

# Examining the Relationship Between Health Perception and Preoperative Anxiety in Surgical Patients

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## Abstract

**Background:** A variety of factors can affect anxiety about having surgery. The aim of this study was to determine the level of health perception and preoperative anxiety levels of surgical patients and to investigate the relationship between them.

**Methods:** This descriptive and correlational study was conducted on 315 surgical patients in the preoperative period in the inner region of Turkey. The data were collected using the "Descriptive Information Form", "Health Perception Scale", and "State-Trait Anxiety Inventory". Multiple regression analyses and structural equation modelling were used to evaluate the data.

**Results:** The mean scores of the Perception of Health Scale and the State Anxiety Inventory were  $43.78 \pm 6.52$  and  $41.10 \pm 10.89$ , respectively. There was a positive relationship between health perception and anxiety. Anxiety explained 1.8% of the health perception score, while age, educational status, income status, health status, hospitalization, history of surgery, and state anxiety scores explained 15% of the health perception score, according to the model created in the study.

**Conclusion:** Understanding factors affecting preoperative anxiety may help identify patients at high risk of anxiety. Factors that cause anxiety should be investigated, and factors that increase the level of anxiety should be known. The effect of more factors should be investigated to explain preoperative anxiety. Understanding perioperative anxiety in the patient will help provide quality nursing care.

**Keywords:** Health perception, Preoperative anxiety, Surgery patient

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## Introduction

Perception is the neurological process of perceiving, selecting, organizing, and interpreting selected stimuli in light of past experiences, and this process includes the way a person perceives the world (1,2). Perception is also an effective driving force for action (2). Health perception is defined as the combination of personal feelings, thoughts, prejudices, and expectations about one's own health (3). Health perception, which includes the adoption of healthy lifestyle behaviors, is closely related to the self-improvement process and individuals' subjective evaluations of their health (4). It is also a strong indicator that reflects the individual's social well-being, along with physical and mental aspects (5). Studies on the subject have reported that health perception is an important predictor of health outcomes. Health perception affects patients' quality of life (6), length of hospitalization, and mortality rates (7). Research findings

demonstrate negative health perceptions in people with chronic diseases such as chronic obstructive pulmonary disease (8), heart failure (9), and diabetes (10,11). Life changes, such as surgery, cause anxiety. Surgery affects patients psychologically and increases their level of anxiety (12). Anxiety is defined as an emotional response to the expectation of a real, perceived, future, or imminent threat (13). Surgery triggers physical, emotional, and cognitive events that create anxiety (14). The prevalence rate of preoperative anxiety among adult patients worldwide has been reported to range from 11% to 80% (15). In two different studies conducted on the Turkish population, it was reported that the preoperative anxiety of the patients was mild to moderate (16,17). Known risk factors for preoperative anxiety include the presence of psychiatric disorders such as anxiety, depression, and negative clinical experiences (18). Anxiety in the preoperative period is affected by uncertainty, uneasiness, and fear associated



with hospitalization, surgery, and anesthesia (19). Preoperative anxiety causes lower patient satisfaction in the postoperative period (20) and prolongs hospital stays (21). The European Society of Anaesthesiology guidelines recommend including patients' anxiety levels in preoperative patient assessment (22).

Surgery affects the patient both physiologically and psychologically (23). Preoperative anxiety in surgical patients is associated with health perception and postoperative complications (24). A systematic review on this subject revealed that patients who were informed about the surgical process in the preoperative period had lower preoperative anxiety levels, lower postoperative pain and anxiety levels, and faster recovery (25). Patients' subjective health perceptions significantly increased after coronary artery bypass graft surgery, but individuals who did not have family support before surgery and who lived alone exhibited depressive states and increased anxiety levels (26).

The factors affecting the health perception of surgical patients (27) or the effects of health literacy levels on health perception and fear of surgery have been examined (28). Studies on the health perceptions of surgical patients are limited. Although health perception and symptoms of anxiety and depression have been associated in previous studies, especially in recent years (29,30), health perception and preoperative anxiety have not been associated with surgical patients. This study contributed to the literature by explaining the relationship between health perception and preoperative anxiety. In line with this information, this study aims to investigate the occasional relationship between health perception and the preoperative anxiety levels of surgical patients. The research seeks answers to the relationship between health perception and anxiety levels in surgical patients and their effects on each other.

