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Factors Affecting Nurses' Performance Regarding Care of Patients post Cardiac Valve Replacement Surgery

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Abstract

Background: Cardiac valve replacements are common and excellent solution for treating patients with symptomatic valvular heart diseases. Adequate post -operative nursing care for patients is important to prevent further complications.

Study Aim: Evaluate factors affecting nurses' performance regarding care of patients post cardiac valve replacement surgery.

Subjects and Methods: Design: A descriptive design was used to achieve the aim of this study.

Setting: Data was collected from Cardiothorathic Surgery Intensive Care Unit and Paid Cardiac Care Unit in Cardiothoracic Sidnawi Hospital.

Subjects: A convenient sample of 50 nurses.

Tools of data collection: Two tools were used; Interviewing questionnaire to assess nurses' demographic characteristics, knowledge and factors affecting nurses performance regarding care of patient post cardiac valve replacement surgery. Observational checklist to assess nurses' practice regarding care of patients post cardiac valve replacement surgery.

Results: This study revealed that about three fifths of studied nurses had unsatisfactory total knowledge and more than half had inadequate total practices regarding care of patients post cardiac valve replacement surgery. 90% of nurses affected by total factors related to nurse. While, 84% affected by total factors related to patient and total factors related to work. Also, there were a significant relation between nurses' knowledge, practice and factors affecting nurses performance.

Conclusion: Studied nurses had unsatisfactory knowledge and inadequate practice regarding care of patients post cardiac valve replacement surgery.

Recommendations: Establish educational and training programs for nurses in order to reach optimal standard of care for patients post heart valve replacement surgery.

Keywords: Cardiac valve replacement surgery, Factors affecting, Nurses' performance, Patients, Postoperative Care.

Introduction

Valve disease is any "pathologic condition" that involves one or more of the heart's four valves interfering with unidirectional blood flow during the cardiac cycle and causing the heart to malfunction, resulting in increased cardiac workload, ventricular dysfunction, and congestive heart failure. Pregnancy, rheumatic heart disease,

infective endocarditis, congenital anomalies, and old age are the main causes of Valvular heart disease **(Chen, Li & Xiang, 2020).**

The unidirectional flow of blood during cardiac circulation is disrupted by valve disorders, which include stenosis, regurgitation, prolapse, atresia, degeneration, and mixed or multiple VHD. Therefore, these conditions are caused by pathoanatomic alterations and pathophysiologic dysfunction of the valve leaflets. The leaflets of the valve do not open normally in valve stenosis, which restricts blood flow forward. When a valve regurgitates due to "insufficiency, leakage, or incompetence," the valve leaflets fail to close all the way, enabling flow to reverse. Furthermore, Multiple (Concomitant) VHD was classified as moderate to severe valvular dysfunction affecting at least two valves, and Mixed VHD, when stenosis and regurgitation occur on the same valve **(Perpetua & Levin, 2022) and (Schoen, 2018).**

VHDs lead to some manifestations such as; dyspnea, dizziness, angina, chest pain, fever, syncope, weight gain, edema in the feet and ankles, ascites, weakness, and easy fatigability. These symptoms are brought on by inadequate cardiac output, anorexia, and right upper quadrant abdominal pain from the liver capsule stretching. Orthopnea, paroxysmal nocturnal dyspnea, pulmonary edema, hemoptysis, atrial fibrillation, arrhythmia or irregular pulse, exercise intolerance, and heart failure are symptoms of systemic venous congestion. Moreover, Patients with aortic stenosis most frequently present with fatigue, dyspnea upon exertion, or a progressive decline in exercise tolerance **(Speight, 2022) and (Libby, 2021).**

VHD can be treated with a variety of approaches, such as medication, lifestyle modifications, surgery, and trans-catheter procedures. While the majority of these therapies can help alleviate symptoms, replacing or repairing damaged valve tissue is the most effective way to fully restore heart function **(Taghizadeh, et al., 2020).** 10-30% of all cardiac disorders are related to heart valve replacements, constituting 23.8% of heart surgeries in Iran **(Hasani, et al., 2024).**

Surgical heart valve replacement remains the only definite treatment for most patients with severe VHD with either mechanical or tissue valve prosthesis" biological valves or bioprosthetics", with approximately 250,000–500,000 replacements globally per year **(Xing & Liu, 2024) and (Nica, et al., 2021**). Moreover, Approximately 50,000 aortic and pulmonary valve replacements are performed each year in Europe due to valve stenosis or valve regurgitation **(Peters, et al., 2024).**

Postoperative care is the management of a patient after surgery. This covers the treatment provided in the days immediately following surgery as well as the postoperative phase. This attempts to decrease hospital stays while improving patient satisfaction by preventing complications like infection, promoting healing, and getting the patient back to a state of health **(Edmealem, et al., 2024).**

