



Contents lists available at ScienceDirect

Journal of PeriAnesthesia Nursing

journal homepage: www.jopan.org

Research

Preoperative Anxiety Levels in Surgical Patients: A Comparison of Three Different Scale Scores



Hesna Gürler, PhD*, Meryem Yılmaz, PhD, Kübra Erturhan Türk, PhD

Surgical Nursing Department, Sivas Cumhuriyet University Faculty of Health Sciences, Sivas, Turkey

A B S T R A C T

Keywords:

preoperative anxiety
perioperative nursing
anxiety scales
preanesthesia nursing
surgery

Purpose: The aim of this study was to compare Anxiety Specific to Surgery Questionnaire (ASSQ) with Spielberger State-Trait Anxiety Inventory (STAI) and Amsterdam Preoperative Anxiety and Information Scale (APAIS) in the assessment of preoperative anxiety level and to evaluate the fears associated with surgery and anesthesia in surgical patients.

Design: This is descriptive, correlational, and cross-sectional study.

Method: The study sample included 507 surgical patients in four surgery wards who underwent elective surgery. All the data were collected using The Descriptive Characteristics and Clinical Information Form, STAI, APAIS and ASSQ.

Findings: A majority (70.8%) of the participants had fears associated with surgery and anesthesia and nearly half of them had a moderate level of preoperative anxiety. Anxiety prevalence was 46.4% according to the APAIS, 44.4% according to STAI and 49.3% according to ASSQ. Women, participants with no primary school education, participants undergoing major surgery and general anesthesia who did not have knowledge about the surgical procedure, and surgical complications had higher anxiety according to three scale scores.

Conclusion: Nearly half of the participants had moderate/high preoperative anxiety, there were consistent results among the scales and the tools were interchangeable to evaluate the preoperative anxiety level in the surgical patients.

© 2021 American Society of PeriAnesthesia Nurses. Published by Elsevier Inc. All rights reserved.

Surgical intervention is a traumatic treatment method that causes major life changes and leads to anxiety in patients.^{1,2} Anxiety experienced in the preoperative period is defined as the feeling of uncertainty, restlessness, and fear associated with hospitalization, surgery, and anesthesia.^{3–5} Most patients have perceived the day of surgery as the biggest and most threatening day in their lives, and 11% to 92.6% experienced preoperative anxiety due to uncertainty, fear of disability and death.^{6,9–12} In a meta-analysis, Mekonnen Abate et al³ evaluated 14,652 surgical patients in 17 countries and found that the universal preoperative anxiety prevalence was 48%. In Turkey, preoperative anxiety prevalence was 23% to 44%.^{8,13,14}

Anxiety is a universal normal response to interventional and life-threatening procedures such as surgery and anesthesia.^{9,15–17} However, when anxiety is at a high level and lasts for a prolonged time, it affects the neuroendocrine functions and increases the need for anesthesia⁸ and analgesics,^{8,15,18,19} postoperative pain severity,^{8,15} recovery time from anesthesia,¹⁷ postoperative mortality,^{8,19} and it causes

postoperative delirium.²⁰ Therefore, the determination of preoperative anxiety level with valid, consistent and reliable measurement tools and alleviating it with appropriate nursing interventions have the potential to contribute to a healthier surgical process and to decrease postoperative morbidity, mortality and hospital stay.^{2–4,21,22,23}

The most widely used tests to determine preoperative anxiety level are STAI which is accepted as the gold standard and The Hospital Anxiety and Depression Scale.^{9,20} However, these measurement tools are more suitable to assess general anxiety due to their comprehensive nature and they are not specific to surgery.^{6,21} The scales developed specifically for surgery are the APAIS which is mostly used by anesthesiologists,^{6,22,25,26} ASSQ,^{5,27,28} Surgical Anxiety Questionnaire²³ and Visual Analog Scale for Preoperative Anxiety (VAS-PA).^{16,29,30} The correlation of STAI with VAS^{30,31} and APAIS^{25,26} has been investigated in the literature, and it was determined that all three scales could be used to assess preoperative anxiety interchangeably. APAIS and STAI were compared in two studies to determine preoperative anxiety level,^{25,32} and it was determined that the scales showed a positive correlation with each other ($r = 0.514$, $P = 0.001$ for the first study; $r = 0.54$, $P = 0.000$ for the second study) and there were consistent results among the scales. In another study,

Conflicts of interest: None to report.

* Address correspondence to Hesna Gürler, Sivas Cumhuriyet University Faculty of Health Sciences, Surgical Nursing Department, Sivas, Turkey.

