

# Efficacy of Guided Imagery for Postoperative Symptoms, Sleep Quality, Anxiety, and Satisfaction Regarding Nursing Care: A Randomized Controlled Study

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**Purpose:** *The purpose of this study was to determine the effects of perioperatively applied guided imagery on nausea, satisfaction, and anxiety.*

**Design:** *This is a prospective randomized controlled study.*

**Methods:** *In addition to standard treatment and nursing care, guided imagery was applied to the intervention group once in the preoperative period, once on the first day of postoperative period, twice in the second and third days, for six times in total. Only standard treatment and nursing care were given to the patients of the control group.*

**Findings:** *Anxiety and intensity of pain were significantly higher in the control group than the intervention group, and the level of satisfaction and sleep quality were lower in the control group than the intervention group.*

**Conclusions:** *Results support that guided imagery can be useful in improving perianesthetic symptoms and can be a part of nursing care.*

**Keywords:** *imagery, pain, anxiety, postoperative nausea and vomiting, patient satisfaction.*

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**HUMAN HEALTH CAN** be influenced in many ways such as emotional, mental, social, spiritual, and behavioral influences.<sup>1</sup> Techniques such as hypnosis, biofeedback, meditation, and imagery are effective with the interaction between mind and body.<sup>2</sup> The general purpose in these applications is to benefit from the self-healing capacity of body by influencing the mind.<sup>3</sup> It is thought that guided imagery accelerates the healing pro-

cess in many systems such as the autonomic nervous system, endocrine system, and immune system.<sup>4</sup> That is why it has recently been used in various areas of health.<sup>3,5</sup> Imagery means experiencing a sense in the mind as if it is really happening.<sup>6,7</sup> Secretion increase in the mouth when you imagine that you eat a juicy sour lemon slice, the physiological consequences of sexual fantasies, and the reactions of the body when you imagine an annoying subject can be given as examples of imagery. Guided imagery is a simple, self-applied method without complication compared with pharmacological treatment.<sup>4</sup> Guided imagery allows the patient to feel happy, relaxed, calm, and safe, as well as to create positive thinking. It can be used with soft background music to help the patient get rid of negative thoughts and relax.<sup>7</sup>

Guided imagery is used to treat postoperative pain and surgery-related anxiety, and to increase patient satisfaction and sleep quality regarding

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surgery.<sup>8,9</sup> There are also studies showing that guided imagery is effective in relieving chemotherapy-induced nausea and vomiting.<sup>10-12</sup> However, the effect of guided imagery on postoperative nausea and vomiting (PONV) is not clear. Briefly, there is not enough evidence for the efficacy of this method in relieving and preventing perianesthetic symptoms and surgery-related symptoms.<sup>7,13</sup> Therefore, this study was planned and carried out to investigate the effects of preoperatively and postoperatively applied guided imagery method on PONV, pain level, satisfaction level regarding nursing care, and the duration of hospital stay.

## Methods

### *Study Design*

This was a prospective randomized controlled experimental study. The study was conducted in the surgery clinic of a public hospital in Turkey between February 2017 and July 2017.

### *Ethics Statement*

The study protocol was approved by the Clinical Trials Ethics Committee of Firat University (27907772/199-E.15559). This study was conducted according to the Declaration of Helsinki 1975 and the International Conference on Harmonization—Harmonized Tripartite Guideline for Good Clinical Practice (GCP).

### *Participants*

Patients who had an elective surgical operation, received only general anesthesia under endotracheal intubation, had no cognitive inefficiency, and knew Turkish language without hearing and visual impairment were included in the study. Patients who were older than 80 years or younger than 20 years, patients with body mass index (BMI) greater than 30 kg/m<sup>2</sup>, with chronic pain, with alcoholism or substance addiction, with oncologic disease, who had severe complications during or after surgery, and who did not accept the operation were excluded.

A total of 73 patients were assessed for eligibility. Eleven patients who did not meet inclusion criteria or did not agree to participate in the study were excluded. One patient discontinued the interven-

tion and another was lost to follow-up. Sixty patients who met the criteria for participation in the study, who volunteered to take part in the trial and approved with their written consent completed the study.

