Hindawi
Nursing Forum
Volume 2023, Article ID 6904576, 8 pages
https://doi.org/10.1155/2023/6904576

Research Article

Self-Care Behaviors among Patients after Cardiac Surgery in Saudi Arabia: Application of Orem's Theory of Self-Care

Mohannad Jamil Alkuwaisi,[1] **Salman Hamdan Alsargri**,[1] **Mohammed Kamel Aldalaykeh**,[2] **Mokhtar Abdu Hamid**,[1] **and Fatimah Hamdan Alsargri**[3]

[1]*Medical Surgical Department, College of Nursing, University of Hail, Hail, Saudi Arabia*
[2]*Community and Mental Health Nursing Department, College of Nursing, University of Science and Technology, Ar-Ramtha, Jordan*
[3]*Maternity and Children Hospital, Hail, Saudi Arabia*

Correspondence should be addressed to Mohannad Jamil Alkuwaisi; mohannad20083040020@live.com

Received 13 December 2022; Revised 23 March 2023; Accepted 3 April 2023; Published 13 April 2023

Academic Editor: Nabeel Al-Yateem

Aims. To examine the self-care behaviors of Saudi patients who had cardiac surgery after hospital discharge and to investigate how much variation in self-care behavior may be attributed to patients' basic conditioning factors (BCFs). *Background*. Self-care behaviors following cardiac surgery should be appropriate for the patient's circumstances to decrease hospital readmissions and maintain good health. *Design*. A cross-sectional design guided this study. Orem's Theory of Self-Care was applied as a theoretical framework. *Materials & Methods*. The Self-Care Behavior Scale (SCBS) was used to gather data from 150 patients who experienced cardiac surgery after they were discharged from cardiac centers in two large cities in Saudi Arabia. *Results*. The two self-care behaviors performed most frequently concerned taking medications as prescribed. The other three self-care behaviors frequently performed were avoiding any strain, assessing all incisions for signs of infection, and contacting a physician if any signs of infection appeared. There was a statistically significant difference between patients' total self-care behaviors according to their BCFs. Married patients reported significantly more self-care behaviors than single patients. Patients with only valve replacement (VR) surgery performed more self-care behaviors than the coronary artery bypass graft (CABG) and VR groups. These factors positively influence (61.2%) self-care behavior and performance. *Conclusion*. Cardiac surgery patients showed moderate self-care behavior after being discharged from hospital. Furthermore, the results of this study showed statistically significant variation in patients' self-care behaviors based on their BCFs.

1. Introduction

Each year, the number of cardiac surgeries carried out worldwide is approximately one million [1]. As the rate of cardiovascular disease increases, the demand for cardiac surgery is predicted to rise by around 5% per year, reaching over 1.3 million surgeries annually by 2026 [2]. In the United States, over 900,000 cardiac surgeries are performed yearly [3]. Coronary artery bypass graft (CABG) is one of the most expensive surgical procedures in the U.S., accounting for $6 billion in healthcare costs annually [4]. Additionally, the average cost of valve replacement surgery (VR) was approximately $170,000 in the United States in 2021 [5]. Similarly, the number of cardiac surgeries in the Middle East has increased. In Turkey, for example, it is estimated that 20,000 cardiac surgeries are performed yearly [6].

The Heart Center of King Salman Specialist Hospital is the sole governmental facility in Hail City that does cardiac surgery and was started in 2010. The number of CABG operations performed at this facility has grown year after year. For example, in 2012, there were just 15 surgeries, compared to 46 surgeries in 2020 [7]. Additionally, the Heart Center of King Saud University in Riyadh currently performs more than 400 open cardiac surgeries annually in

Saudi Arabia [8]. As a result of the increased number of cardiac surgeries, hospitals and patients have recently encountered financial pressure, resulting in significant reductions in hospital stays, a decrease in healthcare services, and a considerable increase in nurse-to-patient ratios across all hospital services [1, 9].

After cardiac surgery, patients undergoing cardiac rehabilitation require education to recover from their surgery [9]. In addition, to improve physical and psychological well-being [10, 11], improve the quality of life [12], and reduce complications, it is imperative to make adequate plans [13]. However, these goals could be difficult to meet in the absence of proper patient education and information.

Education is often provided 24–48 hours before discharge and covers standardized self-care behaviors such as medication management, a safe cardiac diet, physical activity, infection signs and symptoms, wound care, and complications management [14, 15]. The standardized educational approach for self-care behaviors has some issues or concerns [16]. Each patient has a distinct learning style and learning needs, and thus, standardized education may decrease the patient's desire, motivation, and concentration during the learning experience, which ultimately may decrease the patient's satisfaction [16].