E-mail address: hesnagurler@hotmail.com (H. Gürler).

<https://doi.org/10.1016/j.jopan.2021.05.013>

1089-9472/© 2021 American Society of PeriAnesthesia Nurses. Published by Elsevier Inc. All rights reserved.

Karanci and Dirik³³ compared ASSQ with STAI, and they found that both scales were suitable for use. This study was conducted to compare ASSQ with STAI and APAIS in the assessment of preoperative anxiety level and to evaluate the fears about surgery and anesthesia in surgical patients.

Methods

Design and Setting

This descriptive correlational and cross-sectional study was conducted in four surgery wards in a university hospital in Turkey.

Sample

The sample consisted of 507 patients who underwent elective surgery between September 1, 2018, and March 1, 2019. The stratified random sampling method was used in the selection of the individuals included in the study sample. In order to have an equal weighting of participants in the clinics, the sample was divided into four layers, with each clinic as a layer. A total of 507 participants were included in the study, 257 from the general surgery clinic, 119 from the orthopedic clinic, 83 from the urology clinic, and 58 from the thoracic and cardiovascular surgery clinic. Inclusion criteria were participants who underwent elective surgery, older than 18 years and who spoke and understood the Turkish language. Exclusion criteria were participants who had a change in consciousness levels before surgery, who used medication due to anxiety disorders, or had depression diagnosis, or who could not speak Turkish. The data were collected by first and third researchers in the participant's room the day before the surgery using the face-to-face interview technique. The surveys took 20 to 25 minutes to complete.

Measures and Instruments

The Descriptive Characteristics and Clinical Information Form, STAI, APAIS, and ASSQ were used to collect the data. The Descriptive Characteristics and Clinical Information Form was developed by the researchers based on the literature.^{9,13,28,34} The form consists of 10 questions that include age, gender, marital and educational status of the individual, previous surgery, knowledge about the surgical procedure and surgical complications, the extent of surgery and anesthesia to be received, the state of fear associated with surgery and anesthesia, and the reasons for fears of surgery and anesthesia. We classified anesthesia types into local and general. Types of anesthesia (regional and local) other than general anesthesia were classified as local anesthesia. Participants who can not read or write were classified as illiterate and participants who can read and write but have not graduated from any school were classified as literate.

We classified surgery types into minor or major surgery based on the European Surgical Association Delphi Consensus definition³⁵ and literature.^{36,37} For purposes of analysis, the following types of operations were considered major procedures: intra-abdominal operations (eg, bowel resection, gastrectomy), thoracotomies, coronary artery bypass graft, heart valve replacement, nephrectomy, limb amputations, and joint replacements. Other operations, such as transurethral resection of the prostate, urinary stone, repair of an inguinal hernia, carpal tunnel, thyroidectomy, orchiectomy, varicose vein removal and drainage of pilonidal abscess were considered minor. Participants were asked whether they were informed about the surgical procedure and surgical complications and those who said yes were classified as having knowledge.

The validity and reliability study of the Turkish version of the State-Trait Anxiety Inventory was conducted by Oner and Le Compte.^{25,32} The lowest score that can be obtained from the scale is

20 and the highest score is 80. Scale scores of 20 to 37, 38 to 44, and 45 to 80 were evaluated as low, moderate, and high anxiety levels, respectively.^{25,32} In our study, the Cronbach alpha value of the scale was found to be 0.96.

ASSQ was adapted to Turkish by Karanci and Dirik³³ in 2003 to measure the anxiety specific to surgery. It consists of 10 items in total and is a five-point Likert-type scale. The score for ASSQ is obtained by summing the responses to all items. The total score is 50 and there is no cut-off point in the evaluation of scale scores. An increase in the scale score indicates an increase in the anxiety level.³³ In our study, the Cronbach alpha value of the scale was found to be 0.85.

APAIS is a scale that was developed by Moerman et al in 1996 and Turkish validity and reliability study was recently conducted by Cetinkaya et al.⁴ The scale has two subscales measuring anxiety about anesthesia and surgery and the need for information, and includes six statements in total. APAIS is a five-point Likert-type scale and the lowest score that can be obtained from the scale is 6 and the highest score is 30. The total score for the anxiety scale about anesthesia and surgery is 4 to 20. The overall cut-off point for anxiety was accepted as ≥ 11 , and an individual with a score of 11 and above was considered as an anxious individual. The total score of the "need for information" scale is 2 to 10. The "need for information" is evaluated in three groups as 2 to 4 points indicating none/little need of information, 5 to 7 points showing a medium-level need for information, 8 to 10 points for a high-level need for information.^{4,38} In our study, the total Cronbach alpha value of the scale was found to be 0.95.

