

Relationship Between Patients' Anxiety Levels Before Open Heart Surgery With Postoperative Symptoms*

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Abstract

Objective: It was aimed to assess the relationship between patients' anxiety levels before open heart surgery with postoperative pain, dyspnea, and nausea-vomiting in this study.

Method(s): The study was performed between September 2017 and April 2018 with 77 patients who underwent open heart surgery after obtaining ethical approval. Before the surgery, the "Anxiety Specific to Surgery Questionnaire" and patient information forms were completed, while after the surgery, the "Visual Analogue Scale for Pain", the "Modified Borg Scale" and the "Rhodes Index of Nausea, Vomiting, and Retching" were implemented within three days after the patients were discharged from the intensive care unit to follow-up services.

Results: The average age of the patients was 58.63±11.85; 72.7% of the patients were male and 46.8% were overweight. The patients were determined to experience medium-level anxiety before open heart surgery. The total anxiety and nausea-vomiting-retching distress scores obtained by the females were higher than those obtained by the males. A positive statistical correlation was detected in mid-levels between pain and dyspnea and in low levels between pain and nausea-vomiting.

Conclusion: The patients were determined to experience medium-level anxiety before open heart surgery, and it was found that there was no relationship between anxiety and pain, dyspnea, or nausea-vomiting.

Keywords: Anxiety, cardiac surgery, dyspnea, nausea, pain

Açık Kalp Ameliyatı Öncesi Hastaların Kaygı Düzeylerinin Postoperatif Semptomlar ile İlişkisi

Özet

Amaç: Bu çalışmada açık kalp ameliyatı öncesi hastaların kaygı düzeylerinin ameliyat sonrası ağrı, dispne ve bulantı-kusma ile ilişkisinin değerlendirilmesi amaçlandı.

Yöntem: Araştırma, etik kurul onayı alındıktan sonra Eylül 2017-Nisan 2018 tarihleri arasında, açık kalp ameliyatı geçiren 77 hastayla gerçekleştirildi. Ameliyat öncesi "Ameliyata Özgü Kaygı Ölçeği" ve hasta bilgi formu; ameliyat sonrası yoğun bakımdan servise nakledildikten sonraki 3 gün içerisinde ağrı için "Görsel Analog Skala", "Modifiye Borg Skalası" ve "Rhodes Bulantı-Kusma ve Öğürme İndeksi" uygulandı.

Bulgular: Katılımcıların yaş ortalamasının 58,63±11,85, %72,7'sinin erkek, %46,8'inin fazla kilolu olduğu tespit edildi. Açık kalp ameliyatı öncesi hastaların orta düzeyde kaygı yaşadığı belirlendi. Kadınların toplam

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kaygı ve bulantı-kusma-öğürme sıklığı puan medyanları erkeklere göre daha yüksek bulundu. Ağrı ile dispne arasında orta seviyede, ağrı ile bulantı-kusma arasında ise düşük seviyede pozitif yönde istatistiksel olarak anlamlı bir ilişki bulundu.

Sonuç: Açık kalp ameliyatı öncesi hastaların orta düzeyde kaygı yaşadığı, kaygı ile ağrı, dispne, bulantı-kusma arasında ilişki bulunmadığı belirlendi.

Anahtar Kelimeler: Ağrı, anksiyete, bulantı, dispne, kardiyak cerrahi

INTRODUCTION

Cardiovascular diseases (CVD) rank first among the significant causes of mortality and morbidity worldwide and in Turkey. Therefore, cardiac surgery's importance increases gradually (1). The purpose of postoperative care is to prevent or minimize all possible complications as much as possible (2). Patient anxiety before surgery is one of the risk factors that increase the probability of complication incidence. In various studies, patients have been reported to experience high levels (60-80%) of anxiety within this period (3-5). In the case of experiencing high levels of anxiety and stress for a prolonged time, the stress response triggered by the body increases hormone levels. It causes more anesthetic materials to be used during surgery, more intense pains to be experienced postoperatively and consequently more need for analgesia and gastrointestinal (such as nausea or vomiting), cardiac (such as tachycardia), and respiratory (such as dyspnea) complications to appear. To eliminate these negativities, it is important to determine the anxiety levels before educate patients, and providing psychological support (3).

