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Postoperative Complications After Thoracic and Cardiac Surgery and Their Impact on Patients' Perception of Nursing Care Quality

Göğüs ve Kalp Cerrahisi Sonrası Görülen Komplikasyonlar ve Bu Komplıkasyonların Hemşirelik Bakım Kalitesi Algısı Üzerindeki Etkısi

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ÖZET

Amaç: Bu çalışma, göğüs ve kalp cerrahisi sonrası görülen komplikasyonlar ve bu komplikasyonların hemşirelik bakım kalitesi algısı üzerindeki etkisini belirlemeyi amaçlamaktadır.

Yöntem: Bu çalışma, Mayıs 2017-Mayıs 2019 tarihleri arasında Türkiye'de 103 hasta ile kesitsel bir çalışma olarak gerçekleştirildi. Veriler ameliyat sonrası 4. veya 5. günde hasta bilgi formu, komplikasyon kontrol formu ve Bakım Davranışları Envanteri-24 (CBI-24) kullanılarak toplandı.

Bulgular: Hastaların %49,5'inde ameliyat sonrası komplikasyon geliştiği, bu komplikasyonların en sık kalp ritim bozuklukları ve basınç yaralanmaları olduğu tespit edilmiştir. Komplikasyon yaşayan hastaların ortalama CBI-24 skorları, komplikasyon yaşamayan hastalarınkinden istatistiksel olarak anlamlı derecede yüksekti.

Sonuç: Sonuçlar, hastaların yaklaşık yüzde 50'sinin komplikasyon yaşadığını; en sık görülen komplikasyonların kalp ritim bozuklukları ve basınç yaralanması olduğunu ve komplikasyon yaşayan hastaların hemşirelik bakım kalitesi algısının diğer hastalara göre daha yüksek olduğunu göstermektedir. Göğüs ve kalp ameliyatları sonrası komplikasyonların azaltılması için hastaların bakım ve tedavilerinde iyileştirmelere ve bu konuda kanıta dayalı uygulamalara ihtiyaç vardır. Hemşirelerin göğüs ve kalp cerrahisi sonrası komplikasyonları önlemek için hastaya özgü önlemler almalarını önerilmektedir.

Anahtar Kelimeler: ameliyat sonrası komplikasyonlar, sağlık bakım kalitesi, göğüs cerrahisi, hemşirelik, kardiyak cerrahi

ABSTRACT

Aim: This study aims to determine complications after thoracic and cardiac surgery and the impact of these complications on the perceptions of nursing care quality by patients.

Method: The present work was performed as a cross-sectional study with 103 patients in Türkiye between May 2017 and May 2019. Data were collected on postoperative day 4 or 5 using a patient information form, a complication control form, and the Caring Behaviors Inventory-24 (CBI-24).

Results: It was found that postoperative complications developed in 49.5% of the patients, most commonly heart rhythm disorders and pressure injuries. The mean CBI-24 scores of patients who experienced complications were statistically significantly higher than those of patients who did not experience any complications.

Conclusion: The results show that approximately 50 percent of the patients experienced complications; the most common complications were heart rhythm disorders and pressure injury, and perception of nursing care quality of patient with complication was higher than other patients. There is a need for improvements in the care and treatment of patients and scientific studies on this subject to reduce complications after thoracic and cardiac surgeries. We recommend that nurses take patient-specific precautions to prevent complications after thoracic and cardiac surgery.

Keywords: postoperative complications, quality of health care, thoracic surgery, nursing, cardiac surgery

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INTRODUCTION

It is estimated that 17.9 million patient across the world died due to cardio-vascular diseases in 2019, and this number constituted 32% of all mortality rates.[1] Additionally, in accordance with the World Health Organization, seven out of every ten deaths worldwide are currently caused by non-communicable diseases, including heart diseases, diabetes, cancer, and respiratory diseases.[2] Therefore, the world needs to take measures to prevent these diseases, to determine the disease early, its treatment, and care.[1,2] Surgical interventions are frequently used to treat chest and heart diseases among these diseases.