One of the highest readmission rates globally is related to CABG and/or VR patients [17]. Despite the availability of rehabilitation services, more than 16% of all CABG and/or VR patients are readmitted to the hospital within the first month following surgery due to postoperative complications [18]. The common causes of readmission include postoperative infections (26%), pericardial effusion (19%), dysrhythmia (16%), and heart failure (11%) [19]. This high readmission rate causes serious consequences for healthcare resources utilization, quality of care, and increased incidence of underlying cardiac conditions [17]. The quality of patients' participation in self-care behaviors may be one of the reasons for the higher percentage of readmissions to the hospital following cardiac surgery [20]. Unfortunately, patients may not participate in the required self-care behaviors during the first few months after CABG and/or VR. Proper self-care behaviors are crucial in promoting positive health outcomes, such as increasing patients' adaptability, reducing cardiac surgery patients' impairment in role or functioning, and preventing frequent hospitalizations [21]. Patients who conduct adequate self-care have a good quality of life. Furthermore, they are likely to have lower mortality rates [12]. In contrast, poor self-care behaviors can lead to poor health outcomes and frequent hospitalizations [22].

In Saudi Arabia, there is no specific or well-structured education program for cardiac surgery patients after discharge from the hospital. As a result, the purpose of this study was to examine patients' most and least frequent self-care behaviors after they were discharged from the hospital to assist healthcare providers in developing educational programs that will assist these patients in improving their self-care behaviors and thus enhancing their recovery at home. In addition, this study will examine the effect of basic conditioning factors (i.e., demographic variables, surgical procedure type, and comorbid conditions) on self-care behaviors.

1.1. Theoretical Framework. This study is based on Orem's Theory of Self-Care, which was developed by Orem [23]. This theory focuses on people who intentionally engage in self-care actions and sequences of actions to modify or maintain their functioning or development. Some regulatory action requirements stem from medical conditions and are known as "health deviation self-care requisites." Health-deviation self-care requisites raise the overall self-care demand encountered by patients suffering from stressful conditions such as cardiac surgery [23]. Self-care demands provide an individual with information about how to care for themselves. An individual's interpretation of the self-care demands will determine how he or she cares for themselves [24]. Cardiac surgery patients must learn and deliberately perform self-care constantly and in accordance with regulatory requirements to meet the growing demand for self-care [23]. Basic conditioning factors (BCFs) are the factors that affect self-care. Individual diversity depends on BCFs [23]. This study included a variety of BCFs, such as demographic variables, surgical procedure types, and comorbid conditions. According to Orem [23], individuals involved in self-care have special capabilities known as "self-care agency." Self-care agency is an individual's acquired powers comprised of various capabilities, which include knowledge and skills. For example, individuals after cardiac surgery must first gather knowledge of the factors relevant to their condition, reflect on their significance for development and healthy functioning, determine their options, and assess the efficacy and appropriateness of these courses of action.

This theory was frequently used in studies related to home recovery after cardiac surgery, and it successfully predicted and explained self-care behaviors after CABG or cardiac studies [25–28].

2. Method

2.1. Design, Setting, and Sample. The study aims were addressed using a cross-sectional design. The study was carried out at two governmental cardiac centers in two large cities in Saudi Arabia from July to October 2022. Off-pump CABG surgery was performed at these two government cardiac centers. The 30-day readmission rate for CABG and/or VR surgery cases in two government cardiac centers was 31.1%. The sample was recruited consecutively using the convenience sampling method and the following criteria: experienced CABG and/or VR; had the ability to communicate verbally in Arabic, as determined by their nurse; were oriented to time, place, and person; were aged ≥18 years and had access to a phone that worked at home. Individuals were excluded from the study if they were suffering from significant postoperative complications such as stroke, severe wound infections, respiratory illness, and kidney disease, as well as having a mental disorder that may impair the patient's ability to respond to the survey.

The sample size was determined using the G^* Power software program. With a preset power of 0.8, an alpha level of 0.05, and an expected moderate effect size of 0.6. Based on the criteria identified, the required sample was size 150.