When the literature is analyzed, it appears that studies generally focus on pain experienced by patients having undergone cardiac surgery, but other symptoms have not been examined in depth. From this point of view, this study was designed to assess the relationship between patients' anxiety levels before open heart surgery with postoperative pain, dyspnea, and nausea-vomiting.

Our hypotheses were as follows;

H₁: The anxiety level is high before open heart surgery.

H₂: The anxiety level before open heart surgery varies based on gender.

H₃: As the anxiety level before open heart surgery increases, so does the intensity of postoperative pain.

H₄: As the anxiety level before open heart surgery increases, so does the intensity of postoperative dyspnea.

H₅: As the anxiety level before open heart surgery increases, so does the intensity of postoperative nausea & vomiting.

H₆: As the intensity of postoperative pain increases, so does the intensity of dyspnea.

H₇: As the intensity of postoperative pain increases, so does the intensity of nausea & vomiting.

METHODS

Type of The Study

The study was designed to be descriptive to assess the relationship between patients' anxiety levels before their open-heart surgery with postoperative pain, dyspnea, and nausea-vomiting in the cardiovascular surgery clinic of a training and research hospital of a university located in Turkey.

The Population and The Sample of The Study

The population of the study was constituted of 140 patients who underwent open heart surgery between October 2017 and May 2018, while its sample was constituted of volunteer patients who underwent open heart surgery between the aforementioned dates, suitable for the inclusion criteria of the study, and granting verbal/written consent. The study was completed with 77 patients in total as 17 patients were excluded from the study due to their unsuitability for the inclusion criteria and 12 patients could not be reached after surgery.

The number of patients included in the sample of the study (n=77) indicated that the minimum number of patients to be included in the sample based on the simple random sampling formula with a known population number was reached (6,7).

The formula used:

$$n = \frac{Nt^2pq}{d^2(N-1) + t^2pq}$$

N: The number of patients in the population

n: The number of patients to be included in the sample

p: Prevalence of the case to be analyzed

q: Infrequency of the case to be analyzed

t: Value of the t table within a specific degree of freedom and margin of error (1.96)

d: The intended deviation based on the prevalence of the case (0.075)

α : Margin of error

$$\frac{140 \times (1,96)^2 \times (0,5) \times (0,5)}{(0,075)^2 \times (140 - 1) + (1,96)^2 \times (0,5) \times (0,5)} = 77$$

Data Collection Tools

Patient Information Form: This form, containing 21 questions, was created by the researcher who scanned the studies on the subject matter in the literature (1,8). These questions included information such as age, gender, height, weight, marital status, educational level, profession, health insurance, place of residence, and income status.

Anxiety Specific to Surgery Questionnaire (ASSQ): This questionnaire, developed by Karancı & Dirik (2003), is a 5-point Likert scale composed of 10 questions regarding the worries/anxieties possibly to be experienced by patients about surgery (9). In the evaluation of the scale, the total

score obtained by summing the answers given to all items (1 point: do not agree at all, 5 points: completely agree) is used. Only the 8th item that “I think I will get rid of all the pain and distress after surgery” is scored by reverse coding. The highest score to be obtained from the scale is 50 (no cut-off score), and higher scores indicate higher anxiety levels (9).

Visual Analogue Scale For Pain (VAS Pain): This scale has a scoring system beginning from the statement “No pain (0)” through “Excruciating pain (10)” (10).

Modified Borg Scale (MBS): Developed by Borg to measure the amount of effort and capacity spent during physical activity, this scale is also used to measure the intensity of dyspnea during rest (11). The scale points range from 0 (no dyspnea) to 10 (severe dyspnea), and increasing scores are associated with increasing dyspnea severity.

Rhodes Index of Nausea, Vomiting, and Retching (RINVR): The validity and reliability tests of the scale, developed by Rhodes and McDaniel in 1999 and having three sub-dimensions, namely Symptom Experience, Symptom Occurrence, and Symptom Distress, were carried out by Tan & Genç (2010) (12). Eight items are measuring the number and the intensity of nausea/vomiting/retching periods experienced by the patients in the last 24 hours. In the assessment of the scale, the

score obtained by summing the responses to all items related to nausea-vomiting-retching experiences is used. The responses to the items are scored as 0=least distress level and 4=maximum distress level. Items 1, 3, 6, and 7 are reversed when adding points. The maximum score to be obtained from the scale is 32, and the level of distress is indicated to increase as the score gets higher (12,13). The scoring of the sub-scales is as follows (Table1).