Ethical Considerations

Approval from the Clinical Research Ethics Committee (no = 2017-10/18) and written and verbal informed consent from all individuals who agreed to participate in the study were obtained.

Data Analysis

The data obtained from our study were evaluated using Statistical Package for the Social Sciences software (SPSS, version 22.00), and frequency and percentage tests were used for the descriptive variables. Whether the data had a normal distribution was determined by the Kolmogorov-Smirnov (K-S) test. For comparison of scale scores that did not show normal distribution, the Mann-Whitney-U test was used for paired groups, and the Kruskal Wallis test was used for more than two groups. The relationship between STAI, APAIS, and ASSQ scales was evaluated using the Spearman correlation test. For the present study the median was defined as 23 for ASSQ. According to the ASSQ anxiety level, the dependent variable was ≤ 23 for a low anxiety level and >23 for a high anxiety level.^{28,33} A value of $P < .05$ was considered significant.

Results

Table 1 shows the descriptive and clinical characteristics of individuals. The average age of the individuals was 51.28 ± 3.22 , 52.5% were male, 76.9% were married and 43.2% were primary school graduates. Over a majority (56.8%) of participants were scheduled for major surgery, 61.7% were informed about the surgical procedure and surgical complications from a nurse or surgeon, 70% received general anesthesia and 72.4% had previous surgery.

Table 2 shows the fears of the individuals regarding surgery and anesthesia. A majority (70.8%) of the individuals had fears about surgery and anesthesia; 59.5% about experiencing postoperative pain, 51.7% about not being able to wake up after surgery, 42.7% about delaying for healing of their wound, 42.5% about infection developing

Table 1
Descriptive and Clinical Characteristics of the Participants (N = 507)

Descriptive characteristics	n (%)
Age, Mean \pm SD	51.28 \pm 3.22
Gender	
Female	241 (47.5)
Male	266 (52.5)
Marital status	
Single	117 (23.1)
Married	290 (76.9)
Educational status	
No primary school	134 (26.4)
Primary school	219 (43.2)
Secondary school/University	154 (30.4)
Clinical characteristics	
Previous surgery	
Yes	367 (72.4)
No	140 (27.6)
The extent of the operation	
Minor surgery	219 (43.2)
Major surgery	288 (56.8)
Knowledge about the surgical procedure and surgical complications	
Yes	313 (61.7)
No	194 (38.3)
Type of anesthesia	
Local	152 (30.0)
General	355 (70.0)

at the wound site, and 33.2% about not being able to care for their children.

Table 3 shows the anxiety scale scores according to the clinical and descriptive characteristics of the individuals. The mean score of the total APAIS scale was 16.33 ± 7.19 , the mean score of the APAIS anxiety subscale was 10.42 ± 5.14 , the mean score of the need for information subscale was 4.96 ± 2.88 , the STAI mean score was 44.16 ± 16.31 , and the ASSQ mean score was 24.30 ± 1.01 . In our study, the anxiety prevalence of individuals was determined as 46.4% (APAIS score ≥ 11) according to the APAIS anxiety score and 44.4% (STAI score ≥ 45) according to STAI and 49.3% (median score >23) according to ASSQ. Women (12.26 ± 4.98 , 8.75 ± 4.71 for APAIS; 49.28 ± 15.72 , 39.51 ± 13.75 for STAI, 27.50 ± 9.52 , 21.44 ± 9.92 for ASSQ), participants with no primary school education (12.05 ± 5.57 for APAIS, 49.47 ± 17.11 for STAI, 28.14 ± 10.75 for ASSQ) those who would undergo major surgery (11.58 ± 5.23 , 8.90 ± 4.61 for APAIS; 46.88 ± 15.86 , 40.57 ± 14.26 for STAI, 26.55 ± 10.34 , 21.39 ± 9.19 for ASSQ) those who did not have knowledge about the surgical procedure, surgical complications (10.07 ± 5.05 , 11.00 ± 5.26 for APAIS; 42.98 ± 15.59 , 46.06 ± 15.17 for STAI; 23.52 ± 10.14 , 25.61 ± 10.13 for ASSQ), and participants who would receive general anesthesia (11.25

Table 2
Fears of Patients About Surgery and Anesthesia

Fear of individuals about surgery and anesthesia (N = 507)	n (%)
Yes	359 (70.8)
No	148 (29.2)
Fear reasons	
Postoperative pain	213 (59.5)
Not awakening from anesthesia	185 (51.7)
Delay in wound healing	154 (42.7)
Wound infection	153 (42.5)
Being unable to take care of their children	119 (33.2)
Waking up during surgery	98 (27.4)
Physical disability	89 (24.9)
Being in intensive care after surgery	73 (20.4)
Absence from work	71 (19.8)
Postoperative nausea and vomiting	49 (13.7)