2.2. Survey Instrument. The Self-Care Behavior Scale (SCBS) was developed by Artinian et al. [25] to elicit data about performed self-care behaviors of patients who had undergone cardiac surgery. The SCBS is a self-rating tool that has been widely used in postoperative cardiovascular surgery patients. It consists of 29 items that refer to the activities patients can participate in following cardiac surgery. These behaviors are related to postoperative incision and lung complications, the management of symptoms, the performance of activities, and prescribed drug management. Each item has a range of responses from zero, indicating "none of the time," up to five, which means "all of the time." The mean score of all items will be ranging from zero to five [25]. High scores indicate that individuals engage in self-care behaviors more frequently [25].

The SCBS had a content validity index (CVI) of 0.82 and a Cronbach's alpha of 0.79 [25]. In another study by Fredericks and Sidani [17], Cronbach's alpha for the SCBS was 0.72. The internal consistency reliability of the SCBS in this study was good (Cronbach's alpha = 0.87).

2.3. Data Collection Process. Within 48 hours of admission to the coronary care unit (CCU), participants were invited to participate if they met the study's eligibility criteria. First, the charge nurse screened eligible study participants using the inclusion criteria. Second, the investigators contacted all patients who had expressed an interest in learning more about the study and obtained informed consent after confirming that the patients had read and comprehended the information on the consent form. Third, in a face-to-face interview within 48 hours of admission to the CCU, the investigator gathered data on socio-demographics, clinical characteristics, and telephone numbers from eligible patients. Finally, one week after hospital discharge, the investigator conducted a telephone interview to collect data on self-care behaviors. A telephone interview with each patient lasted 15–20 minutes. Because of the patient's recent hospital discharge and erratic recovery, this time was selected because it is expected that they will participate in numerous self-care behaviors during this time [17, 26].

2.4. Ethical Considerations. The Ministry of Health in Saudi Arabia approved this study (H-2022-404). The investigator informed the participants of their ability to withdraw from the study at any time without hindering their ongoing care. Informed consent was obtained from potential participants. The investigators ensured that there was no confidentiality or anonymity violation by coding the participants' responses so that the investigator could not link them to their data. The investigator kept the completed consent forms and coded questionnaires in a locked cabinet at the Cardiac Center's Nursing Education and Training. Patients were informed that their participation in the study might not directly benefit them; however, the study's findings may be used to develop self-management programs for CABG and/or VR patients to promote their home recovery. The risk associated with patients' participation in this study was considered negligible, similar to that encountered in everyday life or during routine care, such as the time and effort spent responding to the investigator during the telephone interview. This study followed all ethical principles, including those in the "World Medical Association Declaration of Helsinki" (version 2002).

2.5. Data Analysis. SPSS version 28 was used for all analyses, with a significance level of 0.05. Descriptive statistics were used to describe the study participants and to determine their self-care behaviors after CABG and/or VR surgery. Continuous data were assessed for normality, and an independent samples *t*-test and one-way ANOVA was used to compare the self-care behaviors between different BCFs. Multiple regression analysis was used to determine the amount of variation in self-care behaviors that BCFs can explain in patients who underwent cardiac surgery. The missing data were addressed using pairwise deletion because the percentage of missing data was very small.

3. Result

3.1. Demographic Characteristics. The sample included 150 participants, and the response rate was 90.6%. The participants had an average age of 59.9 ± 10.1 years. More than half of the participants were men (58.7%) and married (60.0%), while most participants had nonuniversity education (80%). Half of the study participants had CABG surgery (52.0%), while 35.3% had VR, and 12.7% had both CABG and VR procedures. The most frequent comorbidities among the study sample were myocardial infarction (54%), hypertension (36%), diabetes mellitus (31.3%), and heart failure (22.7%) (Table 1).

3.2. Self-Care Behaviors of Cardiac Surgery Patients. The total items mean score of self-care behaviors among patients was 2.53 ± 1.23, 95% CI = [2.34, 2.73]. This indicated that patients' levels of self-care were generally moderate. Most (59%) patients rated their self-care behaviors as "little of the time," "some of the time," or "a good bit of the time." Furthermore, 41% of patients rated their self-care behaviors as "most of the time" or "all of the time." The categories ranked by patients as most frequent self-care behaviors were "taking prescribed medications" (mean ± SD = 3.02 ± 1.11), followed by "chest and leg wound care" (mean ± SD = 2.94 ± 0.98), and other pertinent self-care behaviors (mean ± SD = 2.56 ± 1.24) (Table 2).