## Materials and Methods

### Design

This descriptive and cross-sectional study was conducted between January 2023 and March 2023 to determine the relationship between the health perception of surgical patients and anxiety levels in the preoperative period.

### Study Population and Sample

The study population included adult patients who underwent surgery in a teaching hospital in the Central Anatolia Region of Turkey. Neurosurgery, cardiovascular, otolaryngology, general surgery, orthopedics, and urology surgeries are performed in this facility. Preoperative patients who were between the ages of 18 and 75 years old and able to communicate were included in the study. On the other hand, patients with cognitive and neurologic disorders and patients undergoing day surgery and emergency surgery were not included in the study. Furthermore, patients whose surgery was canceled were excluded from the study. The G-Power 3.1.9.4 program was used for the sample calculation in this study. The

power of the study was estimated to be 81% in a post-hoc power analysis performed with an alpha of a 0.20 confidence interval and a 0.50 effect size. The sample size was found to be sufficient. The sample consisted of 315 individuals who met the inclusion criteria.

### Data Collection Tools

The data were collected with the "Introductory Information Form", "Perception of Health Scale (PHS)", and "State-Trait Anxiety Inventory (STAI)" prepared in accordance with the literature (27,31-36). The following paragraphs provide these tools in more detail.

*Introductory Information Form:* In this form, which was prepared in line with the literature (27,31,32) and expert opinion, participants were asked 13 questions for personal information, 5 questions for disease-related information, and 18 questions in total.

*The Perception of Health Scale:* This scale, developed by Diamond et al and validated by Kadioğlu and Yıldız, shows how a person evaluates his/her own perception of health (33,34). PHS is a five-point Likert-type scale (5=strongly agree, 1=strongly disagree) consisting of 15 items and four sub-dimensions, including center of control, certainty, importance of health, and self-awareness. Sample question items of the center of control and certainty included "Being healthy is largely a matter of good fortune" and "I am often confused about what to do to stay healthy", respectively. Those of importance of health and self-awareness were "I think about my health a lot" and "If I exercise and eat right, I'm almost certain to stay healthy", respectively. For example, the 'center of control' sub-dimension was defined as the perception that the person reflects the disease to his/her own world, regardless of the disease diagnosis. PHS includes positive (Items 1, 5, 9, 10, 11, and 14) and negative (items 2, 3, 4, 6, 7, 8, 12, 13, and 15) statements. Negative statements are reverse-scored, and a minimum of 15 points and a maximum of 75 points are obtained from the scale. Cronbach's alpha values of the study, which were validated by Kadioğlu and Yıldız, were 0.90, 0.91, 0.82, and 0.91 for the control of the center, certainty, importance of health, and self-awareness sub-dimensions, respectively (32). In the present study, Cronbach's alpha was determined to be 0.74, 0.89, 0.80, and 0.69 for the four above-mentioned sub-dimensions, respectively.

*State-Trait Anxiety Inventory:* This scale, developed by Spielberger et al and validated by Öner and Le Compte, determines the state anxiety level of the individual (35, 36). It is a 40-item self-report scale that assesses separate dimensions of "state" and "trait" anxiety. The State Anxiety Inventory consists of 20 items and has a four-point Likert-type scale (1 = none, 2 = somewhat, 3 = a lot, and 4 = completely), and 10 items (1, 2, 5, 8, 10, 11, 15, 16, 19, and 20) are reversely coded. The scale items evaluate the expressed emotions or behaviors according to the severity of the experiences. The total score obtained from the scale varies between 20 and 80, and the level of anxiety

increases with an increase in the score (36). In the present study, Cronbach's alpha was 0.91.

### Data Collection

The informed consent form was obtained from the patients who met the inclusion criteria. Data forms were collected by the researchers using the face-to-face interview technique. It took approximately 15 minutes to complete the forms. A total of 350 surgical patients were invited to the study, out of whom 32 refused to participate, and 3 were excluded from the study because they did not complete the questionnaire. Finally, the study was completed with 315 participants.