± 5.21 , 8.49 ± 4.43 for APAIS; 46.14 ± 15.82 , 39.51 ± 13.66 for STAI; 25.72 ± 10.27 , 21.05 ± 9.19 for ASSQ) had higher mean scores of APAIS anxiety and need for information sub-dimensions, STAI and ASSQ scales. Furthermore, the difference between the groups was statistically significant ($P < .001$). There was no significant difference between the anxiety levels of married and single individuals and those who had or not previous surgery ($P > .001$). The study also determined that 52.7% of the individuals had a mild, 21.7% a medium, and 25.6% a high level of information need according to the APAIS need for information scale score.

Table 4 shows the correlation between APAIS, STAI, and ASSQ scores. When the table was examined, a highly significant positive correlation was found between total STAI and total APAIS ($r = 0.769$, $P < .001$); total STAI and ASSQ ($r = 696$, $P < .001$); and total APAIS and ASSQ ($r = 702$, $P < .001$).

Discussion

In this study, we compared STAI and APAIS with ASSQ to determine the preoperative anxiety level in surgical participants and we found a highly positive correlation between ASSQ and STAI ($r = 0.694$, $P = .000$) and APAIS ($r = 0.703$, $P = .000$). This finding demonstrates consistent results among the scales and suggests that the tools are interchangeable. Similarly to our finding, literature reported that STAI,^{1,17} APAIS^{6,25} and VAS^{16,30} could be used interchangeably to determine preoperative anxiety level.

The findings of this study showed that the majority of participants had worries and fears about surgery and anesthesia. Those who stated that they had fear about surgery had higher anxiety levels and the most common reasons of fear were postoperative pain, not awakening from anesthesia, delayed wound healing, wound infection, and being unable to take care of children, respectively. In similar studies, it was reported that preoperative concerns of the patients included uncertainty about the future,⁷ separation from family members, inability to perform daily routines, economic losses,^{11,32} as well as anesthesia-related concerns such as fear of death,^{1,7,13} postoperative pain,^{7,8,11,13} fear of physical disability^{7,22} and waking up during surgery.^{13,34} In a qualitative study, King et al³⁷ investigated preoperative anxiety components in surgical patients and it was determined that the patients experienced concerns such as uncertainty about the surgical process, development of complications such as postoperative infection, death during surgery, loss of privacy and control, the possibility of being diagnosed with cancer, experiencing postoperative pain, not being able to take care of family members or return to daily life.⁴⁰ As known, surgical intervention is a multidimensional process that affects patients physically, psychologically, socially, economically, and spiritually and it causes various threats and concerns.^{2,26} Therefore, identifying these concerns individually and planning appropriate nursing interventions has the potential to contribute reducing preoperative anxiety and accelerating the postoperative recovery process.

This study determined that the prevalence of preoperative anxiety of participants was 46.4% according to APAIS, 44.4% according to STAI and 49.3% according to ASSQ. These prevalence values are higher than the value (23%) obtained according to STAI in the study conducted in our country by Ekinci et al¹⁴ and they are similar to the value (44.3%) obtained according to APAIS by Celik and Edipoglu.¹³ Our preoperative anxiety prevalence values are lower than the prevalence values in the studies conducted in Sri Lanka (76.6%),¹² Ethiopia (70.3%),⁷ and Greece (81%)⁴¹ and similar to the universally accepted value of 48%.³ In our study, it was determined that the scale scores of the individuals were 16.33 ± 7.19 for the APAIS total scale score, 10.42 ± 5.14 for the anxiety subdimension, 44.16 ± 16.31 for the STAI, 24.30 ± 1.01 for the ASSQ, and that individuals experienced moderate level preoperative anxiety, which supports the findings in

Table 3
Anxiety Scale Scores of Patients According to Descriptive and Clinical Characteristics (N = 507)