The two self-care behaviors performed most frequently concerned taking medications as prescribed. The other three self-care behaviors frequently performed were "avoiding any strain by putting weight on the upper arms, shoulders, back, neck, and chest," "assessing all incisions for signs and symptoms of an infection," and "contacting a physician if any signs and symptoms of infection appeared" (Table 3). On the other hand, the five least frequently performed self-care behaviors concerned "contacting a physician when nausea and vomiting occur," "having rest time during the day," "using different techniques to help with sleep," and

Table 1: Basic conditioning factors of the participants (n = 150).

Variables	Frequency (%)
Gender	
Male	88 (58.7)
Female	62 (41.3)
Marital status	
Married	90 (60)
Unmarried	60 (40)
Education level	
School education	77 (51.3)
Diploma education	43 (28.7)
University education	30 (20.0)
Type of surgery	
CABG	78 (52.0)
VR	53 (35.3)
CABG and VR	19 (12.7)
Comorbidities	
Myocardial infarction (MI)	81 (54.0)
Hypertension (HTN)	54 (36.0)
Diabetes mellitus (DM)	47 (31.3)
Heart failure (HF)	34 (22.7)

Table 2: Description of categories related to self-care behaviors of cardiac surgery patients (n = 150).

Categories	Mean*	SD
Taking prescribed medications	3.02	1.11
Chest and leg wound care	2.94	0.98
Other pertinent self-care behaviors	2.56	1.24
Complication monitoring/management	2.36	1.34
Physical activity	2.27	1.46

*Possible range = 0–5.

"having a reminder system when taking medications" (Table 4).

3.3. Relationship between BCFs and Patients' Self-Care Behaviors. The findings revealed statistically significant differences in self-care behaviors according to marital status (t = 13.49, p = 0.001), with married individuals performing significantly higher self-care behaviors (mean ± SD = 3.28 ± 1.05) than unmarried (mean ± SD = 1.42 ± 0.17). Moreover, there was a statistically significant difference between total self-care behavior and type of surgery (f = 13.77, p = 0.001). Post hoc analysis showed that VR surgery (mean ± SD = 2.95 ± 1.21) and CABG surgery (mean ± SD = 2.54 ± 1.21) patients performed significantly more self-care behaviors than the CABG and VR group (mean ± SD = 1.35 ± 0.18).

There was no significant relationship between the total self-care behavior score and other BCFs (i.e., age, sex, education, or comorbidities). However, several significant differences emerged when BCFs (i.e., comorbidities) were examined concerning specific self-care behaviors (i.e., item differences), but other BCFs (i.e., age, sex, or education) did not show a significant relationship with item differences. Regarding comorbidities, there were statistically significant differences between diabetic patients and nondiabetic patients in their cleanliness of surgical wounds (t = −2.54, p = 0.012), in which diabetic patients were more likely to clean all of their surgical wounds every day with soap and water (mean ± SD = 2.77 ± 1.33), than nondiabetic patients (mean ± SD = 2.07 ± 1.64). Moreover, there were statistically significant differences between diabetic patients and nondiabetic patients in their assessment of all of the incisions for signs of infection (t = 2.01, p = 0.045), in which diabetic patients were more likely to assess all incisions for signs of infection (mean = 3.72 ± 1.05) than patients without DM (mean ± SD = 3.32 ± 1.27). There were statistically significant differences between patients with HF and patients without HF in performing deep breathing and coughing exercises (t = 2.34, p = 0.02), in which patients without HF were more likely to perform deep breathing and coughing exercises (mean ± SD = 2.39 ± 1.57) than patients with HF (mean ± SD = 1.68 ± 1.51). There were also statistically significant differences between patients with HF and patients without HF in weighing themselves (t = 2.13, p = 0.03), in which patients without HF were more likely to weigh themselves every day of the week (mean ± SD = 2.42 ± 1.56) than patients with HF (mean ± SD = 1.76 ± 1.61).

A stepwise linear multiple regression analysis was conducted to identify predictors of self-care behaviors. Categorical variables with three or more categories, such as surgery type and educational level, are recoded into several dichotomous dummy variables. The results of this study revealed that the final model was significant (F = 115.8, p = .001) and contained two variables (marital status and VR surgery) (Table 5). The model explained 61.2% of the variance in total self-care behavior (Adjusted R2 = 0.606). The most influential factor on self-care behavior was marital status (β = −1.86, p = 0.001), followed by VR surgery (β = 0.63, p = 0.003). The CABG surgery was not a significant predictor of self-care behavior (t = −1.10, p = 0.31).