### Data Analysis

The data were evaluated using IBM SPSS Statistics Standard Concurrent User V 26 (IBM Corp., Armonk, New York, USA) statistical package programs. Descriptive statistics were expressed as the number of units (n), percentages (%), means (X), standard deviations (SD), medians (M), and minimum (Min) and maximum (Max) values. The reliability of the scales was analyzed with Cronbach's alpha coefficient. Scales with a Cronbach's alpha coefficient above 0.60 were considered reliable. It is decided that the data are normally distributed if the skewness value is below  $\pm 2.0$  and the kurtosis value is below 7.0 (37). According to Table 1, it was found that the scale scores were suitable for a normal distribution. In addition, Shapiro-Wilk normality test results showed that the data were normally distributed ( $P > 0.05$ ). A Student's t-test was used to compare two groups, and the analysis of variance was utilized to compare variables with more than two categories. Multiple comparisons were made with the Bonferroni test. Normal distribution tests were employed since the skewness was (-2)-(+2) and the kurtosis was below 7. The relationships between numerical variables were analyzed with the Pearson correlation coefficient. The effect of measurements on health perception was evaluated by multiple linear regression analysis. In univariate comparisons, significant characteristics were considered confounding factors, and these variables were included in the regression models. Categorical variables were included in the analyses as dummy variables. The Durbin-Watson value was checked for the autocorrelation between residuals, and  $P < 0.05$  was considered statistically significant.

### Results

The results (Table 1) revealed that the mean total health perception scores of people under 35 years of age were statistically lower than those of people over 35 years of age ( $P < 0.05$ ). The mean total health perception scores of people with primary or secondary education were statistically higher compared to those with high school or higher education ( $P < 0.05$ ). Based on the findings, the mean total health perception scores of people with low income were statistically higher than those of individuals

with medium and high income ( $P < 0.05$ ). The results further demonstrated that the mean total health perception scores of people with poor health status were statistically higher in comparison to people with moderate and good health status ( $P < 0.05$ ). The mean total health perception scores of hospitalized people were statistically higher than those of non-hospitalized people ( $P < 0.05$ ). The obtained data indicated that the mean total health perception scores of people who underwent surgery were statistically higher than those who did not ( $P < 0.05$ ).

Based on the findings (Table 2), the mean total score of the health perception scale was  $43.78 \pm 6.52$  points. The scale consisted of four dimensions, namely, center of control, certainty, importance of health, and self-awareness. Cronbach's alpha reliability coefficient of the scale was 0.733, and the mean total score of the state anxiety scale was  $41.10 \pm 10.89$  points. The scale consisted of one dimension. Cronbach's alpha reliability coefficient of the scale was 0.912. The mean total health perception scores of people under 35 years of age were statistically lower than those of people over 35 years of age ( $P < 0.05$ ). The results revealed that the mean total health perception scores of people with primary or secondary education were statistically higher compared to those with high school or higher education ( $P < 0.05$ ). The mean total health perception scores of people with low income were statistically higher than those with medium and high income ( $P < 0.05$ ).

There was a statistically significant positive relationship between health perception and anxiety ( $P < 0.05$ ). A one-unit increase in the anxiety score could increase the health perception score by 0.081 points. Anxiety explains health perception scores at the level of 1.8% ( $P < 0.05$ , Figure 1).

Table 3 presents the data on the effect of age, educational status, income status, health status, hospitalization, history of surgery state, and anxiety scores on health perception scores evaluated by multiple linear regression analysis. The models were statistically significant ( $F = 7,769$ ,  $P < 0,001$ ). The Durbin-Watson value was found to be 1.974. According to the model, a one-unit increase in the anxiety score increased the health perception score by 0.077 points. One unit increase in age led to an increase in the health perception score by 1.512 points ( $P < 0.05$ ). When education increased by one level, the health perception score decreased by 1.765 points ( $P < 0.05$ ). Although income status, health status, hospitalization, and surgery history were important

