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ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

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Evaluation of Kinesiophobia and Fatigue Levels of Patients Who Have Undergone Open Heart Surgery

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ABSTRACT

Purpose: This study aimed to determine the kinesiophobia and fatigue levels of patients who underwent open heart surgery.

Methods: The study was conducted with 176 patients who underwent traditional open heart surgery in the cardiovascular surgery clinic of a hospital located in Trabzon, Turkey. The data were gathered using a personal information form, the Tampa Kinesiophobia Scale, and the Piper Fatigue Scale.

Result: It was determined that patients had high levels of kinesiophobia and moderate levels of fatigue. A statistically meaningful difference was found between mean total Tampa Kinesiophobia Scale scores and age and employment status and between the mean total Piper Fatigue Scale scores and subscale scores of patients according to gender, body mass index, and employment status. There was a statistically significant positive and moderate correlation between patients' Tampa Kinesiophobia Scale scores and the behavioral, affectivity, and sensory subscales and total score of the Piper Fatigue Scale while there was significant, positive, and weak correlation with the cognitive subscale of the Piper Fatigue Scale.

Conclusion: Considering the kinesiophobia and fatigue levels of patients undergoing open heart surgery in the nursing care process before and after surgery may be useful for the performance of physical activities that will contribute to recovery.

Keywords: Cardiovascular surgery, care, fatigue, kinesiophobia.

Açık Kalp Ameliyatı Geçiren Hastalarda Kinezyofobi ve Yorgunluk Düzeylerinin Değerlendirilmesi

ÖZET

TÜRKÇE ANAHTAR SÖZCÜKLER EKLEYİNİZ. Amaç: Bu çalışmada açık kalp ameliyatı geçiren hastaların kinezyofobi ve yorgunluk düzeylerinin belirlenmesi amaçlanmıştır.

Yöntemler: Çalışma Türkiye'de Trabzon ilinde bulunan bir hastanenin kalp ve damar cerrahisi kliniğinde geleneksel açık kalp ameliyatı geçirmiş 176 hasta ile gerçekleştirildi. Veriler Kişisel Bilgi Formu, Tampa Kinezyofobi Ölçeği ve Piper Yorgunluk Ölçeği kullanılarak toplandı.

Bulgular: Hastaların yüksek düzeyde kinezyofobi ve orta düzeyde yorgunluğa sahip olduğu tespit edildi. Hastaların toplam Tampa Kinezyofobi Ölçeği puan ortalamaları ile yaş ve çalışma durumu arasında, toplam Piper Yorgunluk Ölçeği puan ortalamaları ve alt boyut puan ortalamaları ile cinsiyet, beden kitle indeksi ve çalışma durumu arasında istatistiksel olarak anlamlı fark bulundu. Hastaların Tampa Kinezyofobi Ölçeği puanlarının Piper Yorgunluk Ölçeği'nin davranışsal, duygulanım, duysal alt maddeleri ve toplam puanı ile istatistiksel olarak anlamlı, pozitif yönde ve orta düzeyde korelasyona sahip olduğu ve Piper Yorgunluk Ölçeği'nin bilişsel alt maddesi ile Tampa Kinezyofobi Ölçeği puanı arasında ise istatistiksel olarak anlamlı, pozitif yönde ve zayıf düzeyde korelasyon olduğu bulundu.

Sonuç: Açık kalp ameliyatı geçiren hastaların kinezyofobi ve yorgunluk düzeylerinin ameliyat öncesi ve sonrası dönemde hemşirelik bakım sürecine dahil edilmesi, hastaların iyileşmesine katkı sağlayacak fiziksel aktiviteleri gerçekleştirmesinde faydalı olabilir.

Anahtar Sözcükler: Kardiyovasküler cerrahi, bakım, yorgunluk, kinezyofobi.