As in other surgical interventions, thoracic and cardiac surgical interventions increase daily in Türkiye and the world. The Lancet Commission on Global Surgery describes surgical interventions as an integral and indispensable part of healthcare services and states that 313 million surgical interventions are performed worldwide annually.[3] In Türkiye, coronary heart disease has 140,000 new cases every year, and mortality is 5.7 per 1000 men and 3.6 per 1000 women.[4] The American Heart Association, United States (US), reports that the prevalence of coronary heart disease in men and women is ~40% in the 40–59 age range, ~75% in the 60–79 age range, and ~86% over the age of 80.[5] In Japan, the incidence of cardiovascular diseases in men is 2–5 times higher than in women. It was also determined that the rate decreased from 25.9 (2015) to 25.0 (2020) in Yamagata Prefecture[6]

The number of isolated coronary artery bypass graft (CABG) surgeries per year is 157,704 in the US, cardiovascular surgical intervention in Japan is 70,078, and thoracic surgical intervention is 85,307.[7,8] There is a need for improvements in the care and treatment of patients and scientific studies on this subject to reduce complications after thoracic and cardiac surgeries, which are in the major surgery class and whose number of interventions and postoperative mortality and morbidity rates cannot be ignored.[9]

Postoperative complications are "any unfavorable status that occurs in the normal postoperative process."[10] There is a risk of developing a complication after each surgery. Bleeding, pneumonia, atelectasis, nausea and vomiting, infection, deep vein thrombosis, etc., can be listed among the possible postoperative complications.[11] It is estimated that at least 4.2 million people worldwide die from adverse events/complications within 30 days after surgery.[12]

Planned nursing care interventions in the pre- and postoperative periods are important to prevent

complications and increase the quality of care.[13] At the same time, with quality nursing care, it is possible to identify the symptoms of complications early and prevent the deterioration of patients' general condition and their worsening.[14] Complications cause severe consequences, such as extended hospital stays, the need for readmission to the hospital, adverse

impacts on the healing process, and deteriorating quality of life.[15-17] These consequences adversely affect not only patients but also physicians, nurses, and other healthcare professionals.[16] Balcı et al.[18] revealed that at least one complication developed in

12.7% of patients after CABG surgery, and Wang et al.[19] determined that complications developed in 16.8% of patients after lobectomy.

Low complication rates in the surgical process are accepted as an indicator of quality nursing care.[15,20]An effective way to assess the quality of nursing care is to determine patients' feedback on care with valid and reliable measurement tools.[21]Measuring patients' perceptions of nursing satisfaction and quality of care makes it possible to improve the quality of nursing care by making necessary improvements.[21,22] To evaluate the holistic care and bio-psycho-social dimension of perioperative nursing and enhance the quality of surgical patient care according to the results, it is essential to examine patients perception of quality of care and the factors impacting this perception.[23] When the literature was examined, it was determined that there were few studies on this subject.[13,14] In the results of these few studies, a relationship was found between unmet nursing care needs and adverse events. This was done because there are few studies on this subject and to obtain more specific results in two clinics close to each other.

This study's goal is to determine complications in patients after thoracic and cardiac surgeries and the impact of complication on the perceptions of nursing care quality.

MATERIALS AND METHODS

The present cross-sectional research was carried out in a university hospital's thoracic and cardiovascular surgery clinics in western Türkiye by collecting data between May 2017 and May 2019.

Sample and setting

The study population comprised patients who had undergone surgery in the thoracic and cardiovascular surgery clinics. The literature was reviewed to determine the sample number. According to the findings of the study titled "The problems experienced by the patients at home after surgery"[15], it was calculated that 103 patients should be included in the sample at a 95% confidence level, with 95% power, and the tolerance ratio not exceeding 0.05 of the relevant parameter. The study included 103 patients over the age of 18 who volunteered to take part in the research and who had undergone planned thoracic or cardiac surgery in the clinics where the study was conducted. Non-elective procedures and patients who did not want to take part in the research were not included in the sample.

Data collection tools

Data collection was performed with a patient information form, a complication control form, and the Care Behaviors Inventory-24.