### *Sample Size*

For the calculation of sample size, G Power 3.0.10 for windows<sup>14</sup> was used. The sample size of 52 was determined on the basis of a power analysis with an effect size of 0.20, an alpha of 0.05, and a power of 0.80.<sup>15</sup> It was decided to take 30 patients for each group by foreseeing the missing data.

### *Randomization*

A simple random sampling method was used for randomization in the study. The study was planned to include 30 patients in each group and 60 patients in total. Patients to be included in the study were sequentially numbered from 1 to 60. A random allocation sequence was created with an internet module ([www.randomization.com](http://www.randomization.com)) used to establish a randomization scheme in which 30 of the 60 patients were in the intervention group and 30 in the control group. Each patient in the study was assigned to the group corresponding to the sequence number in the randomization scheme by the principal investigator.

### *Data Collection*

Demographic data including age, BMI, gender, marital status, educational status, and occupation of the patients were recorded on a data collection form. A visual analog scale (VAS) numbered between 0 and 100 was used for measuring the intensity of pain and nausea severity. A VAS numbered between 0 and 10 was used to determine the satisfaction level of the patients regarding nursing care. According to the VAS used for pain intensity,<sup>16</sup> “0” means that the patient has no pain, whereas “100” means that the patient has unbearable pain. According to the VAS used for nausea severity,<sup>17</sup> “0” means that the patient does not have nausea, whereas “100” means that the patient has unbearable nausea. In the VAS used for satisfaction,<sup>18</sup> “0” means that the patient is not satisfied at all with nursing

care, whereas “10” means that the patient is totally satisfied with the nursing care.

The Anxiety Specific to Surgery Questionnaire (ASSQ)<sup>19</sup> was used to measure anxiety level of the patients regarding surgery. ASSQ consists of 10 questions, each of which is scored between 1 and 5. The lowest score is 10 and the highest score is 50. A high score indicates a high level of anxiety. The Richards-Campbell Sleep Questionnaire (RCSQ)<sup>20</sup> was used to assess the sleep quality of patients. According to the RCSQ, a score between 0 and 25 indicates that the quality of sleep is very poor, whereas a score between 76 and 100 means a high-quality sleep.

These scales were administered by the principal investigator during the time patients stayed in the hospital. The ASSQ was administered only once at any time before surgery; the VAS satisfaction was administered only once after all gastrointestinal (GI) applications and standard treatments were finished. VAS pain and RCSQ were administered at postoperative 24th, 48th, and 72nd hours. VAS nausea was assessed at postoperative 2nd, 6th, 24th, 48th, and 72nd hours. In addition to VAS nausea, the number of patients who were vomiting was recorded simultaneously.

When a patient discharged before the 72nd hour after the operation, then the patient was given a guided imagery CD and asked to complete the remaining guided imagery applications at home in the same way and at the same time as planned to be performed at the hospital. In addition, the principal investigator talked to the patient on phone within the first hour after the patient performed the guided imagery at home to complete the scales that could not be completed in the hospital because of discharging the patient earlier than expected.

### **Outcome Measure**

As the primary outcome measure of the study, decreased PONV and increased patient satisfaction and sleep quality were measured. As the secondary outcome measure of the study, decreased postoperative pain and decreased surgery-related anxiety were determined.

### **Interventions**

Only standard treatment and nursing care were given to the patients of the control group. As the standard treatment; intravenous metoclopramide was primarily used for nausea and vomiting in accordance with the medical treatment protocol. Following the duration for effect, in case of the presence of nausea, ondansetron was administered intravenously. Also, 20 mg of tenoxicam, a nonsteroidal anti-inflammatory drug, was administered intravenously three times a day as the first line therapy for postoperative pain. When tenoxicam was insufficient, it was supported with 1 g paracetamol or 1.5 mcg/kg fentanyl administered as an intravenous infusion.