Nurses should maintain hemodynamic stability, bleeding monitoring, assessing breathing patterns, recording fluid intake and output, control hypothermia, control pain, draining flow and closely monitor patients postoperatively for dysrhythmias (atrial fibrillation, flutter, tachycardia, and ventricular fibrillation), acute myocardial infraction, shock, pericarditis, pericardial effusion, and cardiac tamponade such care must be taken to prevent neurological, respiratory, cardiovascular, hematological, infectious complications **(Hany, et al., 2023) and (Reisdorfer, 2021).**

The health of critically sick patients is directly and significantly impacted by the work of nurses in intensive care units. Therefore, the following factors affect their performance in caring for patients with valvular heart disorders: leadership style, work environment, coordination, communication, training, recognition, promotion, compensation, organizational commitment, and patient-related factors. Additionally, it covers the nurse-patient interaction, consistency of caregivers, adequate time, personal qualities, personality, attitude, and technical abilities for compassionate and empathetic care. These elements could have to do with the organizational environment, nurses' expertise and methods, and the patients themselves **(Habib, Adly & Hassan, 2023).** Therefore, nurse performance is a priority that must be addressed promptly, as nursing services determine the quality of care **(Daba, et al., 2024).**

Because of the nature of their employment, nurses are vulnerable to burnout, stress, sleep and eating disorders, and hard work. Numerous health issues result from this, most notably musculoskeletal illnesses, neurological conditions, immunological deterioration, and cardiovascular disease (CVD). This may result in lower productivity at work and higher levels of despair **(Nasaif, Alaradi & Hammam, 2024).** Since nurses' motivation is a key component of job satisfaction, improved performance, better patient outcomes, fewer errors, and enhanced productivity, nurses should be encouraged by rewards, pay, promotions, and supervision **(Mohammed, Al Jaffane & Al Qahtani, 2024).**

Significance of the study

Valvular heart disease (VHD), the next cardiovascular epidemic that affects millions of individuals globally and has a significant influence on health care systems, is one of the main types of cardiovascular illnesses. The incidence and prevalence of VHD will keep rising as the population ages **(Messika-Zeitoun, et al., 2023).** In Egypt, Mitral Valve Replacement accounted for 33.9%, followed by tricuspid valve repair and mitral valve replacement **(Elnahal et al., 2022).** A number of factors, including organizational, environmental, and nurse-related (individual) factors, influence the nurses' performance in providing patient care after CVRS **(Mohamed, et al., 2023).** Therefore, the current study carried out to evaluate factors affecting nurses' performance regarding care of patients post cardiac valve replacement surgery.

Aim of this study

This study aimed to evaluate factors affecting nurses' performance regarding care of patients post cardiac valve replacement surgery.

Research questions

- What is the level of nurses' knowledge regarding care of patients post cardiac valve replacement surgery?
- What is the level of nurses' practice regarding care of patients post cardiac valve replacement surgery?
- What are the factors affecting nurses' knowledge and practice regarding care of patients post cardiac valve replacement surgery?

Subjects and methods

Study design

A descriptive, exploratory study design has been employed.

Setting

This study has been executed within two intensive caring units; Cardiothoracic Surgery Intensive Care Unit and Paid Cardiac Care Unit of Cardiothoracic Sadnawi Hospital, connected to the Sharkia Governorate's Zagazig University Hospitals in Egypt.

Subjects :

A convenient sample was used, including 50 who work in the above-described settings.

Tools of data collection

The researcher gathered the data of this study by utilizing two tools as the following:

Tool I: An interview questionnaire

It has been arranged in simple, clear Arabic to prevent misunderstandings. It was constructed by the researcher after reviewing relevant academic references and recommendations of experts for its validity, and it is divided into three parts as the following:

Part I: Demographic characteristics of the study nurses: it covered the personal data of the subjects under study which consisting of seven close-ended questions including (Age, gender, marital status, qualifications,

experience years in ICU, income, residence and attendance of previously training courses regarding care of patients post cardiac valve replacement surgery **(Kassew, Dejen & Liyew, 2020).**

Part II: Nurses' knowledge assessment: it was utilized to assess knowledge of nurses regarding care of patients post CVRS. This is composed of 60 questioning of MCQ / true or false format, and arranged into four sections:

Section A: It included 11 questions about nurses' knowledge regarding anatomy and function of the heart such as (The heart location, heart function, number of heart valves, number of heart chambers, heart valves sites, layers of the heart, main role of heart valves, and function of all four heart valves) and it was developed by the researcher based on recent related literature review (**Hardin & Kaplow, 2025).**