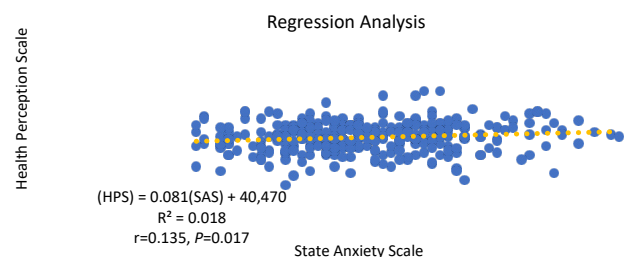


Figure 1. Relationship Between Health Perception and Anxiety

**Table 1.** Comparison of the Effect of Demographic Characteristics on Health Perception Scores (N=315)

	No. (%)	Health Perception Scale	Test (P)	Difference (Post Hoc)
<b>Age</b>				
18-34 years old <sup>a</sup>	106 (33.70)	41.38±6.74	F=12.603 P<0.001*	a<(b=c)
35-65 years old <sup>b</sup>	133 (42.20)	44.56±6.74		
Over 65 years old <sup>c</sup>	76 (24.10)	45.78±4.58		
<b>Gender</b>				
Female	175 (55.60)	43.53±6.88	t=0.786 P=0.432	-
Male	140 (44.40)	44.11±6.03		
<b>Education status</b>				
Primary-secondary education <sup>a</sup>	170 (54.00)	45.55±5.34	F=15.071 P<0.001*	a>(b=c)
High school - Associate degree <sup>b</sup>	96 (30.50)	41.97±6.40		
Bachelor's degree <sup>c</sup>	49 (15.60)	41.20±8.48		
<b>Marital status</b>				
Married	255 (81.00)	44.08±6.37	t=1.679 P=0.094	-
Single	60 (19.00)	42.52±7.01		
<b>Area of residence</b>				
City center	151 (47.90)	43.15±6.71	F=2.243 P=0.108	-
District, town	131 (41.60)	44.03±6.33		
Village, rural area	33 (10.50)	45.70±6.07		
<b>Living with someone</b>				
Single life	33 (10.50)	43.67±6.74	F=0.815 P=0.444	-
Nuclear family	258 (81.90)	43.65±6.37		
Extended family	24 (7.60)	45.42±7.78		
<b>Employment status</b>				
Yes	84 (26.70)	43.46±6.31	F=0.596 P=0.552	-
No	182 (57.80)	44.10±7.29		
Retired	49 (15.60)	44.47±5.89		
<b>Income status</b>				
Income lower than expenditure <sup>a</sup>	17 (5.40)	50.41±4.85	F=10.07 P<0.001*	a>(b=c)
Income equal to expenditure <sup>b</sup>	186 (59.00)	43.60±6.16		
Income more than expenditure <sup>c</sup>	112 (35.60)	43.08±6.80		
<b>Smoking</b>				
There is	203 (64.40)	43.92±6.59	t=0.484 P=0.629	-
None	112 (35.60)	43.54±6.40		
<b>Alcohol use</b>				
There is	178 (56.50)	44.03±6.65	t=0.757 P=0.450	-
None	137 (43.50)	43.47±6.35		
<b>Eating pattern</b>				
I never pay attention	81 (25.70)	44.65±5.74	F=1.072 P=0.344	-
I miss it sometimes	124 (39.40)	43.66±6.23		
Yes	110 (34.90)	43.28±7.31		
<b>Daily activity</b>				
I never do	132 (41.90)	44.27±5.72	F=0.648 P=0.524	-
I do it occasionally	115 (36.50)	43.49±6.45		
Yes	68 (21.60)	43.34±7.97		
<b>Regular doctor check-up</b>				
Yes	169 (53.70)	43.56±6.55	t=-0.667 P=0.505	-
No	146 (46.30)	44.05±6.49		

