and experienced pain intensity in implant surgery. Implant Dent 2012; 21: 502-506.
43. Yılmaz Y, Durmuş K, İnal FY, et al. The effect of preoperative and postoperative anxiety on postoperative pain and analgesic requirements in septoplasty operations. Dicle Tıp Dergisi 2014; 41: 288-229.