4. Discussion

The results of this study revealed that Saudi cardiac surgery patients had moderate self-care behavior after being discharged. Most self-care behaviors were rated as occurring "little of the time" or "some of the time" or "a good bit of the time." This finding was explained by Lin et al. [29], who claimed that patients find it challenging to perform self-care behaviors adequately following cardiac surgery due to psychological issues such as anxiety, depression, memory loss, dementia, and delirium. Meanwhile, hospital nurses have limited time to educate and assist patients. Moreover, patients suffer moderate-to-severe anxiety and depression symptoms after cardiac surgery. These increased symptoms have been shown to last for up to six weeks after discharge [30, 31]. Jaarsma et al. [32] suggested that anxious and depressed individuals were less able to perform self-care behaviors because they had more difficulty planning efficiently and realistically and coping during recovery. In addition, cognitive decline can occur for up to six weeks after cardiac surgery, with a 20–50% incidence, whereas a slight decline in cognitive function lasting from six months to a year can occur with a 10–30% incidence [33]. The long-

Table 3: Top 5 most frequently specific performed self-care behaviors ($n = 150$).

Self-care behavior	Mean*	SD
"I always refill my prescriptions on time"	4.15	1.06
"I take my pills every day as the doctor prescribed"	4.05	1.31
"I try to avoid strain (such as putting weight of upper arms, shoulders, back, neck, and chest)"	3.74	1.12
"I constantly assess all of my incisions for redness, swelling, puffiness, leaks, and tenderness"	3.59	1.13
"I contact my doctor if I notice any redness, swelling, puffiness, leaks, and tenderness"	3.58	1.01

*Possible range = 0–5.

Table 4: Least 5 frequently specific performed self-care behaviors ($n = 150$).

Self-care behavior	Mean*	SD
"I plan rest times during my day"	2.12	1.675
"I contact my doctor when I have vomiting"	2.19	1.678
"I contact my doctor when I have nausea i.e.: sick to the stomach"	2.20	1.626
"When I am unable to sleep I use different techniques to help put me to sleep"	2.21	1.661
"I have a system to help tell me when to take my pills"	2.22	1.682

*Possible range = 0–5.

Table 5: Results of stepwise multiple regression to predict self-care from BCFs.

Variables	t	β	p value
Marital status	−14.42	−1.86	0.001
Type of surgery (VR)	4.76	0.63	0.001

β = partial correlation. *Significant at $p \leq 0.05$. $R = 0.78$.

term decline was evident in 42% of patients after five years [34]. As a result, increased cognitive decline after cardiac surgery may affect an individual's ability to participate in self-care behaviors. Previous studies have found that patients who have undergone cardiac surgery have poor self-care behaviors after discharge [9, 35]. Cardiac surgery is a distressing condition for Saudi patients, which may result in moderate self-care behavior after discharge.

Self-care behaviors about refilling prescriptions on time, taking medications as the physician prescribed, avoiding strain, assessing incisions for signs of infection, and informing the physician about these signs were most commonly practiced by cardiac patients after discharge. Patients were most likely to perform these self-care behaviors after discharge to manage their home care [17, 36]. However, contacting the physician when nausea and vomiting occurred, using a reminder system to help to take medications, using different techniques to help with sleep, and resting during the daytime were the least performed self-care behaviors by patients after discharge [17].

4.1. Marital Status. The results of this study showed that the total scores of self-care behaviors differed significantly based on marital status. Married patients engaged in more self-care behaviors than unmarried patients. This result is in line with previous studies [17, 25]. This result can be explained by the fact that the married patients in this study often had higher education, which could affect their awareness and observance of self-care behaviors. Another possible explanation is that married patients have more responsibility to other individuals at home than unmarried patients, and they feel compelled to sustain their duties as soon as possible to care for their families, or they are being encouraged by their spouses or children to take care of themselves.

4.2. Type of Surgery. The current study found a significant difference in the total scores of self-care behaviors based on the type of surgery. Patients who had experienced only VR surgery performed higher self-care behaviors than those who had experienced only CABG surgery or both CABG and VR surgeries. This result is consistent with Fredericks and Sidani [17] result. This finding could be explained by the fact that patients who have only had CABG surgeries or both surgeries may have a greater sense of vulnerability and severity for their surgery, resulting in reduced self-care behavior.