Table 1. Continued

	No. (%)	Health Perception Scale	Test (P)	Difference (Post Hoc)
<b>Health status</b>				
Bad <sup>a</sup>	23 (7.30)	47.61 ± 5.20	F = 4.363 P = 0.005*	a > (b = c = d)
Medium <sup>b</sup>	115 (36.50)	43.99 ± 6.02		
Good <sup>c</sup>	151 (47.90)	43.50 ± 6.72		
Very good <sup>d</sup>	26 (8.30)	41.12 ± 7.19		
<b>Chronic disease</b>				
There is <sup>a</sup>	104 (33.00)	43.30 ± 7.34	t = -0.929 P = 0.353	-
None <sup>b</sup>	211 (67.00)	44.02 ± 6.07		
<b>Hospitalization</b>				
There is <sup>a</sup>	295 (93.70)	44.01 ± 6.50	t = 2.346 P = 0.020*	a > b
None <sup>b</sup>	20 (6.30)	40.50 ± 5.91		
<b>History of surgery</b>				
There is <sup>a</sup>	285 (90.50)	44.03 ± 6.55	t = 2.059 P = 0.040*	a > b
None <sup>b</sup>	30 (9.50)	41.47 ± 5.75		

Note. ANOVA: Analysis of variance. Student's t Test (t); ANOVA (F); Descriptive statistics are expressed as means and standard deviations (SD).

\* Statistically significant (P < 0.05). Superscripts a, b, c, d in the row indicate the difference between groups.

Table 2. Descriptive Statistics and Reliability Results for the Scales (N = 315)

	Statistics	Number of item	Cronbach's alpha
<b>Center of control</b>			
Mean ± SD	16.92 ± 3.71	5	0.745
Median (Min-Max)	17 (8-25)		
<b>Certainty</b>			
Mean ± SD	12.99 ± 3.05	4	0.695
Median (Min-Max)	13 (4-20)		
<b>Importance of health</b>			
Mean ± SD	6.40 ± 2.17	3	0.895
Median (Min-Max)	6 (3-13)		
<b>Self-awareness</b>			
Mean ± SD	7.50 ± 1.92	3	0.807
Median (Min-Max)	7 (3-13)		
<b>Mean ± SD</b>			
Median (Min-Max)	43.78 ± 6.52	15	0.733
Mean ± SD	44 (23-64)		
<b>State anxiety scale</b>			
Mean ± SD	41.10 ± 10.89	20	0.912
Median (Min-Max)	40 (20-72)		

SD, Standard deviation

for the model, the regression coefficients on health perception were not statistically significant ( $P > 0.05$ ). According to the model, age, educational status, income status, health status, hospitalization, and surgical history could explain the state anxiety scores of health perception at the level of 15%.

## Discussion

Measurement of health perception includes assessments of the dimensions of *health* as well as the physical, mental, and social functionality of perceived well-being (38). It is

highly important to determine the health perceptions of patients to ensure compliance with the postoperative period (27). Anxiety, which is common with the stress of having surgery (39,40), may be affected by health perception. This study, which was conducted to examine the relationship between health perception and the preoperative anxiety levels of surgical patients, was discussed within the scope of the literature. The researchers found that there was a positive relationship between health perceptions and state anxiety. Age, educational status, income, health status, hospitalization, history of surgery, and preoperative anxiety were found to have a 15% effect on the health perception of surgical patients.

In another study in which the characteristics of the participants were the same, similar results were observed with this study (41). In addition, it was reported that the health perceptions and anxiety of surgical patients were at a moderate level (28). Although the participants in the current study had moderate levels of health perception and state anxiety and perceived their health status as good (Table 2), we think that patients actually have risk factors that may predispose them to various diseases.

Health perception is an important concept that changes human behavior (42). We found that the health perception and anxiety levels of the participants included in the study were moderate ( $43.78 \pm 6.52$  and  $41.10 \pm 10.89$ , respectively), and there was a positive relationship between health perception and anxiety. Anxiety explained 1.8% of the health perception score (Figure 1), while age, educational status, income status, health status, hospitalization, history of surgery, and state anxiety scores explained 15% of the health perception score according to the model created in the study (Table 3). Although there are limited studies on the subject, while it was reported that health perception and anxiety levels increased together in pregnant women (43), it was found that there

**Table 3.** The Effect of Health Perception Scores on Anxiety and Demographic Characteristics (N=315)

	$\beta$	SE	z $\beta$	t	P	95% Confidence Interval for $\beta$	
						Lower	Upper
Model: Health perception							
Constant	41.469	3.033		13.671	0.000	35.501	47.438
State anxiety	0.077	0.032	0.129	2.416	0.016	0.014	0.140
Age	1.512	0.492	0.175	3.074	0.002	0.544	2.480
Education status	-1.765	0.494	-0.201	-3.570	0.000	-2.737	-0.792
Income status	-0.907	0.647	-0.079	-1.402	0.162	-2.181	0.367
Health status	-0.310	0.508	-0.036	-0.611	0.542	-1.310	0.689
Hospitalization	0.771	2.387	0.029	0.323	0.747	-3.925	5.468
History of surgery	1.410	1.986	0.064	0.710	0.478	-2.498	5.318