Table 1: Calculation of Subscale Scores of RINVR

Calculation of Subscale Scores		
Symptom experience	Scale items	Potential score range
Nausea experience	4,5,7	0-12
Vomiting experience	1,3,6	0-12
Retching experience	2,8	0-12
Total symptom experience	All items	0-32
Symptom occurrence	Scale items	Potential score range
Nausea occurrence	4,7	0-8
Vomiting occurrence	1,6	0-8
Retching occurrence	8	0-4
Total symptom occurrence	All items	0-20
Symptom experience	Scale items	Potential score range
Nausea distress	5	0-4
Vomiting distress	3	0-4
Retching distress	2	0-4
Total symptom distress	All items	0-12

Data Collection Process

Data were collected through the face-to-face question-and-answer interview

method. "Patient Information Form" and "Anxiety Specific to Surgery Questionnaire" were filled before surgery to determine the anxiety levels of the patients projected to undergo open heart surgery. Filling out these forms lasted for about 5 to 10 minutes.

Within three days after being transferred from the intensive care unit to follow-up services following surgery; "Visual Analogue Scale for Pain," "Modified Borg Scale," and "Rhodes Index of Nausea, Vomiting, and Retching" were implemented to determine and assess the pain levels, the intensity of dyspnea, nausea & vomiting, respectively. Filling out these scales lasted for about 15 minutes.

Statistical Analysis

Data were analyzed by being transferred to the licensed software IBM SPSS Statistics 23. After the Kolmogorov-Smirnov test for normality was performed along with descriptive statistics (mean, standard deviation, and frequency distribution), the data were assessed with the Mann-Whitney U, Spearman's rank correlation, and the Kruskal-Wallis tests as they did not fit the normal distribution.

Ethical Aspects

Before starting the study, the necessary approvals were obtained from the institution at which the study would be

carried out. The ethics committee approval number 71522473/050.01.04/165, 04/10/2017 from University Faculty of Medicine Non-Invasive Investigation Ethics Committee, scale consents from the researchers have performed the validity and reliability tests of the scales used in the study, and verbal/written consent from the participants were all obtained.

RESULTS

It was determined that the average age of the patients participating in the study was 58.63 ± 11.85 (min=18, max=78), 72.7% (n=56) of the patients were male, their body mass index (BMI) average was 28.46 ± 4.48 (with 46.8% overweight), 85.7% (n=66) were married, 67.5% (n=52) were primary school graduates, and 44.2% (n=34) were retired (Table 2).

The patients were assessed within 4.52 ± 2.024 days on average after surgery. In the preoperative period, the ASSQ mean score of the patients was 22.69 ± 6.273 , and they were observed to experience medium-level anxiety. In the postoperative period, their VAS Pain mean score was determined to be 1.94 ± 2.467 and they were accordingly observed to experience mild pain while regarding the intensity of dyspnea, their MBS mean score was 0.91 ± 1.720 and they were determined to have very mild dyspnea. Also, in the postoperative period, their RINVR mean

score was calculated to be 1.21 ± 2.993 , and they were determined to experience mild

nausea/vomiting/retching based on the sub-dimensions of the scale, namely Symptom

Table 2: Introductory Information Regarding the Patients (n=77)