Complication control form

The researchers prepared a form in line with the literature[9,11,23,24] to control and record postoperative complications. This form included 20 questions about a complication in the respiratory system (atelectasis, prolonged air leak, etc.), circulatory system (bleeding, hypovolemic shock, and venous thromboembolism), gastrointestinal system (postoperative ileus, hepatic failure, etc.), genitourinary system (urinary infection, acute renal failure, etc.), neurological system (delirium), and musculoskeletal system (burn, pressure injury, etc.). The Kuder-Richardson 21 reliability coefficient of this form, whose items were answered as "Yes-No," was found to be 0.535 (reliable).[25]

Caring Behaviors Inventory-24 (CBI-24)

The Caring Behaviors Inventory-24 (CBI-24) was used to evaluate the perception of care quality in this study. *The CBI-24 was developed by* Wolf et al. (1994)[26] (42 items) and structured by Wu et al. (2006)[27] (24 items), and Kurşun and Kanan (2012) [21] (carried out the Turkish validity-reliability study for the inventory.[19] The scale comprises four subscales, Assurance (8 items= 16-17-18-20-21-22-23-24), Knowledge and Skill (5 items= 9-10-11-12-15), Respectful (6 items= 1-3-5-6-13-19), and Connectedness (5 items= 2-4-7-8-14), and a total of 24 items. Cronbach's alpha value for the subscales ranged from 0.89 to 0.93.[21]

A 6-point Likert scale (1=never, 2=almost never, 3=sometimes, 4=usually, 5=mostly, 6=always) is utilized for answers. The total score that can be received on the scale varies between a minimum of 1 (one) and a maximum of 6 (six) points, and it is accepted that the level of perception of care quality increases as the mean score increases. Cronbach's alpha value was determined to be 0.97 in the Turkish version of the scale.[21] Cronbach's alpha value was 0.972 in the present study.

Data collection

Patients meeting the inclusion criteria in thoracic and cardiovascular surgery clinics were visited in their rooms on postoperative day 4 or 5. The patients were informed about the study's goal and the method applied. Verbal consent was received from individuals who agreed to take part in the research. The researchers filled out the personal information and complication control forms by employing the face-to-face interview method. The records of each patient in the nurse observation form were also examined to confirm the accuracy of the data in the complication control form. The patients filled out the CBI-24. The questions that were not understood in the data collection forms were explained to the patients, and they were given time (15-25 minutes) to complete the scale. The researchers collected the scale from the patients at the end of the given time.

Ethical considerations

To conduct the study, the necessary written permissions were acquired from the Scientific Research Ethics Board of XX (to be written later) University School of Medicine (XX-BAEK 2017/105: decision number 07/13) and the Central Directorate of the Health Research

and Application Centre. The research objectives and methods were explained to the managers of the clinic where the study would be performed, the head service nurse, all the clinic nurses, and patients meeting the inclusion criteria. The patients were informed that their information would be utilized only for research purposes, and their verbal consent was obtained before they participated in the study.

Data analysis

The data analysis was conducted with the Statistical Package for Social Sciences (SPSS) for Windows version 20.0 program (IBM, Armonk, NY, USA). Descriptive analysis, Mann-Whitney U, and chi-squared tests were used to assess data. The value of $p < 0.05$ was considered statistically significant.

RESULTS

The mean age of the study participants was 55.88 ± 11.72; 75.7% were male, 91.3% were married, and 42.7% were secondary school graduates. It was found that 51.5% of the patients had no chronic disease, and 50.5% had undergone surgical intervention in the thoracic surgery clinic. Upon examining the types of surgical intervention, it was found that patients had mostly undergone CABG surgery (37.9%), lobectomy (23.3%), and video-assisted thoracoscopic surgery (6.8%) (Table 1).

Table 1. Patients' characteristics (*n* = 103)

Characteristics			
Age (years, *Mean ± Standard deviation)*		55.88 ± 11.72	
		n	%
Gender	Female	25	24.3
	Male	78	75.7
Marital status	Married	94	91.3
	Single	9	8.7
Educational level	Primary school	54	52.4
	High school	44	42.7
	University	5	4.9
Chronic illness	Yes	50	48.5
	None	53	51.5
Surgical clinics	Thoracic	52	50.5
	Cardiovascular	51	49.5
Surgical interventions	CABG†	39	37.9
	Lobectomy	24	23.3
	VATS‡	7	6.8
	Others	33	32.0

†CABG = Coronary Artery Bypass Grafting, ‡VATS = Video-Assisted Thoracic Surgery

Postoperative complications developed in 49.5% of the patients, and the most common complications were determined as heart rhythm disorders (11.7%) and pressure injury (11.7%). The other complications detected in the study were atelectasis and pneumonia (9.7%), prolonged air leak (8.7%), urinary system infection (5.8%), bleeding and hypovolemic shock (4.9%), delirium (3.9%), emphysema (1.9%), wound infection and delayed wound healing (1.9%), pleural effusion (1%), venous thromboembolism (1%), and acute kidney injury (1%), (Table 2).