	APAIS m/SD		STAI m/SD	ASSQ m/SD
Total score	16.31 ± 7.21		44.16 ± 16.31	24.30 ± 1.01
	Anxiety	Need for Information		
	10.42 ± 5.14	4.96 ± 2.88		
Descriptive and clinical characteristics				
Gender				
Female	12.26 ± 4.98	5.86 ± 2.91	49.28 ± 15.72	27.50 ± 9.52
Male	8.75 ± 4.71	4.14 ± 2.60	39.51 ± 13.75	21.44 ± 9.92
Test	z = -7.808 P < .001	z = -6.707 P < .001	z = -7.171 P < .001	z = -7.083 P < .001
Marital status				
Single	10.15 ± 5.31	4.71 ± 2.85	44.64 ± 15.54	23.77 ± 9.84
Married	10.51 ± 5.09	5.03 ± 2.89	44.01 ± 15.50	24.48 ± 10.29
Test	z = -0.762 P = .446	z = -1.068 P = .285	z = -0.407 P = .684	z = -0.550 P = .582
Educational state				
No primary school	12.05 ± 5.57	6.12 ± 3.14	49.47 ± 17.11	28.14 ± 10.75
Primary school	10.42 ± 4.87	4.87 ± 2.73	43.68 ± 14.90	24.29 ± 10.04
Secondary school/University	9.01 ± 4.72	4.07 ± 2.50	40.22 ± 13.50	21.04 ± 8.66
Test	KW = 23.22 P < .001	KW = 31.928 P < .001	KW = 22.176 P < .001	KW = 33.357 P < .001
The extent of the operation				
Minor surgery	8.90 ± 4.61	4.04 ± 2.42	40.57 ± 14.26	21.39 ± 9.19
Major surgery	11.58 ± 5.23	5.65 ± 3.01	46.88 ± 15.86	26.55 ± 10.34
Test	z = -5.761 P < .001	z = -6.020 P < .001	z = -4.427 P < .001	z = -5.598 P < .001
Previous surgery				
Yes	10.36 ± 5.23	4.97 ± 2.98	43.94 ± 16.14	24.37 ± 10.53
No	10.59 ± 4.92	4.92 ± 2.62	44.71 ± 13.70	24.18 ± 9.24
Test	z = -0.626 P = .531	z = -0.213 P = .832	z = -1.116 P = .264	z = -0.132 P = .895
Knowledge about surgical intervention				
Yes	10.07 ± 5.05	4.65 ± 2.77	42.98 ± 15.59	23.52 ± 10.14
No	11.00 ± 5.26	5.46 ± 2.99	46.06 ± 15.17	25.61 ± 10.13
Test	z = -1.935 P = .043	z = -2.922 P = .003	z = -2.208 P = .02	z = -2.368 P = .01
Fear about surgery				
Yes	12.15 ± 4.87	5.92 ± 2.80	49.26 ± 14.41	28.37 ± 8.83
No	6.25 ± 2.91	2.62 ± 1.32	31.78 ± 10.12	14.51 ± 5.47
Test	z = -12.268 P < .001	z = -12.305 P < .001	z = -12.230 P < .001	z = -14.842 P < .001
Type of anesthesia				
Regional	8.49 ± 4.43	3.99 ± 2.45	39.51 ± 13.66	21.05 ± 9.19
General	11.25 ± 5.21	5.37 ± 2.95	46.14 ± 15.82	25.72 ± 10.27
Test	z = -5.517 P < .001	z = -4.866 P < .001	z = -4.142 P < .001	z = -4.730 P < .001

APAIS, Amsterdam Preoperative Anxiety and Information Scale; ASSQ, Anxiety Specific to Surgery Questionnaire; m, mean; SD, standard deviation; STAI, Spielberger State-Trait Anxiety Inventory.

the literature. The preoperative anxiety score in the study of Matthias et al¹² was 15.60 ± 7.08 according to total APAIS, and 49.89 ± 11.2 according to STAI in the study of Nigussie et al.⁷ In the study of Karadag Arli,²⁵ which was conducted in our country, the pre-operative anxiety level was found as 15.8 ± 5.9 according to total APAIS and 42.4 ± 10.4 according to STAI. In studies using the ASSQ, the scale score was determined as 31.91 ± 6.30²⁸ and 27.31 ± 6.72.²⁷ The reason why the preoperative prevalence and

Table 4
Correlation Scores Between APAIS, STAI and ASSQ (N = 507)

		STAI	APAIS	ASSQ
STAI	r	1	0.769	0.696
	p		P < .001	P < .001
APAIS	r	0.769	1	0.702
	p	P < .001		P < .001
ASSQ	r	0.696	0.702	1
	p	P < .001	P < .001	

APAIS, Amsterdam Preoperative Anxiety and Information Scale; ASSQ, Anxiety Specific to Surgery Questionnaire; STAI, Spielberger State-Trait Anxiety Inventory.

anxiety scale scores in our study differed from other national and international studies may be due to the different socio-cultural, economic, and clinical characteristics of the individuals in the sample groups.