4.3. Comorbidities. A statistically significant association was not found between overall self-care behavior and comorbidities. However, certain self-care behaviors were associated with some comorbidities. For example, diabetic patients were more likely than nondiabetics to clean all of their surgical incisions with soap and water regularly, and they were more likely to assess all of their incisions for signs of infection. This result can be explained by the fact that diabetic patients in this study had good awareness and knowledge about the increased risk of wound infection and other severe complications among diabetic patients.

Patients with heart failure were less likely to engage in deep breathing and coughing exercises and weigh themselves every day of the week. The low self-care behaviors might be attributed to a lack of awareness and information about their condition. Heart failure was not previously recognized as the primary cause of mortality. As a result,

information on specific self-care practices relevant to this condition was limited, and patients received no training [32]. These reasons could explain the low mean score in the former self-care behaviors of heart failure patients.

The regression model explains 61.2% of the variance in self-care scores of cardiac surgery patients, indicating that BCFs are good predictors of self-care behavior scores. As a result, other variables account for 38.8% of self-care scores' variability. The findings are similar to those recently found in research on sociodemographic factors' influence on surgical populations' treatment-seeking behaviors [17]. However, more research is required to determine the impact of BCFS on self-care behavior in the cardiovascular surgery population. In addition, a comprehensive assessment of the impact of BCFs in predicting self-care after cardiac surgery is necessary, including an evaluation of occupation, economic status, and urbanization.

5. Conclusion

Following cardiac surgery, Saudi patients performed moderate self-care behaviors. There were statistically significant differences in the total self-care behaviors according to the patients' BCFs. Married patients took better care of themselves. Patients who had only VR surgery demonstrated better self-care behaviors than those who had CABG and both surgeries. DM patients were more likely to clean all of their surgical incisions and were likely to assess all of their incisions for signs of infection. HF patients were less likely to perform deep breathing and coughing exercises and weigh themselves every day of the week. Patients' BCFS accounted for 61.2% of the variability in self-care behavior performance.

6. Implications for Nursing Practice

During the 24–48 hours before discharge from the hospital, CABG and VR patients should receive more information about appropriate self-care behaviors. Nurses in coronary care units should be equipped with enough knowledge about self-care behaviors in addition to teaching skills so that nurses will be able to explain self-care behaviors in a simple and informative way, which ultimately may increase patients' understanding and retention of information and enable patients to restore health, independent living, and well-being.

The findings of this study highlight that there is diversity in patient self-care behaviors, which validates the necessity for healthcare providers to conduct individual assessments of self-care behaviors. Unmarried patients, patients who underwent both surgeries, patients without diabetes, and HF patients should all receive targeted educational programs focused on improving functional recovery.

There is a significant amount of variance caused by other variables, with 38.8% remaining unexplained. Nurses must be aware that other variables might influence self-care behavior despite considering age, gender, education, marital status, surgery type, and comorbidities in their educational sessions with patients. Hypothetical evidence suggests that psychological factors influence self-care behavior. Further investigation into the impact of these variables is required. Future studies should investigate the influence of anxiety, depression, delirium, dementia, and memory loss on self-care behavior and performance. Furthermore, nurses should continue monitoring and managing these psychological factors after surgery to support theoretical arguments that link psychological factors to self-care behavior and performance.

7. Limitations of the Study

The sample was recruited using a convenience sampling method, and this study was carried out at two cardiac centers in a particular region of Saudi Arabia. This may limit the representativeness of the sample and the generalizability of findings. The findings can be applied only to those patients who have similar characteristics. Future studies should focus on collecting data from multisite (national) studies and use random sampling methods. The use of a cross-sectional correlational design may limit the causality of findings. Therefore, future studies should focus on conducting longitudinal or experimental studies.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

S. A and M. A conceptualized the data. M. A. wrote the original draft and performed formal analysis. M. H wrote reviewed and edited the manuscript. All authors contributed to methodology.

Acknowledgments

This research has been funded by the Deputy for Research and Innovation, Ministry of Education, through the Initiative of Institutional Funding at the University of Hail, Saudi Arabia, through project number IFP-22-145.

References

[1] K. Tiwari, J. Grapsa, S. Laudari, M. Pazdernik, and D. Vervoort, "Challenges and possibilities of developing cardiac surgery in a peripheral hospital of low-and middle-income countries," *Perfusion*, vol. 36, no. 1, pp. 38–43, 2021.

[2] J. J. Lee, N. H. Park, K. S. Lee et al., "Projections of demand for cardiovascular surgery and supply of surgeons," *The Korean Journal of Thoracic and Cardiovascular Surgery*, vol. 49, no. 1, pp. S37–S43, 2016.