According to the World Health Organization, cardiovascular diseases are the leading cause of death globally. It is estimated that, in 2019, there were 17.9 million deaths from cardiovascular diseases, representing 32% of all global deaths (1). In Turkey, cardiovascular diseases ranked first among all causes of death at a rate of 39.1% in 2019. Treating cardiovascular diseases, which account for a large percentage of global deaths, is important in reducing mortality rates (2).

The treatment of cardiovascular diseases entails lifestyle changes, pharmacological methods, angioplasty and stent applications, and surgical procedures. Surgical procedures include minimally invasive techniques with fewer incisions to reach the heart and traditional methods such as open heart surgery (3). Open heart surgeries are preferred in the treatment of coronary artery disease (CAD), valve diseases, and congenital heart diseases and in heart transplantation. While performing traditional open heart surgery, the extracorporeal circulation technique fulfills the functions of the heart and lungs temporarily outside the body during the surgery. In this way, the heart can be easily treated in a bloodless environment while at rest (4). Open heart surgeries can cause complications in the postoperative period as well as having life-saving features. Low cardiac output syndrome, postoperative bleeding and arrhythmia, respiratory dysfunction, postoperative renal dysfunction, cardiac tamponade, sternum infections, cerebrovascular events, anxiety, and depression are observed in the early postoperative period (5). During open heart surgery, the tissues and nerves in the chest are damaged due to the opening of the sternum and this can cause serious problems after surgery. On the other hand, coronary artery bypass graft (CABG) surgeries may cause leg pain after surgery due to vein grafts taken from the legs in addition to the sternum. In the postoperative period, the patient's chest tube, endotracheal aspiration, and exposure to interventions such as intubation increase the patient's pain level while reducing the power of the individual to cope with the problems (6). After open heart surgery, especially when pain is present, the patient shows behaviors of avoiding necessary activities. The avoidance phenomenon that develops in the context of cognitive-behavioral fear of pain is called kinesiophobia (7). For the incision area to heal, the patient needs to protect the wound area after surgery from the external environment and avoid sudden movements that may cause additional trauma. Patients who experience unpleasant sensations such as pain and who fear damage to the wound area, even while doing activities that they know are beneficial, may restrict their movements involuntarily due to the worry of making a wrong move. Due to kinesiophobia, the patient cannot properly perform activities such as respiration and coughing after surgery and this affects the recovery process negatively (8).

One of the most common situations after open heart surgery is fatigue. Determining the perceived fatigue by the patient is important for effective management of fatigue in the postoperative period. Although the term "fatigue" is generally used to mean perceived fatigue in the literature, perceived fatigue is in fact a subjective dimension of fatigue. Perceived fatigue, which is a subjective feeling that can be evaluated using scales based on the individual's self-report, is divided into physical fatigue and mental fatigue (9). Physical fatigue is the need for rest that occurs in order to ensure the excretion of lactic acid accumulated as a result of the movement of the muscles and oxygenation of the tissues (10). It is expressed as situations such as "feeling the strength of the muscles decreasing," "feeling weak," and "feeling weak and heavy." It is felt throughout the body and can also be expressed as general fatigue. On the other hand, mental fatigue is a subjective perception described by weakness, fatigue, and mood changes in the individual that greatly affects quality of life. Perceived fatigue is felt as a result of compulsive and prolonged cognitive activity and can cause impaired memory, decreased concentration, and emotional lability (11). Conditions related to surgical intervention such as immobility, decreased respiratory capacity, problems due to the effect of anesthesia, the use of analgesics and sedative drugs, infection, hunger, sleep changes, tissue damage, stress, and disease processes all cause fatigue after open heart surgery. Observing the fatigue symptoms of the patient during the postoperative period and investigating the patient's perception of fatigue is important in terms of the individual's participation in daily life activities and accelerating the recovery process (12).