In this study, preoperative anxiety level in women was higher than men according to all three scales. Other studies showed that gender was a fundamental factor affecting preoperative anxiety, and anxiety levels of women were higher than men.^{9,25,28} In a meta-analysis preoperative anxiety level in women was 1.27 times higher than that of men.³ This finding can be explained by the fact that women are unable to fulfill their responsibilities to their families due to hospitalization and surgical intervention, and that they express anxiety more easily than men.

We found that preoperative anxiety levels of the participants with no primary education were lower than the other education groups. This finding may be related to the fact that individuals with a low education level have a limited level of awareness regarding anesthesia and surgery, limited access to health information, and a limited capacity for interpretation of the information they have obtained. There are different findings in the literature regarding the effect of

education level on preoperative anxiety.^{9,13,24,28} While some studies found that education level did not affect anxiety level,^{9,13,25} lower education level was reported as a risk factor in some studies,^{24,28} and higher education level as a risk factor in others.^{30,42}

In this study, the preoperative anxiety level of the participants undergoing major surgery was higher than those undergoing minor surgery. This finding can be interpreted as that participants undergoing major surgery are more concerned about the size of the surgery, its effect on vital organs, postoperative recovery, and returning to daily life. There are conflicting results in the literature regarding the extent of the operation and its relationship with anxiety.^{9,22,23,28} While some studies reported that patients undergoing major surgery had higher preoperative anxiety levels,^{9,22,23} one study found that moderate level surgical interventions increased preoperative anxiety more.²⁸ Kuzminskaitė et al⁹ found that patients undergoing high-risk surgery had higher preoperative anxiety levels.

In this study, having a previous surgery did not affect the preoperative anxiety level. Matthias and Samarasekera¹² and Jafar and Khan³⁰ found that individuals who had previous surgery had lower preoperative anxiety levels. Woldegerima et al¹¹ found that anxiety levels did not differ between those who had and did not have surgery previously. Although no significant findings were obtained in our study, having a previous surgery can cause less anxiety by minimizing the fear of uncertainty.^{11,36}

Our study, in line with the literature, found that 38.3% of participants did not have knowledge about the surgical procedure and surgical complications, this meant they have not a clear understanding of the surgical intervention and complications, 47.3% needed a medium-to-high level of information according to the APAIS need for information scale, and those who did not know about the surgical procedure had higher anxiety levels. Studies reported that the majority of patients needed moderate-to-high level information about the operation,^{22,32} and those who needed more information had higher preoperative anxiety levels.^{22,23,43} Informing the patient about surgery and anesthesia is the first stage of the patient's psychological preparation for surgery, and it is an important factor to reduce preoperative anxiety.^{17,32} Inadequate knowledge of surgical patients about the surgical process may lead to misunderstandings about the treatment process, not understanding the medical information given, anger and anxiety.^{2,39} Therefore, surgical nurses should assess the information needs of patients and provide information about the surgery and anesthesia.

Preoperative anxiety level varies according to the type of anesthesia.³⁹ In the current study participants receiving general anesthesia had higher preoperative anxiety levels; and the difference between the groups was statistically significant ($P < .001$). Arakelian et al⁴⁴ found that the anxiety level of the patients undergoing local anesthesia was higher than patients receiving general anesthesia in their study evaluating the anxiety level in surgical patients. Çelik and Edipoğlu¹³ and Pokheral et al⁴³ found that patients receiving general anesthesia had higher preoperative anxiety levels. This may be because participants receiving general anesthesia experienced a loss of control during the surgery and thought that they would not be able to wake from anesthesia.

Limitations of the Study

The anxiety levels of individuals who underwent surgery for cancer and those who underwent non-cancer surgery were not compared since the medical diagnosis of the individuals was not evaluated in the study. We included only elective surgical participants in surgical wards and it was a single-center study. Therefore, these would limit the generalizability of the results.

Conclusion

Approximately half of the participants scheduled for elective surgery experienced a moderate level of preoperative anxiety, the anxiety level was higher in women, in those with a low education level, in those who had major surgery, had no knowledge of the surgical procedure and complications, and who would receive general anesthesia. Study results also demonstrate there are consistent results among the scales and suggest that the tools are interchangeable to assess the preoperative anxiety level. We suggest routinely assessing preoperative anxiety levels of patients using surgery-specific measurement tools to determine the fears associated with surgery and anesthesia and to reduce anxiety levels with patient-centered nursing care practices. We also recommend planning multi-center studies with a broader sample of patients.

Acknowledgments

The authors thank all patients who participated in the study.