In addition to standard treatment and nursing care, an audio CD-based imaging method called “guided imagery” for relaxation, which was prepared by the Turkish Psychologists Association, was administered to the intervention group once before surgery and once on the first day after surgery, and twice on the second and third days, six times in total. To perform GI, patients were asked to listen to the CD with a CD player and headphones. This CD has three sections: the definition and education of relaxation and relaxation techniques in the first section of 10 minutes, vocal relaxation instruction in the second section of 30 minutes, and a relaxing music in the last 30 minutes. In the first application, a total of 50 minutes of CD was played with a 10-minute part of the last 30-minute section including only music. In further applications, a 40-minute section that contained instruction and music was played without the first 10-minute section.

Moreover, during the last 10-minute section of the CD’s relaxing music in the preoperative period, the patients were asked to think that “*the surgery and postsurgical period would be good, that operation was required to be healthier; a fast recovery without any scars would occur, and they could return to their previous lives in a short time.*” They were also asked to dream about doing the first thing they would enjoy to do after the surgery.

During the relaxing music in the last 10-minute section of CD, while listening to the CD in the

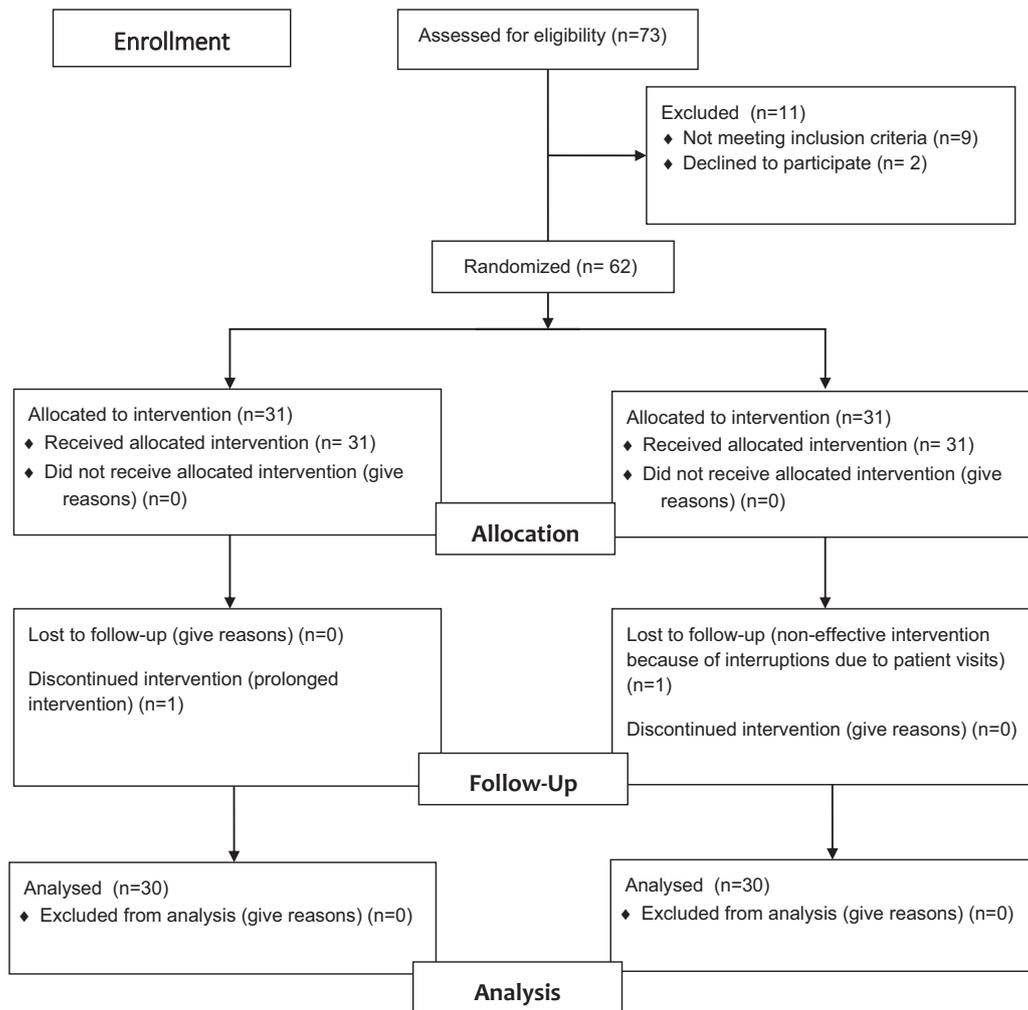


Figure 1. Patient recruitment and flow.

postsurgical period, the patients were asked to *imagine* that “*everything was alright, they recovered in a short time and they were discharged from hospital and they returned to their daily activities and social life in a short time.*” They were also asked to dream about doing the first thing they would enjoy to do after the surgery.