It is important to evaluate kinesiophobia and fatigue and to support the patient with appropriate approaches during the process to aid in effective adaptation to the treatment after the surgery, improve the performance of physical activities, and contribute to the healing process. In this sense, the responsibility of the surgical nurse is to observe the symptoms of kinesiophobia and fatigue in patients who have undergone open heart surgery to ensure that patients maintain self-expression and to take a role in the nursing care with an appropriate therapeutic approach. Thus, the patient's fear of movement and fatigue level will be determined, the care of the patient will be provided with a holistic approach, and the postoperative recovery process will be accelerated.

The aim of this study is to evaluate the levels of kinesiophobia and fatigue in patients who have undergone open heart surgery.

Research Questions

1. What is the level of kinesiophobia and fatigue of patients who underwent open heart surgery?

2. Is there a correlation between kinesiophobia and fatigue level?

MATERIALS and METHODS

Design

This study was a descriptive research.

Sample

The study was undertaken at a hospital in Trabzon between January 7 and September 4, 2019. The sample of the study comprised 176 patients who have undergone traditional open heart surgery - CABG and/or valve replacement - for the first time were recruited at the cardiovascular surgery clinic following their discharge from the intensive care unit. To determine the number of participants, power analysis was performed in the G Power program over the number of patients in one year (n=651). According to that analysis, at the 5% significance level with 0.5 effect size, the number of samples required to ensure that the strength of the study (1-β) be 0.95 was found to be at least 176 (13). In this context, 176 patients who met the admission criteria constituted the sample of the study.

The acceptance criteria for the study were as follows:

- Having open heart surgery for the first time

- Being aged ≥18 years old

- Be able to communicate verbally in Turkish language

- At least primary school graduate

The exclusion criteria were as follows:

- Having any additional disease that would affect movement after surgery

- Having hearing or speaking problems

- Having psychiatric illness or treatment

Data Collection

The data were gathered by the researcher. Patients were interviewed in the patient room in the cardiovascular surgery clinic at an appropriate time using the face-to-face interview technique within 1-7 days after transfer from the intensive care unit to cardiovascular surgery. The personal information form, TKS, and PFS were administered to the patients, respectively. Filling in the forms took about 20-30 minutes.

Data Collection Tools

The data were gathered using a personal information form, the Tampa Kinesiophobia Scale (TKS), and the Piper Fatigue Scale (PFS).

Personal Information Form: The personal information form was designed in two parts by the researcher in line with the relevant literature and observations, and it included a total of 20 questions. The first part of the form included nine questions that addressed patients' descriptive characteristics (age, sex, marital status, etc.). The second part of the form included eleven questions that addressed disease and surgery information (diagnosis, type of surgery performed, etc.).

Tampa Kinesiophobia Scale (TKS): The TKS is a scale developed by Miller, Kori, and Todd in 1991 to evaluate the fear of movement and reinjuries and avoidance behaviors associated with fear (14). Turkish validity and reliability tests of the scale were performed by Yılmaz et al. in 2011 (15). The scale consists of 17 questions. Likert scores ranging from 1 to 4 are used in the scale, where 1 = "strongly disagree," 2 = "disagree," 3 = "agree," and 4 = "fully agree." Total scores range between 17 and 68, and a high score indicates that the individual's kinesiophobia is high.

Piper Fatigue Scale (PFS): The PFS is a scale developed by Piper et al. in 1998 to evaluate fatigue subjectively (16). The scale consists of a total of 27 items. The behavioral subscale, which has four subjective dimensions of fatigue, consists of six items [2-7]; the affectivity subscale consists of five items [8-12]; the sensory subscale consists of five items [13-17]; and the cognitive subscale consists of six items [18-23]. Total and subscale fatigue scores are calculated with 22 specified items and five other items [1 and 24-27] are not included in the calculation. There are three open-ended questions about the cause of fatigue, methods that reduce fatigue, and developing symptoms.

Each item in the scale receives a value between 0 and 10 points. In order to calculate the total fatigue score, all points of the 22 items are summed and this sum is divided by the number of items, where 0 points indicates that there is no fatigue according to the average obtained score, 1-3 points indicate mild fatigue, 4-6 points medium fatigue, and 7-10 points severe fatigue. A higher score thus indicates that the perceived fatigue level is high.