References

1. Bedaso A, Ayalew M. Preoperative anxiety among adult patients undergoing elective surgery: A prospective survey at a general hospital in Ethiopia. *Patient Safety Surg.* 2019;13:1–8.
2. Albuquerque VC, Silva Batista IA, Oliveira CP, et al. Evaluation of anxiety levels in preoperative patients: A literature review. *Int J Innovative Sci Res Technol.* 2019;4:1–3.
3. Mekonnen Abate S, Chekol YA, Basu B. Global prevalence and determinants of preoperative anxiety among surgical patients: A systematic review and meta-analysis. *Int J Surg Open.* 2020;25:6–16.
4. Çetinkaya F, Kavuran E, Ünal Aslan KS. Validity and reliability of the Amsterdam Preoperative Anxiety and Information Scale in the Turkish population. *Turkish J Med Sci.* 2019;49:178–183.
5. Yıldız Fındık Ü, Yıldızeli Topçu S. Effect of the way of surgery on preoperative anxiety. *Nursing J Health Sci Faculty.* 2012;22–33.
6. Aust H, Eberhart L, Sturm T, et al. A cross-sectional study on preoperative anxiety in adults. *J Psychosom Res.* 2018;111:133–139.
7. Nigusie S, Belachew T, Wolancho W. Predictors of preoperative anxiety among surgical patients in Jimma University Specialized Teaching Hospital, South Western Ethiopia. *BMC Surg.* 2014;14:1–10.
8. Ali A, Altun D, Oguz BH, et al. The effect of preoperative anxiety on postoperative analgesia and anesthesia recovery in patients undergoing laparoscopic cholecystectomy. *J Anesth.* 2014;28:222–227.
9. Kuzminskaitė V, Kaklauskaitė J, Petkevičiūtė J. Incidence and features of preoperative anxiety in patients undergoing elective non-cardiac surgery. *Acta Medica Lituanica.* 2019;26:93–100.
10. Wei L, Ge C, Xiao W, et al. Cross-sectional investigation and analysis of anxiety and depression in preoperative patients in the outpatient department of aesthetic plastic surgery in a general hospital in China. *J Plastic Reconstruct Aesthetic Surg.* 2018;71:1539–1546.
11. Woldegerima YB, Fitwi GL, Yimer HT, et al. Prevalence and factors associated with preoperative anxiety among elective surgical patients at University of Gondar Hospital, Gondar, Northwest Ethiopia, 2017. A cross-sectional study. *Int J Surg Open.* 2018;10:21–29.
12. Matthias AT, Samarasekera DN. Preoperative anxiety in surgical patients-experience of a single unit. *Acta Anaesthesiol Taiwan.* 2012;50:3–6.
13. Çelik F, Edipoğlu IS. Evaluation of preoperative anxiety and fear of anesthesia using APAIS score. *Eur J Med Res.* 2018;23:1–10. 41.
14. Ekinci M, Gölboyu BE, Dülgeroğlu O, et al. The relationship between preoperative anxiety levels and vasovagal incidents during the administration of spinal anesthesia. *Braz J Anesthesiol.* 2017;67:388–394.
15. Türksal E, Alper I, Sergin D, et al. The effects of preoperative anxiety on anesthetic recovery and postoperative pain in patients undergoing donor nephrectomy. *Rev Bras Anesthesiol.* 2020;70:271–277.
16. Andersson V, Bergstrand J, Engström A, et al. The impact of preoperative patient anxiety on postoperative anxiety and quality of recovery after orthopaedic surgery. *J Perianesth Nurs.* 2020;35:260–264.
17. Bayrak A, Sagirolu G, Copuroglu E. Effects of preoperative anxiety on intraoperative hemodynamics and postoperative pain. *Coll Physicians Surg Pak.* 2019;29:868–873.
18. Kil HK, Kim WO, Chung WY, et al. Preoperative anxiety and pain sensitivity are independent predictors of propofol and sevoflurane requirements in general anaesthesia. *Br J Anaesth.* 2012;108:119–125.
19. Wu H, Huang Y, Tian X, et al. Preoperative anxiety-induced glucocorticoid signaling reduces GABAergic markers in spinal cord and promotes postoperative hyperalgesia by affecting neuronal PAS domain protein 4. *Mol Pain.* 2019;15:1–15.