Table 2. Postoperative complications in thoracic and cardiovascular surgical interventions

Postoperative complications	n	%
Heart rhythm disorders	12	11.7
Pressure injury	12	11.7
Atelectasis and pneumonia	10	9.7
Prolonged air leak	9	8.7
Urinary system infection	6	5.8
Bleeding and hypovolemic shock	5	4.9
Delirium	4	3.9
Emphysema	2	1.9
Wound infection and delayed wound healing	2	1.9
Pleural effusion	1	1
Venous thromboembolism	1	1
Acute kidney injury	1	1

The rate of postoperative complication development in the cardiovascular surgery clinic (62.7%) was statistically significantly higher compared to the thoracic surgery clinic (37.3%). The rate of postoperative complication development in patients with chronic disease (60.8%) was statistically significantly higher than in patients without chronic disease (39.2%) (x^2 = 7.074, p = 0.008; x^2 = 6.060, p = 0.014, respectively).

The mean CBI-24 score of patients with postoperative complications was 5.52 ± 0.70, and it was 5.17 ± 0.74 for patients who did not develop complications. It was revealed that the mean scores for the CBI-24 and the Assurance, Knowledge and Skill, Respectful, and Connectedness subscales of patients with postoperative complications were statistically significantly higher than those of patients without complications (p < 0.05, Table 3).

Table 3. Comparison of patients' perception of nursing care quality according to developing postoperative complications

	Total	Postoperative Complication Development		
The Scale and Subscales	Mean ± SD†	Yes Mean ± SD† (Mean Rank)	None Mean ± SD† (Mean Rank)	Test value *p*
Caring Behaviors Inventory-24	5.34 ± 0.74	5.52 ± 0.70 (59.78)	5.17 ± 0.74 (44.37)	Z = -2.646* *p* = **.008**
Assurance	5.39 ± 0.78	5.56 ± 0.71 (58.23)	5.22 ± 0.82 (45.89)	Z = -2.195* *p* = **.028**
Knowledge and Skill	5.48 ± 0.67	5.64 ± 0.59 (59.56)	5.31 ± 0.70 (44.59)	Z = -2.678* *p* = **.007**
Respectfulness	5.24 ± 0.87	5.42 ± 0.87 (60.01)	5.06 ± 0.84 (44.14)	Z = -2.763* *p* = **.006**
Connectedness	5.27 ± 0.85	5.45 ± 0.83 (59.26)	5.09 ± 0.83 (44.88)	Z = -2.511* *p* = **.012**

†SD = Standard deviation, *Mann-Whitney U test

DISCUSSION

The current work, which investigated complications after thoracic and cardiac surgery, found the rate of postoperative complications to be 49.5%. The most common complications in this study were heart rhythm disorders (11.7%) and pressure injuries (11.7%).

Ohsawa et al.[28] reported complications in 34.2% of patients after lung surgery. Mavili et al.[29] indicated that 41.5% of CABG patients had at least one complication, and more than one complication developed in 19% of CABG patients. Seese et al.[17] determined that a major

complication developed in 16.8% of patients and that complications reduced postoperative survival rates. Speir et al.[30] indicated that healthcare costs increased significantly when complications developed after CABG.

Findings obtained from this and other research are similar and demonstrate that patients develop postoperative complications at significant rates. It is very important to quickly identify when complications develop in the postoperative period and manage these complications by applying treatment and care to patients.[23]

Similar to the results of the current work, Speir et al.[30] identified that the most common complications were atrial fibrillation and heart rhythm disorders (15.2%). In their study in which they assessed complications after CABG, Mavili et al.[29] classified the most common complications as cardiac (29.8%), renal dysfunction (21%), and respiratory (12.3%). Iribarne et al.[31] investigated the causes requiring hospital readmission after cardiac surgery and revealed that arrhythmia (17.1%) was one of the three most common causes, and the other two common causes were infection and volume overload. The same study found that approximately one-fifth of cardiac surgery patients required rehospitalization, treatment, and care.