[3] iDataResearch, "Cardiac surgery market report suite for US 2020-2026 synopsis," 2022, https://idataresearch.com/over-900000-cardiac-surgeries-performed-every-year-in-the-united-states/.

[4] M. Mori and R. Khera, "Pumping the breaks on health care costs of cardiac surgery by focusing on postacute care spending," *Circulation: Cardiovascular Quality and Outcomes*, vol. 13, no. 11, Article ID e007253, 2020.
[5] J. Mendoza, "Heart valve replacement cost in Colombia," 2021, https://www.statista.com/statistics/981160/latin-america-heart-valve-replacement-cost/.
[6] M. Aksüt, D. Günay, T. Özer, ÖA. Yerlikhan, E. Selçuk, and M. K. Kırali, "In-hospital and long-term outcomes after open-heart surgery in Turkish octogenarians: a single-center study," *Brazilian Journal of Cardiovascular Surgery*, vol. 36, no. 1, pp. 64–70, 2021.
[7] M. O. H. King, "Specialist hospital- Hail," 2022, https://www.moh.gov.sa/en/Ministry/MediaCenter/News/Pages/News-2020-12-21-004.aspx.
[8] K. Alburikan and R. Nazer, "Use of the guidelines directed medical therapy after coronary artery bypass graft surgery in Saudi Arabia," *Saudi Pharmaceutical Journal*, vol. 25, no. 6, pp. 819–822, 2017.
[9] L. Shahmoradi, N. Rezaei, S. Rezayi, M. Zolfaghari, and B. Manafi, "Educational approaches for patients with heart surgery: a systematic review of main features and effects," *BMC Cardiovascular Disorders*, vol. 22, no. 1, pp. 1–24, 2022.
[10] O. Younes, R. Amer, H. Fawzy, and G. Shama, "Psychiatric disturbances in patients undergoing open-heart surgery," *Middle East Current Psychiatry*, vol. 26, no. 1, pp. 4–7, 2019.
[11] L. Chen, J. Zheng, D. Kong, and L. Yang, "Effect of enhanced recovery after surgery protocol on patients who underwent off-pump coronary artery bypass graft," *Asian Nursing Research*, vol. 14, no. 1, pp. 44–49, 2020.
[12] P. Asadi, S. Ahmadi, A. Abdi, O. Shareef, T. Mohamadyari, and J. Miri, "Relationship between self-care behaviors and quality of life in patients with heart failure," *Heliyon*, vol. 5, no. 9, Article ID e02493, 2019.
[13] M. Choshi, A. Rosenfeld, and M. Koithan, "Self-care behaviors of rural women post-invasive coronary interventions," *Online Journal of Rural Nursing and Health Care*, vol. 20, no. 2, pp. 78–107, 2020.
[14] S. Fredericks and A. Bechtold, "Challenges associated with delivering education to patients after heart surgery," *Japan Journal of Nursing Science*, vol. 11, no. 3, pp. 223–227, 2014.
[15] J. Aroesty and G. Saperia, "Patient education: recovery after coronary artery bypass graft surgery (CABG). Wolters Kluwer," 2021, https://www.uptodate.com/contents/recovery-after-coronary-artery-bypass-graft-surgery-cabg-beyond-the-basics.
[16] S. Fredericks and T. Yau, "Clinical effectiveness of individual patient education in heart surgery patients: a systematic review and meta-analysis," *International Journal of Nursing Studies*, vol. 65, no. 2017, pp. 44–53, 2017.
[17] S. Fredericks and S. Sidani, "Socio-demographics and health profile: influence on self-care," *British Journal of Cardiac Nursing*, vol. 7, no. 2, pp. 77–82, 2012.
[18] M. Alghafees, N. Alsubaie, L. Alsadoon, S. Aljafari, E. Alshehri, and I. Suliman, "Thirty-day readmission rates and associated risk factors after coronary artery bypass grafting," *Journal of Taibah University Medical Sciences*, vol. 15, no. 4, pp. 292–297, 2020.
[19] S. Trooboff, P. Magnus, C. Ross et al., "A multi-center analysis of readmission after cardiac surgery: experience of the northern new england cardiovascular disease study group," *Journal of Cardiac Surgery*, vol. 34, no. 8, pp. 655–662, 2019.
[20] J. Nellipudi, R. Baker, L. Dykes, B. Krieg, and J. Bennetts, "Prognostic value of high-sensitivity troponin T after on-pump coronary artery bypass graft surgery," *Heart Lung & Circulation*, vol. 30, no. 10, pp. 1562–1569, 2021.