20. Wada S, Inoguchi H, Sadahiro R, et al. Preoperative anxiety as a predictor of delirium in cancer patients: A prospective observational cohort study. *World J Surg.* 2019;43:134–142.
21. Turzaková J, Sollár T, Solgajová A. Faces Anxiety Scale as a screening measure of preoperative anxiety: Validation and diagnostic accuracy study. *Int J Nurs Pract.* 2019;25:1–7.
22. Laufenberg-Feldmann R, Kappis B. Assessing preoperative anxiety using a questionnaire and clinical rating: A prospective observational study. *Eur J Anaesthesiol (EJA).* 2013;30:758–763.
23. Burton D, King A, Bartley J, et al. The surgical anxiety questionnaire (SAQ): Development and validation. *Psychol Health.* 2018;1–19.
24. Prado-Olivares J, Chover-Sierra E. Preoperative anxiety in patients undergoing cardiac surgery. *Diseases.* 2019;7:1–10.
25. Karadağ Arlı Ş. Evaluation of the preoperative anxiety with APAIS and STAI-I Scales. *Hacettepe Univ J Nursing Faculty.* 2017;4:38–47.
26. Goebel S, Mehdorn HM. Assessment of preoperative anxiety in neurosurgical patients: Comparison of widely used measures and recommendations for clinic and research. *Clin Neurol Neurosurg.* 2018;172:62–68.
27. Soydaş Yeşilyurt D, Yıldız Fındık U. Effect of preoperative video information on anxiety and satisfaction in patients undergoing abdominal surgery. *Comput Inform Nurs.* 2019;37:430–436.
28. Yılmaz M, Sezer H, Gürler H, et al. Predictors of preoperative anxiety in surgical inpatients. *J Clin Nurs.* 2012;21:956–964.
29. Kindler CH, Harms C, Amsler F, et al. The visual analog scale allows effective measurement of preoperative anxiety and detection of patients' anesthetic concerns. *Anesthesia Analgesia.* 2000;90:706–712.
30. Jafar MF, Khan FA. Frequency of preoperative anxiety in Pakistani surgical patients. *JPMA.* 2009;59:359–363.
31. Romanik W, Kański A, Soluch P, et al. Preoperative anxiety assessed by questionnaires and patient declarations. *Anestezjol Intens Ter.* 2009;41:94–99.
32. Aykent R, Kocamanoğlu Sİ, Üstün E, et al. Evaluation of preoperative anxiety causes. *J Turkey Clinics Anesth Reanim.* 2007;5:7–13.
33. Karancı AN, Dirik G. Predictors of pre- and postoperative anxiety in emergency surgery patients. *J Psychosom Res.* 2003;55:363–369.
34. Yoldaş TK, Yoldaş M, Güngör H, et al. Questionnaire study on the knowledge, experience and concerns of about anesthesia applications in preanesthetic evaluation. *J Ege Med.* 2016;19:118–128.
35. Martin D, Mantziari S, Demartines N, Hubner M. Defining major surgery: A Delphi Consensus among European Surgical Association (ESA) Members. *World J Surg.* 2020;44:2211–2219.
36. Chard R. Care of preoperative patients. In: Ignatavicius DD, Workman ML, eds. *Medical Surgical Nursing Patient-Centered Collaborative Care.* Canada: Elsevier; 2016:215–218.
37. Brummett CM, Waljee JF, Goesling J, et al. New persistent opioid use after minor and major surgical procedures in US adults. *JAMA Surg.* 2017;152: 170504.
38. Moerman N, van Dam FS, Müller MJ, et al. The Amsterdam Preoperative Anxiety and Information Scale (APAIS). *Anesth Analg.* 1996;82:445–451.
39. Stamenkovic DM, Rancic NK, Latas MB, et al. Preoperative anxiety and implications on postoperative recovery: What can we do to change our history. *Minerva Anestesiol.* 2018;84:1307–1317.
40. King A, Bartley J, Johanson DL, et al. Components of preoperative anxiety: A qualitative study. *J Health Psychol.* 2017;24(13):1897–1908.
41. Mavridou P, Dimitriou V, Manataki A, et al. Patient's anxiety and fear of anesthesia: Effect of gender, age, education, and previous experience of anesthesia. A survey of 400 patients. *J Anesth.* 2013;27:104–108.
42. Caumo W, Schmidt AP, Schneider CN, et al. Risk factors for preoperative anxiety in adults. *Acta Anaesthesiol Scand.* 2001;45:298–307.
43. Pokharel K, Bhattarai B, Tripathi M, et al. Nepalese patients' anxiety and concerns before surgery. *J Clin Anesth.* 2011;23:372–378.
44. Arakelian E, Fardig M, Nyholm L. Nurses anaesthetists' versus patients' assessment of anxieties in an ambulatory surgery setting. *J Perioper Pract.* 2019;29:400–407.