Section B: It composed of 13 questions about nurses' knowledge regarding valvular heart diseases and treatment, such as (definitions and types of valvular heart diseases as valve stenosis, valve prolapse, valve regurgitation, causes, risk factors, signs and symptoms of VHD, Diagnosis of VHD), treatment (surgical valve replacement and types of valves used to replace the damaged heart valves), and it was developed by researcher after reviewing recent related literature of (**Varon, 2021).**

Section C: It involved 26 questions about nurses' knowledge regarding care of patients post-surgical valve replacement (position post-surgery, maintaining patient body temperature, assess and manage pain, care of chest tube, mechanical ventilator care, weaning from mechanical ventilation, nutrition after surgery, wound care and assessment, care of central venous catheter, measuring CVP and evaluation patient after surgery; it was adapted from **(Sharaf Eldeen et al., 2022) and (Soliman, Ebraheim and Abd Elsatter, 2020)**.

Section D: It composed of 10 questions about nurses' knowledge regarding complications from valve replacement surgery and follow-up, such as (time of the complication to occur, signs of bleeding after surgery and it's causes, warning signs after surgical valve replacement, nutrition, follow-up, medication adherence, warning signs of toxicity from anticoagulants, patient exercise, daily living activities and taking shower **(Sharaf Eldeen et al., 2022)**

The scoring system regarding the previous parts of knowledge

The total score for the knowledge was 60 grades (100%). Each correct answer scored one grade, zero for incorrect answer. For each area of knowledge, the score of the items was summed up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. Knowledge was considered satisfactory if the percent score was equal or above 75% and unsatisfactory if less than 75% based on statistical analysis.

Part III: Factors Affecting Nurses' Performance Regarding Care of Patients post Cardiac Valve Replacement Surgery Questionnaire:

This part was concerned with assessing factors affecting nurses' performance regarding care of patients post cardiac valve replacement surgery. This part consisted of three points were factors related to nurse included 24 items, factors related to patient included 12 items and factors related to work included 39 items. Total items were 75 items. It was translated into Arabic language; it was adapted from **(Mohamed, et al., 2023) and (El Desouky, et al., 2020)** and modified by the researcher to suit aim of the study.

The scoring system: The total score of the factors was 75 grades (100%). The responds to these statements were on two scales as follows: one point for affected, zero point for not affected. Total score for whole factors assessment tool was calculated for every nurse and the mean of total score was calculated. These scores were converted into percentage scores. The nurses' role was affected with this factor when the total score equal or above 60% and not affected when the total score below 60% based on statistical analysis.

Tool II: Observational checklist:

This tool was designed by the researcher based on current literature checklist for **(Carter & Notter, 2024; Perry et al., 2024; Cobbett, 2023; Johnson, 2023; Potter et al., 2023).** To evaluate nurses' practices regarding

care of patients post cardiac valve replacement surgery**).** It included the following area of practice: vital signs monitoring (21 items), pain assessment and management (21 items), measuring central venous pressure (25 items), mechanical ventilator care; (29 items), weaning patient from mechanical ventilator (37 items), chest tube care (26 items), central line care (19 items), wound care (33 items) and breathing exercises (30 items).

The Scoring system regarding practice:

The total score of the practice was 241 grades (100%). For each section, items that were seen to be completed received a score of one, while those that were not completed received a score of zero. The sum of the item scores was calculated and then divided by the total number of things. Percentage scores were created from these scores. According to statistical analysis, the nurses' level of practice was considered satisfactory if the total score was equal to or higher than 80%, and unsatisfactory if it was lower than 80%.

Content validity and reliability

Content validity was carried out to ensure that the tools content adequately cover the study aim. It was be used to modify the tools. It was ascertained by a committee involving five expertise from the Medical Surgical Nursing Department at the Faculty of Nursing Zagazig University (one of them professor and four assistant professors), who reviewed the tool for clearance, relevancy, coverage, simplicity and applicability. All suggested changes were implemented. Cronbach's Alpha has been employed to measure the entire consistency (reliability) concerning the tools, yielding a score of 0.740 for knowledge and 0.733 for nurses' practice. while Cronbach's Alpha for factors that affect nurses' performance was 0.981.

Table test of reliability of study tools by Cronbach's Alpha

Tool	Cronbach's Alpha	No of Items
Knowledge	.740	60
Factors that Affect Nurses' performance	.981	75
Observational Check list for Nurses' Practice	.733	241

Filed work

The fieldwork of the current study was conducted over six months from the beginning of December 2024 to the end of May 2025, during this stage all the data were collected from the study subjects. Before sample collection, meetings head units to clarify the study objectives. Nurses' schedules and assignment sheets were obtained to plan data collection. All participating nurses received the same instructions, with the researcher personally meeting each nurse to explain the study purpose and their role with completing the questionnaire, which was then distributed for them to fill out. Then, the questionnaire has been distributed daily at the end of the morning shift for those who work in the mornings and before starting of the afternoon shift for those working later. Each nurse was given the questionnaire individually, with completion time ranging from 30 to 40 minutes. Observations were maintained continuously within the mornings and afternoons shifts before the questionnaire was filled out.