[21] H. Mohsenipouya, F. Majlessi, A. Rahimi Forooshani, and R. Ghafari, "The effects of health promotion model-based educational program on self-care behaviors in patients undergoing coronary artery bypass grafting in Iran," *Electronic Physician*, vol. 10, no. 1, pp. 6255–6264, 2018.
[22] A. Navidian, F. Yaghoubinia, A. Ganjali, and S. Khoshsimaee, "The effect of self-care education on the awareness, attitude, and adherence to self-care behaviors in hospitalized patients due to heart failure with and without depression," *PLoS One*, vol. 10, no. 6, Article ID e0130973, 2015.
[23] N. Orem, *Concepts of Practice*, Mosby, Missouri, MO, USA, 6 edition, 2001.
[24] D. Orem, *Concept Formalization in Nursing: Process and Product*, Little, Rhode Island, Brown, 2 edition, 1979.
[25] N. Artinian, M. Magnan, M. Sloan, and M. P. Lange, "Self-care behaviors among patients with heart failure," *Heart & Lung*, vol. 31, no. 3, pp. 161–172, 2002.
[26] S. Fredericks, S. Sidani, and D. Shugurensky, "The effect of anxiety on learning outcomes post-CABG," *Canadian Journal of Nursing Research Archive*, vol. 40, no. 1, pp. 127–140, 2008.
[27] S. Fredericks, "Timing for delivering individualized patient education intervention to coronary artery bypass graft patients: an RCT," *European Journal of Cardiovascular Nursing*, vol. 8, no. 2, pp. 144–150, 2009.
[28] V. Zamanzadeh, L. Valizadeh, A. F. Howard, and F. Jamshidi, "A supportive-educational intervention for heart failure patients in Iran: the effect on self-care behaviours," *Nursing Research and Practice*, vol. 2013, no. 492729, pp. 1–7, 2013.
[29] I.-H. Lin, M. Oldham, K. Hawkins, L. Scoutt, D. Yuh, and H. Lee, "Depression predicts delirium after coronary artery bypass graft surgery independent of cognitive impairment and cerebrovascular disease: an analysis of the noahs study," *American Journal of Geriatric Psychiatry*, vol. 27, no. 3, pp. S201–S202, 2019.
[30] M. Kamali, F. Shoushi, Y. Janati, N. Mousavinasab, and V. Shafipour, "The impact of family support program on depression, anxiety, stress, and satisfaction in the family members of open-heart surgery patients," *Journal of Nursing and Midwifery Sciences*, vol. 7, no. 2, p. 69, 2020.
[31] H. Sveinsdóttir, S. Zoëga, B. Ingadóttir, and K. Blöndal, "Symptoms of anxiety and depression in surgical patients at the hospital, 6 weeks and 6 months postsurgery: a questionnaire study," *Nursing Open*, vol. 8, no. 1, pp. 210–223, 2021.
[32] T. Jaarsma, L. Hill, A. Bayes-Genis et al., "Self-care of heart failure patients: practical management recommendations from the Heart Failure Association of the European Society of

Cardiology," *European Journal of Heart Failure*, vol. 23, no. 1, pp. 157–174, 2021.

[33] S.-M. Yuan and H. Lin, "Postoperative cognitive dysfunction after coronary artery bypass grafting," *Brazilian Journal of Cardiovascular Surgery*, vol. 34, no. 1, pp. 76–84, 2019.

[34] A. Reichenberg, K. Dahlman, S. Mosovich, and J. Silverstein, "Neuropsychiatric consequences of coronary artery bypass grafting and noncardiovascular surgery," *Dialogues in Clinical Neuroscience*, vol. 9, no. 1, pp. 85–91, 2022.

[35] F. Aliakbari, Z. Moosaviean, R. Masoudi, and S. Kheiri, "The effect of Orem self-care program on sleep quality, daily activities, and lower extremity edema in patients undergoing coronary artery bypass graft surgery," *Advanced Biomedical Research*, vol. 10, no. 1, pp. 1–7, 2021.

[36] A. Salari, L. Rouhi Balasi, A. Ashouri, F. Moaddab, F. Zaersabet, and A. Nourisaeed, "Medication adherence and its related factors in patients undergoing coronary artery angioplasty," *Journal of Caring Sciences*, vol. 7, no. 4, pp. 213–218, 2018.