Introductory Information		n	%*
Age	Mean±SD**=58.63±11.85 (min-max:18-78)		
Gender	Female	21	27.3
	Male	56	72.7
BMI ^a Mean±SD=28.46±4.481 (min-max:15.7-39.2)	Thin	3	3.9
	Normal weight	12	15.6
	Overweight	36	46.8
	Class I obese	22	28.6
	Class II obese	4	5.2
Marital status	Married	66	85.7
	Single	11	14.3
Educational background	Primary school	52	67.5
	Secondary school through associate degree	25	32.5
Profession	Retired	34	44.2
	Officer (public + private sector)	22	28.6
	Housewife	21	27.3
Health insurance	Yes	76	98.7
	No	1	1.3
Place of residence	City	36	46.8
	Rural/district/town	41	53.2
Income status	Income less than expenses	15	19.5
	Income equal to expenses	56	72.7
	Income more than expenses	6	7.8
Chronic disease status	Yes, DM ^b + HT ^c	22	28.6
	Yes, HT	20	26.0
	No	24	31.2
Smoking	No, I do not smoke	52	67.5
	6-10 times	5	6.5
	16-20 times	6	7.8
	More than one package	14	18.2
Constant medicine intake	No	21	27.3
	Yes	56	72.7
Surgical history	No	40	51.9
	Yes	37	48.1
Incidence of heart disease in the family	No	24	31.2
	Yes, mother	12	15.6
	Yes, father	12	15.6
	Yes, sibling	15	19.5
	More than one cardiac patient in the family	14	18.2
Informed about their disease/surgery before the operation	No	44	57.1
	Yes	33	42.9
Total		77	100

* Percentages within 77 people; ** SD: Standard deviation;

^a BMI: Body-Mass Index; ^b DM: Diabetes Mellitus; ^c HT: Hypertension

Experience, Symptom Occurrence, and Symptom Distress (Table 3).

The female participants' anxiety levels were determined to be higher than those of the males based on their total ASSQ scores

and Retching Experience, Retching Distress, and Total Symptom Distress score medians ($p < 0.05$). It was also found that nausea/vomiting/retching distress levels were significantly higher in those

with surgical history, and the levels of pain decreased as the number of postoperative days increased ($p < 0.05$).

Table 3: Descriptive Statistics from the Scales (n=77)

Scale	Mean±SD	Min-Max
Pain Level	1.94±2.467	0.0-9.0
Borg Scale	0.91±1.720	0.0-8.0
ASSQ^a	22.69±6.273	10.0-39.0
RINVR^b	1.21±2.993	0.0-14.0
Nausea Experience	0.73±1.978	0.0-10.0
Vomiting Experience	0.03±0.228	0.0-2.0
Retching Experience	0.45±1.095	0.0-5.0
Total Symptom Experience	1.21±2.993	0.0-14.0
Nausea Occurrence	0.48±1.382	0.0-8.0
Vomiting Occurrence	0.00±0.000	0.0-0.0
Retching Occurrence	0.22±0.620	0.0-4.0
Total Symptom Occurrence	0.70±1.906	0.0-12.0
Nausea Distress	0.25±0.672	0.0-3.0
Vomiting Distress	0.03±0.228	0.0-2.0
Retching Distress	0.23±0.626	0.0-3.0
Total Symptom Distress	0.51±1.324	0.0-6.0

^a ASSQ: Anxiety Specific to Surgery Questionnaire

^b RINVR: Rhodes Index of Nausea, Vomiting, and Retching

No correlation was found between the patient’s anxiety levels before surgery (total ASSQ score) and their postoperative pain, dyspnea (MBS), nausea/vomiting/retching (total RINVR score), ($p > 0.05$). In other words, anxiety before surgery was determined to have no relationship with postoperative pain, dyspnea, nausea/vomiting/retching, A statistically significant medium-level positive correlation between pain levels and dyspnea, and a statistically significant low-level positive correlation between pain levels and nausea/vomiting/retching. It

means that as pain levels increased, so did the intensity of dyspnea and nausea/vomiting/retching (Table 4).

Table 4: Examination of the Correlation among the Scale Score Medians (n=77)

Correlation of Scales		Borg Scale	ASSQ ^a	RINVR ^b
Pain level	r	0.303	0.118	0.230
	p	0.007**	0.309	0.044*
Borg Scale	r		0.120	0.118
	p		0.298	0.305
ASSQ^a	r			0.123
	p			0.287

* $p < 0.05$; ** $p < 0.01$

^a ASSQ: Anxiety Specific to Surgery Questionnaire

^b RINVR: Rhodes Index of Nausea, Vomiting, and Retching

DISCUSSION

It has been reported in the literature that the process of hospitalization is by itself a source of anxiety, and patients admitted to surgical clinics experience more anxiety due to the feeling of being hospitalized coupled with concerns over such things as bleeding, death, and fear of ambiguity (3,14). It has also been stated in the literature that the heart is symbolically the center of life, and consequently, it brings about more anxiety than other surgical interventions for patients and their families (15,16).