Statistical Analysis

Data were analyzed using the software application program SPSS 22.0 for Windows. The study results were analyzed using percentages, means, standard deviations (SD), minimum and maximum values, the Mann-Whitney U test, Kruskal-Wallis variance analysis, and Spearman correlation analysis.

One-Sample Kolmogorov Smirnov test was performed to determine whether the TKS and PFS scores of the patients showed normal distribution. In independent groups, two groups with normal distribution were compared with the t-test and two groups that did not show normal distribution with the Mann-Whitney U test.

The comparison of three or more groups with a normal distribution using the Tukey-corrected Oneway ANOVA test and three or more groups with a non-normal distribution using the Kruskal-Wallis Analysis of Variance were made. Spearman Correlation test was applied to determine the relationship between kinesiophobia and fatigue. Data were evaluated at the 95% confidence interval, $p<0.05$, using percentile, standard deviation, minimum-maximum values, and mean.

Ethics

This study was approved by the Karadeniz Technical University Medical Faculty's Ethics Committee (Decision Date: 03/12/2018, Decision No: 24237859-759). Written informed consent was obtained from participants prior to data collection. They were also informed that participation was voluntary, and their confidentiality was assured.

RESULTS

It was determined that 59.1% of the patients were in the age range of 51-70 years, 65.3% were male, 81.8% were not employed, 40.9% had BMIs of 25.0-29.9 kg/m^2, 69.3% had a chronic disease, and 73.6% had received no education before the surgery. The total mean kinesiophobia score of the patients was 42.7±4.7, reflecting a high level, and the mean fatigue score was 5.3±1.5, which represents a moderate level.

The total mean scores of the TKS were statistically significant in terms of age (p=0.042), employment status (p=0.019), the presence of a chronic disease (p=0.026), and preoperative education (p=0.015). The age group of 30-50 years was found to have significantly lower scores than the age group of 51-70 and employed patients had significantly lower scores than the unemployed (Table 1).

Table 1. Mean total TKS scores of patients according to their some sociodemographic, disease and surgery characteristics (n=176)

Sociodemographic Characteristics		n(%)	$\bar{X}$±SD	Mean Rank	Statistical Analysis
Age	30-50	18 (10.2)	39.9±6.3	60.22	**p=0.042** χ^2=6.323
	51-70	104 (59.1)	43.0±4.3	92.71	
	≥71	54 (30.7)	43.0±4.5	89.82	
Employment Status	Employed	32 (18.2)	40.4±6.0	69.50	**p=0.019** Z=-2.338
	Nonemployed	144 (81.8)	43.2±4.2	92.72	
Presence of Chronic Illness	Yes*	122 (69.3)	43.3±4.4	94.18	**p=0.026** Z=-2.227
	No	54 (30.7)	41.4±5.0	75.68	
Preoperative Education	Yes**	46 (26.4)	41.2±4.7	72.12	**p=0.015** Z=-2.421
	No	128 (73.6)	43.0±4.6	93.03	

SD: Standart Deviation, χ^2: Kruskal Wallis Test, Z: Mann–Whitney U test, p<0.05
** Diabetes, hypertension.*
*** Surgery, mobilization, breathing-cough exercises, pain control, nutrition.*

There were statistically significant differences between the mean total PFS scores and subscale scores of the patients according to gender (p=0.0001), employment status (p=0.0001), BMI (p=0.016), presence of a chronic disease (p=0.003), and preoperative education status (p=0.0001). There was a statistically significant difference between the overweight (25.0-29.9 kg/m2) and obese (30-39.9 kg/m2) groups ($p<0.05$). It was found that the mean total and subscale scores of fatigue of the patients who were in the overweight group were significantly lower compared to the obese group. A statistically significant difference was found in the mean behavioral subdimension scores only for those receiving nutritional education before surgery (p=0.047) (Table 2 and Table 3).