Patients had determined the exact time themselves when they would perform each GI, provided that they performed them within the period determined by the principal investigator and before VAS pain, VAS nausea, VAS satisfaction, ASSQ, and RCSQ measurements. The periods determined by the principal investigator were as follows:

1. Any time after hospitalization on preoperative period except last 1 hour prior to surgery.
2. A 4-hour period after getting transferred from the postanesthesia care unit to the inpatient service on postoperative first day.
3. The first half of the day for the first application and the second half of the day for the second application on postoperative second and third days.

### Statistical Methods

IBM SPSS Statistics for Windows, version 23.0 (IBM Corp Released 2015, Armonk, NY),

program was used to analyze the data. Median, interquartile range, minimum and maximum values for numerical variables, and frequency distributions (number, percentage) for categorical variables are given. The Mann-Whitney *U* test was used to compare the categorical variables with two groups, the Friedman test to compare the data obtained according to the time, the Spearman correlation coefficient to examine the relationship between numerical variables, and the square test to examine the relationship between two categorical variables.

## Results

The patient recruitment and flow in the study are shown in [Figure 1](#). Although the age of the patients ranged from 20 to 78 years, it was  $49.7 \pm 16.9$  years on average. Fifty-three point three percent were female; 73.3% were married; 38.3% were high-school graduates; 25.0% were undergraduates; 41.7% were civil servants; and 23.3% were retired. The BMI of the patients ranged from 20.0 to 29.5 kg/m<sup>2</sup> ( $25.1 \pm 2.7$  kg/m<sup>2</sup>; [Table 1](#)). Patients with chronic diseases were generally diagnosed with hypertension (6.7%), asthma (6.7%), chronic obstructive pulmonary disease (5.0%), and diabetes (5.0%). The proportion of patients with an American Society of Anesthesiologists 1 score was 66.7%, and 73.3% of them underwent laparoscopic surgery ([Table 1](#)).

There was no statistically significant difference between the groups in terms of age, BMI ([Table 2](#)), nausea (2nd, 24th, 48th, and 72nd hours) and number of patients vomiting (6th, 24th, 48th, and 72nd hours) ( $P > 0.05$ ). However, it was observed that there was a statistically significant difference in terms of ASSQ score, VAS pain score (24th, 48th, and 72nd hours), VAS satisfaction score, RCSQ score, and medians of number of patients vomiting up to 2 hours postoperatively ( $P < .05$ ). The control group, ASSQ score, RCSQ score at the 24th and 48th hours, and VAS score regarding pain level at the 24th, 48th, and 72nd hours were significantly higher than that of the intervention group; and control group's level of satisfaction at the 72nd hour was significantly lower than that of the intervention group ([Table 3](#)).

**Table 1. Sociodemographic Characteristics of Guided Imagery and Control Group (N = 60)**

	n, or mean $\pm$ SD	%*
Age, y	49.7 $\pm$ 16.9	
BMI, kg/m <sup>2</sup>	25.1 $\pm$ 2.7	
Gender		
Female	32	53.3
Male	28	46.7
Marital status		
Married	44	73.3
Single	16	26.7
Educational status		
Illiterate	4	6.7
Literate	5	8.3
Primary school	13	21.7
High school	23	38.3
Undergraduate	15	25.0
Occupation		
Unemployed	9	15.0
Civil servant	25	41.7
Worker	4	6.7
Self-employment	8	13.3
Retired	14	23.3
Diagnosis		
Hemorrhoids	11	18.3
Laparoscopic cholecystectomy	11	18.3
Femoral hernia	7	11.7
Umbilical hernia	7	11.7
Appendectomy	6	10.0
Inguinal hernia	5	8.3
Pilonidal sinus	5	8.3
Benign breast tumor	5	8.3
Ileus	3	5.0
Chronic disease condition		
No	40	66.7
Asthma	4	6.7
Hypertension	4	6.7
COPD	3	5.0
Diabetes	3	5.0
COPD and hypertension	3	5.0
Asthma and hypertension	2	3.3
Diabetes and hypertension	1	1.7
ASA score		
1	40	66.7
2	20	33.3
Surgical procedure		
Laparoscopic	16	26.7
Open	44	73.3