DW, Durbin-Watson. Model significance:  $F=7.769$ ,  $P<0.001$ ,  $R^2=0.150$ ,  $DW=1.974$

was a significant positive relationship between disease perception and anxiety level of surgical patients in the preoperative period (44). The health perception level of patients who underwent cardiac surgery was significantly lower than that of patients who did not undergo cardiac surgery (45). Furthermore, it has been demonstrated that the anxiety level of patients who would undergo major surgery has been significantly higher in the preoperative period (46,47). Further, although interventions such as open heart surgery are frightening for patients, it has been reported that the health perceptions of patients over 70 years of age have increased after heart surgery compared to before heart surgery (48). These studies revealed that health perception increases with a decrease in anxiety levels. However, individuals with good health perceptions may experience higher levels of anxiety. Anxiety about one's health perception is a motivating force in leading healthy life behaviors. Health perception affects the development of positive behaviors related to the disease, adaptation to the disease, and improvement of functional status (41). The high state-trait anxiety level in individuals with high health perception may be related to the patient's ability to obtain information in the preoperative period, to understand the medical information obtained, and to interpret and evaluate this information. Accordingly, knowledge of the disease and its consequences can be considered a factor that increases the state-trait anxiety level. A high positive health perception may not always have a positive effect on preoperative anxiety. In this study, the level of state anxiety had a direct predictive effect on patients' perceptions of health, but when other mediating factors intervened, the effect on anxiety increased as much as possible.

### Limitations Research

There are few studies on this subject, and the results can only be generalized to this patient group since the research was conducted on patients who had surgery at the surgical clinics of the hospital where the research was conducted. The reliability of the data reported here is limited to the information provided by the patients since the data have been collected with questionnaire forms using the face-to-

face interview method.

### Conclusion

This study examined the effects of primarily state anxiety and mediating factors on the preoperative health perception of surgical patients. The researchers found that there was a positive relationship between health perceptions and state anxiety. Age, educational status, income, health status, hospitalization, history of surgery, and preoperative anxiety were found to have a 15% effect on the health perception of surgical patients. More comprehensive studies should be conducted on the rates of factors affecting health perception. Surgical nurses should attempt to understand their patients' preoperative anxiety and the factors affecting this parameter. Understanding the cause of preoperative anxiety will help reduce anxiety in patients.

### Authors' Contribution

**Conceptualization:** Özlem Şahin Akboğa, Yurdagül Günaydın.

**Data curation:** Özlem Şahin Akboğa, Esra Arıca Özbudak.

**Formal analysis:** Özlem Şahin Akboğa, Yurdagül Günaydın.

**Funding acquisition:** Özlem Şahin Akboğa.

**Investigation:** Özlem Şahin Akboğa, Yurdagül Günaydın, Esra Arıca Özbudak.

**Methodology:** Özlem Şahin Akboğa, Yurdagül Günaydın.

**Project administration:** Özlem Şahin Akboğa.

**Resources:** Özlem Şahin Akboğa.

**Software:** Özlem Şahin Akboğa, Yurdagül Günaydın.

**Supervision:** Özlem Şahin Akboğa, Yurdagül Günaydın.

**Validation:** Özlem Şahin Akboğa, Yurdagül Günaydın.

**Visualization:** Özlem Şahin Akboğa.

**Writing—original draft:** Özlem Şahin Akboğa, Yurdagül Günaydın.

**Writing—review & editing:** Özlem Şahin Akboğa, Yurdagül Günaydın, Esra Arıca Özbudak.

### Competing Interests

None declared.

### Ethical Approval

Before starting the research, ethical approval was obtained from the local ethics committee (Decision No. 01/26 Date: January 25, 2023) and then institutional permission. Patients participating in the research also gave written informed consent.

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