Table 2. Mean total PFS and subscale scores of patients according to their some sociodemographic, disease and surgery characteristics (n=176)

Sociodemographic Characteristics		**n (%)**	**PFS Subscales**				**Total Score Ẋ±SD**
			Behavioral Ẋ±SD	**Affectivity Ẋ±SD**	**Sensory Ẋ±SD**	**Cognitive Ẋ±SD**	
Gender	Female	61 (34.7)	6.1±1.6	5.8±1.5	6.7±1.5	5.0±1.4	5.9±1.1
	Male	115 (65.3)	5.3±1.7	5.3±1.9	5.4±2.0	4.0±1.8	5.0±1.6
	Statistical analysis		**0.005** t=2.847	**0.031** t=2.178	**0.0001** Z=-3.772	**0.0001** t=3.769	**0.0001** t=4.217
Employment Status	Employed	32 (18.2)	4.7±1.9	4.9±2.2	4.6±2.3	3.7±1.6	4.4±1.7
	Nonemployed	144 (81.8)	5.8±1.6	5.6±1.7	6.1±1.8	4.5±1.7	5.5±1.4
	Statistical analysis		**0.003** Z=-2.982	0.093 t=-1.722	**0.001** Z=-3.472	**0.015** t=-2.449	**0.0001** t=-3.69
Body Mass Index	18.5-24.9 kg/m²	31 (17.6)	6.0±1.9	5.8±1.9	6.2±1.9	4.6±1.7	5.6±1.5
	25.0-29.9 kg/m²	72 (40.9)	5.3±1.7	5.0±1.8	5.3±2.0	4.0±1.6	4.9±1.5
	30-39.9 kg/m²	64 (36.4)	5.8±1.7	5.8±1.8	6.3±1.8	4.7±1.8	5.6±1.5
	≥40 kg/m²	9 (5.1)	5.6±1.6	5.1±0.7	5.5±1.5	3.9±1.3	5.0±0.8
	Statistical analysis		0.132 χ^2: =5.614	**0.048*** χ^2: =7.922	**0.022*** χ^2: =9.584	0.052 χ^2: =7.712	**0.016** F=3.527
Presence of Chronic Illness	Yes	122 (69.3)	5.8±1.7	5.5±1.7	6.2±1.8	4.6±1.7	5.5±1.4
	No	54 (30.7)	5.2±1.6	5.2±1.9	5.1±2.0	3.7±1.6	4.8±1.4
	Statistical analysis		0.061 t=1.885	0.325 t=0.986	**0.001** Z=-3.413	**0.002** t=3.198	**0.003** t=2.98
Preoperative Education	Yes	46 (26.4)	4.7±2.0	5.4±2.3	5.5±2.3	4.4±1.9	5.0±1.8
	No	128 (73.6)	5.9±1.5	5.5±1.6	6.0±1.8	4.3±1.6	5.4±1.3
	Statistical analysis		**0.0001** Z=-3.727	0.818 t=-0.231	0.325 Z=-0.984	0.738 t=0.336	0.146 t=-1.472

Z: Mann–Whitney U test, χ^2: Kruskal Wallis Test, t: Independent Samples t test, F: One Way ANOVA, p<0.05
** Statistically significant difference between overweight (25.0-29.9 kg/m²) and obese (30-39.9 kg/m²) group p<0.05*

Table 3. Mean rank scores of patients' PFS subscale according to their some sociodemographic, disease and surgery characteristics (n=176)

Sociodemographic Characteristics		**PFS Subscales**	**Mean Rank**
Gender	Female	Sensory	108.38
	Male		77.96
Employment Status	Employed	Behavioral	64,.22
	Nonemployed		93.90
	Employed	Sensory	60.23
	Nonemployed		94.78
Body Mass Index	18.5-24.9 kg/m²	Behavioral	101.94
	25.0-29.9 kg/m²		78,.47
	30-39.9 kg/m²		93.61
	≥40 kg/m²		86.11
	18.5-24.9 kg/m²	Affectivity	99.76
	25.0-29.9 kg/m²		76.93
	30-39.9 kg/m²		97.82
	≥40 kg/m²		76.00