In this study, the patients were determined to experience medium-level anxiety before surgery and the H₁ hypothesis was accepted. However, there are varying results regarding whether patients undergoing open heart surgery experience medium-level, low-level, or high-level anxiety in the literature (14,17,18). In

addition, it is observed that females experienced more anxiety according to the total ASSQ scores, which is in parallel with results from other studies (14,16,19). The H₂ hypothesis was accepted as anxiety manifested at different levels in males and females. We can correlate the issue of females experiencing more anxiety with their ability to express their feelings more easily than males do or their concerns over whether they will change their roles and responsibilities within their families after surgery.

Post-cardiac surgery pain is one of the most frequently encountered problems. In this study, the patients were determined to experience mild pain during the postoperative period (VAS=1.94±2.467). It is stated in the literature that pain is experienced more intensely, especially within the first 48-72 hours after surgery, but it decreases significantly from the second or third day through the seventh day after surgery (20,21). Therefore, it was expected that the patients would experience "mild pain" as they were assessed within 4.52±2.024 days on average after surgery within the scope of this study. Likewise, in other studies, it has been observed that patients assessed within the first 48-72 days and afterward experienced mild pain (21-23).

Anxiety is claimed to increase the felt pain and indirectly the need for analgesia by

raising the neuroendocrine response levels caused by postoperative stress (1,3). Nevertheless, as there are studies stating that anxiety experienced before surgery affects postoperative pain, there are also studies that state the opposite (1,24,25). In this study, the anxiety experienced before surgery was determined to not affect postoperative pain, and consequently, the H₃ hypothesis was rejected. We can explain with the probability that anxiety claimed to be experienced in varying degrees by patients in studies will likewise have varying effects on symptoms.

In this study, the H₆ hypothesis was accepted as it was found that the patients experienced very mild levels of dyspnea whose intensity increased as the postoperative pain levels got higher. Even though there are studies claiming that anxiety increases the intensity of dyspnea, especially in patients with respiratory diseases, it was contrarily found in this study that anxiety levels before surgery did not affect postoperative dyspnea, so the H₄ hypothesis was rejected (26,27). It is known that patients experience dyspnea as a result of the fact that the inspiratory capacity declines due to the incisional pain felt while breathing deeply or coughing (28,29). Thus, the gradual decrease in postoperative pain will lead to the inspiratory capacity to recover and the respiratory system being relieved.

Therefore, the conclusion that the intensity of dyspnea was found to be at low levels as 72 hours on average passed after surgery is by results from the literature. When the studies examining the correlation between post-sternotomy pain following open heart surgery and the respiratory system functions are analyzed, it appears that the results of this study are in parallel with such studies as aforementioned (30-32).

Postoperative nausea and vomiting (PONV) are one of the common complaints that are seen in and stressing patients despite technological and pharmacological developments (33,34). PONV generally occurs in the early postoperative period. However, patients undergoing cardiac surgery report GIS symptoms occurring up to 4-6 weeks after surgery (34). In this study, it was determined that the patients experienced mild nausea/vomiting/retching based on the Rhodes Index of Nausea, Vomiting, and Retching and its sub-dimensions of Symptom Experience, Symptom Occurrence, and Symptom Distress but anxiety before surgery did not affect on postoperative nausea/vomiting. Thus, the H₅ hypothesis was rejected. It was also found in our study that the distress levels were higher in females and patients with surgical histories, and as the pain levels increased, distress also increased, leading the H₇ hypothesis to be accepted. As is

known, pain has a stimulating effect on GIS (28,33). The results of our study bear similarities to the results of other studies found in the literature (34,35). We can correlate higher distress levels regarding nausea/vomiting/retching in patients with surgical history with the fact that they have experienced PONV before.

CONCLUSION AND RECOMMENDATIONS

In conclusion, patients have been determined to experience medium-level anxiety before open heart surgery, and the complaints of dyspnea and nausea/vomiting have been found to increase as postoperative pain gets more intense. However, no correlation has been determined to exist between anxiety and pain, dyspnea, and nausea/vomiting. We think that the correlation between anxiety and symptoms can be put forward more clearly if the sample is numerically increased and monitored regularly for a long time in the postoperative period.

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