In studies conducted with surgical patients, Katran[32] found the pressure injury rate to be 20.56% in a surgical intensive care unit, and Chen et al.[33] determined it to be 15% across surgical clinics. According to the types of surgical intervention, the most common pressure injury incidence was found in cardiac surgery at 29.3%.[33] After thoracic and cardiac surgery, factors such as excessive blood loss during surgical intervention, prolonged mechanical ventilation, and restriction of mobilization due to care equipment, e.g., catheters, drains, etc., increase the risk of pressure injury.[34] Pressure injuries are accepted as an indicator of the quality of care provided to patients and are a chronic problem to which definite precaution has not been found yet worldwide.[35]

In the present study, the atelectasis and pneumonia rate was 9.7%, and the prolonged air leak rate was 8.7%. Zhoa et al.[37] determined that prolonged air leaks developed in 10.6% of patients and were associated with longer postoperative lengths of stay and higher medical costs. Jing et al. reported that the incidence of postoperative pulmonary complications in non-small cell lung cancer was 29.0%, including pulmonary edema, pneumonia, atelectasis, acute respiratory distress syndrome, and respiratory failure. Postoperative pulmonary complications, including atelectasis, pneumonia, and prolonged air leaks, are common complications after cardiothoracic surgery.[29, 36-38] Okada et al.[36] found that the most common complications that occurred in elderly patients with lung cancer were atrial fibrillation (17.0%), air leak (9.0%), and pneumonia (4.8%).

The results of this and other research are consistent and show that complications such as heart rhythm disorders, pressure injuries, and

pulmonary complications are common in postoperative patients. It is very important not to ignore these complications to improve care quality, prevent or reduce problems, and thus reduce the burden of care and healthcare costs for thoracic and cardiac surgery patients.[23,31]

It is expected and compatible with the literature to find that more complications develop in individuals with chronic diseases in this study. Mavili et al.[29] determined that more complications developed after CABG in individuals with diabetes mellitus, asthma, chronic renal failure, and lung diseases. Ayazoglu et al.[34] revealed that the incidence of pressure injuries increased in the presence of chronic diseases in intensive care patients who underwent thoracic and cardiac surgery. The findings of the current and other research indicate that patients with chronic diseases develop more complications after thoracic and cardiac surgery.

The current research revealed that the mean scores for the CBI-24 and the Assurance, Knowledge and Skill, Respectful, and Connectedness subscales of patients with postoperative complications were statistically significantly higher compared to those of patients without complications. When the literature was reviewed, few studies[39,40] evaluated the perceptions of care quality in patients according to the complication development status after the surgical intervention. Research by Mert et al.[39] reported that patients who did not experience any problems or complications during their hospital stay had significantly more positive perceptions regarding the subscales, and overall nursing care quality. Stein et al.[40] found that patients with low complication rates had high perceptions of care. Conversely, Fenton et al.[41] revealed that patients with a higher level of satisfaction had a higher number of hospitalizations, increased total health expenditures, and a mortality risk that was 26% higher compared to those who reported lower satisfaction levels.

The level of care dependency of patients with complications increases, and the need for nursing care also increases in such patients. [42] The high perceptions of care quality in patients with complications in this study may have originated from the frequency of treatment and care interventions applied to these patients and the long time allocated to the patient. In order to reveal the effect of nursing care and its reflections on the perception of care, more scientific studies evaluating patients' satisfaction with nursing care and their perceptions of quality of care according to the development of complications are needed.[43]

Limitation

In the study, patients were followed up for the first 5 days postoperatively, and complications developing at home were not followed up. In addition, the study was conducted in two clinics at a hospital. These are the limitations of our study.

CONCLUSION AND RECOMMENDATIONS

The study results demonstrated that complications, mostly heart rhythm disorders and pressure injury, developed in approximately 50 percent of patients in the postoperative period, and more complications occurred in patients with chronic diseases and who had undergone surgery in the cardiovascular surgery clinic than in other patients. The perception of nursing care quality in patient with complication was higher compared to patients without complications. In order to prevent postoperative complications, we recommend that nurses follow the patients closely and take patient-specific precautions. Furthermore, we recommend conducting scientific studies to assess patient satisfaction with nursing care and their perceptions of care quality according to the status of complication development.

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Declaration of Competing Interest

None.

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