Table 3. Mean rank scores of patients' PFS subscale according to their some sociodemographic, disease and surgery characteristics (n=176) (Continuation of Table 3)

Sociodemographic Characteristics		**PFS Subscales**	**Mean Rank**
Body Mass Index	18.5-24.9 kg/m²	Sensory	97.44
	25.0-29.9 kg/m²		75.85
	30-39.9 kg/m²		100.39
	≥40 kg/m²		74.39
	18.5-24.9 kg/m²	Cognitive	95.89
	25.0-29.9 kg/m²		77.36
	30-39.9 kg/m²		99.41
	≥40 kg/m²		74.56
Presence of Chronic Illness	Yes	Sensory	97.21
	No		68.81
Preoperative Education	Yes	Behavioral	63.77
	No		96.03
	Yes	Sensory	81.24
	No		89.75

PFS: Piper Fatigue Scale.

There was a statistically significant, positive, and moderate correlation between the TKS scores of the patients and the PFS behavioral, affectivity, and sensory subscales and total scores (p<0.0001) while there was a significant, positive, and weak correlation with the cognitive subscale of the PFS (p<0.0001) (Table 4).

DISCUSSION

In the literature, there are studies conducted to determine the levels of kinesiophobia and fatigue in different patient groups (7,12). Studies related to kinesiophobia are usually in the field of physical therapy and rehabilitation, while studies related to surgery address some fields such as orthopedics and neurosurgery. Although there are studies on kinesiophobia in coronary artery patients in the literature, there have not been any studies involving patients who have undergone open heart surgery. In this respect, our study is the first study with patients having had open heart surgery.

In our study, it was found that patients undergoing open heart surgery experienced a high level of kinesiophobia, and the level of kinesiophobia was affected by age, employment status, the presence of a chronic disease, and preoperative education. It was reported in previous studies that patients undergoing CABG had intense kinesiophobia and the treatment process was affected negatively by their decreased participation in physical activities (7,17). Accordingly, it is thought that kinesiophobia, which develops from the concern of causing more pain due to opening the incision area in patients who have undergone open heart surgery and making wrong movements during exercise, affects their physical activity levels negatively.

It was found the mean total kinesiophobia score of the patients who were in the age group of 30-50 years was significantly lower compared to the age group of 51-70; those who were ≥71 years old were found to have high levels of kinesiophobia, but there was no significant difference in the statistical evaluation. In a study conducted with older adults, it was stated that diseases such as cardiovascular and musculoskeletal diseases cause a decrease in the physical activity of patients over the age of 65 and this increases the level of kinesiophobia (18). In another study, it was stated that postoperative complications were more common in elderly patients who had CABG (19). It is thought the problems of the musculoskeletal and cardiovascular systems that develop due to aging and the changes in perception of health affect the patient's level of movement and beliefs.

It was determined that the mean total kinesiophobia score of the patients who were employed was lower than that of the unemployed and there was a statistically significant difference between them. Working individuals returning to work with awareness after recovery may be encouraged to perform more physical activities in the postoperative period. On the other hand, unlike the results of our study, another study reported that patients who underwent CABG were afraid of not being able to return to work after their sick leave during the postoperative recovery period, and this was related to their economic situations (20). When patients do not reach the level of mobility required by their jobs, anxieties about losing their jobs, not being able to financially manage, and not being able to support a family may increase the development of kinesiophobia.