BMI, body mass index; ASA, American Society of Anesthesiologists; COPD, chronic obstructive pulmonary disease; SD, standard deviation.

\*Percentage among the 60 people was taken.

**Table 2. Examination of the Relationship Between Imagery Applied and Nonapplied Groups and Variables**

	Guided Imagery		Chi-Square	P Value
	Applied (Intervention Group)	Nonapplied (Control Group)		
Age, y, mean (SD)	47.03 (17.66)	52.5 (15.95)		.824
BMI, kg/m <sup>2</sup> , mean (SD)	24.52 (2.77)	25.75 (2.65)		1.431
Gender, n (%) <sup>*</sup>				
Female	17 (56.7)	15 (50.0)	0.268	.605
Male	13 (43.3)	15 (50.0)		
Marital status, n (%) <sup>*</sup>				
Married	24 (80.0)	20 (66.7)	1.364	.243
Single	6 (20.0)	10 (33.3)		
Educational status, n (%) <sup>*</sup>				
Primary school	11 (36.7)	11 (36.7)	0.110	.946
High school	11 (36.7)	12 (40.0)		
Undergraduate	8 (26.7)	7 (23.3)		
Chronic disease condition, n (%) <sup>*</sup>				
No	20 (66.7)	20 (66.7)	0.000	1.000
Yes	10 (33.3)	10 (33.3)		
ASA score, n (%) <sup>*</sup>				
1	20 (66.7)	20 (66.7)	0.000	1.000
2	10 (33.3)	10 (33.3)		

ASA, American Society of Anesthesiologists; BMI, body mass index.

The general characteristics of guided imagery applied and nonapplied groups were similar; No statistically significant relationship between age, BMI, gender, marital status, educational status, chronic disease, and ASA score was detected.

\*Percentage among the 30 people was taken.

## Discussion

Interactions between the mind and body, such as guided imagery, have been shown to be useful for surgical symptoms because of the positive psychological and physiological effects of intensive therapies.<sup>3,21</sup> This study found that guided imagery application reduced the anxiety related to the operation, improved patient satisfaction, decreased postoperative pain level, and increased sleep quality postoperatively (except postoperative 72nd hour), but PONV (except postoperative 2nd hour) was not affected.

It is known that the sleep quality of a patient is impaired in the postoperative period, which affects the healing process negatively and impairs quality of life. Postoperative sleep disturbance has many causes such as anxiety, postoperative pain, and general anesthesia.<sup>22,23</sup> A small number of studies have reported the use of

guided imagery in prevention of postoperative sleep disturbance, most of which reported negative results.<sup>24,25</sup> This study found that the sleep quality of patients in the intervention group improved at the 24th and 48th hours, whereas it did not change at the 72nd hour. Most of the patients were discharged home before completing the 72 hours in the hospital. It is unclear whether these patients had correctly implemented the imagery method at home. In addition, mobilization of these patients might have caused an increase of postsurgical pain and disrupted comfort. These reasons may explain why patients' sleep quality was not affected at 72 hours.