Table 4. Relationship between patients' TKS and PFS scores

		TPS	PFS	Behavioral	Affectivity	Sensory	Cognitive
TPS	r	1	0.373*	0.320*	0.312*	0.379*	0.261*
	p		0.0001	0.0001	0.0001	0.0001	0.0001
PFS	r		1	0.820*	0.847*	0.823*	0.789*
	p			0.0001	0.0001	0.0001	0.0001
Behavioral	r			1	0.614*	0.609*	0.484*
	p				0.0001	0.0001	0.0001
Affectivity	r				1	0.655*	0.590*
	p					0.0001	0.0001
Sensory	r					1	0.518*
	p						0.0001
Cognitive	r						1
	p						

**Spearman Correlation, p<0.0001*
***Tampa Kinesiophobia Scale*
****Piper Fatigue Scale*

It was found that the mean total kinesiophobia score of the patients with chronic diseases was higher than that of those who had no chronic disease and there was a statistically significant difference between them. Kocjan stated that patients with hypertension had a high level of kinesiophobia (21). Patients having difficulties in the preoperative period due to the symptoms of chronic diseases may develop a fear of movement due to their belief that they will experience similar situations while performing physical activities in the postoperative period. In addition, chronic diseases such as hypertension and diabetes can affect system functions in the healing process and cause systemic complications.

It was determined that the mean total kinesiophobia score of the patients who received preoperative education was lower than that of those who did not receive such education and there was a statistically significant difference between them. Studies show that training before open heart surgery enables patients to cope with pain better in the postoperative period and positively affects the healing process (22). It can be thought that the education received in the preoperative period is effective in developing a positive approach toward postoperative kinesiophobia. Informing the patient about pain management, mobilization, nutrition, surgical intervention, breathing and cough exercises, and activities that are objectionable after the operation may provide better preparation for the operation and better adaptation in the postoperative period.

In our study, it was found there was moderate fatigue in patients undergoing open heart surgery, and this was influenced by gender, employment status, BMI, the presence of chronic diseases, and preoperative education. Similar to our study, individuals who underwent CABG surgery were reported to experience fatigue in the postoperative period (23,24). Patients who have undergone open heart surgery are exposed to equipment such as drains, mechanical ventilators, and intravascular catheters, as well as painful procedures related to treatment and maintenance applications; they have secondary incisions in the extremities in addition to the chest incision according to the type of surgery, and they have sleep and comfort problems due to avoiding certain lying/sitting positions to prevent the opening of the incision area. Finally, trying to perform activities such as walking, breathing, and coughing in this process may cause the patient to feel tired.

It was determined that the mean total and subscale scores of fatigue of men were lower compared to those of women and there was a statistically significant difference between them. Ekman and Ehrenberg reported that women stated that they were mostly involved in physical activity due to their active role in the care of the household in their studies on fatigue in women and men with chronic heart failure (25). In another study, it was stated that, unlike men, women have menstrual cycles and also have more than one responsibility, such as home and work life, making women feel more tired (26). Reasons such as the expectations of multiple roles (e.g., employee, spouse, and parent) and performing these roles successfully, frequent exposure to hormonal changes, problems with the muscular and bone system due to menopause, and feeling the effects of emotional stress as physical complaints can cause fatigue in women more frequently than men.

It was found that the mean total fatigue score of the employed patients undergoing open heart surgery was significantly lower than that of the unemployed. There was a statistically significant difference between the mean total fatigue score and the behavioral, sensory, and cognitive subscale scores in terms of working status. Studies showed that returning to work after surgery is related to the preoperative work. It is difficult for patients working in jobs that require physical strength (athletes, long-hour jobs, long-distance drivers, construction workers, etc.) to return to their previous work life in the postoperative period, while patients working in non-exhausting desk jobs can return to work earlier (27). On the other hand, working patients being physically active, the idea of regaining their previous work routine after recovery, and maintaining their lives and the expectation of earning a livelihood can make it easier to cope with fatigue.

It was found that the mean total and subscale scores of fatigue of the patients who were in the overweight group (25.0-29.9 kg/m^2) were significantly lower compared to the obese group (30-39.9 kg/m^2) and there was a statistically significant difference between the mean total score and the affectivity and sensory subscale scores of fatigue. Studies have shown that high BMI is associated with fatigue, and obesity affects the postoperative recovery process, leading to a prolonged hospital stay (28). Obesity can make it difficult to perform mobilization, walking, breathing, and cough exercises that need to be done regarding the healing process in the postoperative period by affecting the patient's physical performance.