The increasing competition in health care has made patient satisfaction and thus the quality of health care offered to patients much more important. Although patient satisfaction is influenced by many factors such as past experience of the patient, sociocultural level, age, and gender,<sup>26</sup>

**Table 3. Examination of the Difference Between Application Groups in Terms of Variables (N = 60)**

	Imagery Nonapplied		Imagery Applied		MW	P Value
	Median	IQR	Median	IQR		
ASSQ score	32.50	12.00	22.00	13.00	-2.606	.009*
VAS pain (0-100)						
24 h	65.00	10.00	50.00	10.00	-5.129	.000***
48 h	60.00	15.00	40.00	10.00	-5.074	.000***
72 h	40.00	20.00	27.50	15.00	-3.429	.001**
VAS satisfaction (0-10)	6.00	2.00	8.00	1.00	-5.503	.000***
VAS nausea (0-100)						
2 h	0.00	40.00	0.00	30.00	-0.554	.580
6 h	0.00	40.00	0.00	30.00	-0.479	.632
24 h	0.00	0.00	0.00	0.00	-0.410	.682
48 h	0.00	0.00	0.00	0.00	-0.974	.330
72 h	0.00	0.00	0.00	0.00	0.000	1.000
Number of patients vomiting (n)						
2 h	0.00	0.00	0.00	0.00	-2.315	.021*
6 h	0.00	0.00	0.00	0.00	-1.419	.156
24 h	0.00	0.00	0.00	0.00	-1.762	.078
48 h	0.00	0.00	0.00	0.00	-1.000	.317
72 h	0.00	0.00	0.00	0.00	0.000	1.000
RCSQ score						
24 h	35.00	15.00	55.00	30.00	-2.982	.003**
48 h	37.50	25.00	57.50	20.00	-3.997	.000***
72 h	55.00	20.00	50.00	25.00	-0.661	.509

IQR, Interquartile Range; MW, Mann-Whitney *U*; ASSQ, Anxiety Specific to Surgery Questionnaire; VAS, visual analog scale; RCSQ, Richards-Campbell Sleep Questionnaire.

\**P* < .05.

\*\**P* < .01.

\*\*\**P* < .001.

the level of patient the satisfaction regarding nursing care is affected by communication between the patient and nurse, and the nurse's accessibility, empathy, and sympathy.<sup>27</sup> There are conflicting results in the literature regarding the effect of imagery on patient satisfaction.<sup>8,28</sup> In this study, the satisfaction level of patients regarding nursing care was significantly higher in the intervention group than the control group (Table 3). Applying guided imagery to a patient requires that a nurse spend more time with the patient and improves the communication between the nurse and the patient. This is a different experience for both patient and nurse from the normal patient and nurse relationship. During this experience, there may be a special relationship between nurse and patient. We believe that this special situation is one of the

reasons why guided imagery improved the satisfaction level of the patients. Reducing the level of postoperative pain and the level of surgery-specific anxiety may be another reason.

There is insufficient evidence that nausea and vomiting is positively affected by guided imagery, although it is shown to be psychologically supportive and comfort-enhancing.<sup>7</sup> Studies have shown that the guided imagery method reduces chemotherapy-induced nausea and vomiting,<sup>10-12</sup> whereas postsurgical studies are more focused on anxiety and pain,<sup>6,29</sup> and the effect of guided imagery on PONV is not clear.<sup>7</sup> Previous studies in which guided imagery was applied suggest that guided imagery had no effect on PONV.<sup>8,30</sup> In this study, it was found that guided imagery had no significant effect on PONV except at the

postoperative 2nd hour (Table 3). Some patients were given metoclopramide before discharging from the postanesthesia care unit. This situation might have caused the improvement of PONV on 2nd hour. We believe that further studies are needed with larger patient populations.

There are many studies and meta-analyses showing the effect of guided imagery on postoperative surgical pain and the surgery-related anxiety level. Many of these studies show that guided imagery is effective in reducing postoperative surgical pain and anxiety due to surgery,<sup>6,29,31</sup> although some say that it is not effective.<sup>32</sup> In this study, in accordance with the literature, it was found that preoperative surgery-related anxiety level and postoperative surgical pain level

were lower in the intervention group than the control group.

### Limitations

The limitation of this study is heterogeneity of the groups because of multiple types of surgery performed. The results might have been different if there were groups with single type of surgery.

### Conclusion

Although it is promising that guided imagery has positive effects on patient satisfaction, sleep quality, anxiety, and postoperative pain, the evidence for the use of this is still inadequate and more clinical trials are needed.

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