It may be difficult for the patient to perform daily life activities due to delays in wound healing due to excessive adipose tissue. In addition, the dysfunctions caused by the fat accumulation in the vessels and organs in the future may affect the body oxygenation and performance, causing the individual to feel weak and tired.

In this study, it was found that the mean total fatigue score of the patients with chronic diseases was significantly higher than that of those without chronic disease. In terms of the presence of chronic disease, there was a statistically significant difference between the total scores of fatigue and sensory and cognitive subscale scores. In some studies in the literature, it was stated that fatigue is frequently experienced in individuals with chronic diseases and affects the maintenance of daily living activities (29). Chronic diseases such as hypertension and diabetes can cause symptoms such as deterioration in tissue oxygenation, deformation in the vascular structure, respiratory complications, and associated fatigue. Patients may try to restrict the activities that they perform in order to cope with fatigue because of long-term symptoms associated with chronic diseases that affect their daily lives.

In was determined, it was determined that the mean fatigue score of the patients who received preoperative education was significantly lower than the mean score of those who did not receive education, while there was a statistically significant difference only between behavioral subdimension mean scores. A statistically significant difference was found in the behavioral subdimension mean scores only for those receiving nutritional education before surgery. It was reported in the study of Robinson et al. that a significant decrease was found in the level of fatigue after surgery in the patient group with regulated nutrition (30). Preoperative fasting, hormonal changes caused by surgical stress, catabolism in tissues, and inappetence experienced in the postoperative period may affect the nutrition level of patients and cause fatigue. The patient's fatigue can be reduced by accelerating wound healing with proper nutrition, regular excretion, and reaching a sufficient energy level to perform physical activities. In addition, it is thought that patients who receive preoperative information about issues related to the surgery will adapt to the postoperative period and manage the healing process better by displaying a more informed approach to the tiring activities they encounter.

It was found there was a statistically significant, positive, and moderate correlation between the kinesiophobia scores of the patients and the behavioral, affectivity, and sensory subscales and total scores of fatigue. In addition, there was a statistically significant, positive, and weak correlation between the cognitive subscale of fatigue and kinesiophobia scores. Yümin et al. reported there was a significant relationship between kinesiophobia and fatigue in their study with patients with CAD and that fatigue caused kinesiophobia (7). Patients decreasing their physical activity levels due to fatigue may have their fear of movement be strengthened. A patient experiencing fatigue due to the operation process may be reluctant to act postoperatively due to previous negative physical activity experiences. Patients can show fear avoidance behaviors by further reinforcing their kinesiophobia in activities that they failed to complete due to fatigue.

CONCLUSIONS

In conclusion, patients who underwent open heart surgery had high levels of kinesiophobia and moderate levels of fatigue. A positive and moderate correlation was found between kinesiophobia and fatigue. The presence of kinesiophobia should be investigated by the primary responsible nurse before and after surgery in patients undergoing open heart surgery. The fear of movement of patients should be measured by the nurse using kinesophobia scales and patients should be educated about the recovery process in the preoperative period and their fears about physical activity should be eliminated.

Kinesiophobia should be reduced by determining the main problem causing it with a multidisciplinary approach using the appropriate cognitive behavioral therapy method and exercise supports. Since studies on kinesiophobia and fatigue in patients with open heart surgery are limited. However, further studies are needed in this field.

DECLARATIONS

Limitations

Since this study was undertaken in one hospital with patients who had undergone open heart surgery and who agreed to take part in the study, the results can only be generalized to the cardiovascular surgery clinics of the hospital where the study was performed. These findings may not be valid for all cardiovascular surgery patients.

Conflict of Interest

The authors have no conflicts of interest to disclose.

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Ethical Approval

The study was approved by The Ethics Committee of Karadeniz Technical University School of Medicine (Number: 2018/275).

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