Pilot study

A total of five nurses 10% of the study population, took part in the pilot study for testing the clearness, comprehensiveness and the time spent to complete the questionnaire. These participants were not excluded from the sample in the study as no tool modifications were done.

Administration and ethical consideration

First, the study proposal was accepted by the Zagazig University Faculty of Nursing's Post Graduate Committee and Research Ethics Committee. An official permission to gather data from Sednawi Hospital affiliated to Zagazig University Hospital in Egypt had been received from the hospital administration supervisor through submitting of an official document from the Dean of the Nursing College.

The researcher held meetings with the head nurses of the hospital and ICUs, who are responsible for nursing administration, to explain the purpose of the study and its significance. The goal was to improve collaboration and facilitate the implementation phase. Before beginning data collection, nurses' verbal consent was also obtained.

The study was approved by the nursing faculty ethics commission before it began. Additionally, the researcher assured the participants' privacy and confidentiality by outlining the study's goals to them. Additionally, nurses were informed of their right to withdraw from the study at any moment and their freedom to choose whether or not to participate.

Statistical analysis

The overall data were gathered, organized and analyzed statistically using SPSS 25.0 for windows. A fixed frequency (numbers) and a proportional frequency (percentages) were used to display the qualitative results, while the mean ± SD and median (range) were used to illustrate the quantitative findings. When applicable, the percentage of categorical variables was compared using Fisher's exact test or chi square. Every test had two sides. Pearson's correlation coefficient was implemented for assessing the relation among the different research variables, with (+) indicating a positive correlation and (-) indicating a reversed correlation; value close to one reflects strong correlations and value close to zero reflects weak correlations. It was considered that P-value less than 0.05 has a statistical significance, and there was no statistical significance if P-value ≥ 0.05.

Results

Table1: Clarifies that around three quarters (74.0%) of studied nurses their age less than 30 years old with mean age 30.08±5.04 and more than half (56.0%) are females. Also, about two thirds (62.0) of studied nurses are married, 64.0% had technical institute. As well as more than half (56.0%) of studied nurses had experience from five to less than ten years in the nursing field. Furthermore, the majority of studied nurses had insufficient income, only two thirds (66.0%) are living in rural area. In addition, more than half hadn't training courses regarding care of patients post CVRS.

Table 2: Shows that the nurses under study had unsatisfactory levels of knowledge regarding valvular heart diseases and treatment, patient care after CVRS and the complications of heart valve replacement surgery and follow-up (60.0%, 66.0%, 52.0%) respectively.

Table 3: showed that; 94.0% their practices were affected by total nursing physical factors, nursing socio-economic factors and relationship with nursing colleagues.

Table 4: Clarifies that studied nurses had satisfactory level in nursing practice regarding vital signs monitoring, mechanical ventilator care and mechanical ventilator weaning (54.0%, 62.0%, 66.0%) respectively. Otherwise, 58.0% of studied nurses had an unsatisfactory level in practice during pain assessment and management, 52.0% of studied nurses had an unsatisfactory level in practice during measuring central venous pressure. Also, 58.0% of nurses had unsatisfactory level in practice regarding care of chest tube. Moreover, 54.0% of nurses had unsatisfactory level in practice regarding care of central line, wound care and breathing exercises.

Table5: showed that; there was statistically significant correlation between the studied nurses total knowledge and total practices with P-value was **.010.** Also, there were highly statistically significant correlations between the studied nurses' total knowledge, total practices and total factors affecting nurses' performance regarding care of patients post cardiac valve replacement surgery with P-value was **.000.** Also, total knowledge and total practices were **.010,** total knowledge and factors were **-.039.** Total practices and factors were **0.000.**

Figure1: Showed that; 58.0% of studied nurses had unsatisfactory level of total knowledge score regarding care of patients after CVRS.

Figure2: Illustrated that; the majority (84.0%) of studied nurses their performance regarding care of patients post CVRS was affected by nurse, patient and work- related factors.

Figure 3: Portrayed that 54.0% of the studied nurses had unsatisfactory level of total practice regard caring of patient post CVRS.

Discussion

The present study demonstrated that approximately three quarters of studied nurses their age less than 30 years. This result was in the same line with **Gad Allah and Ahmed, (2024)** who studied "Impact of Educational Program on Nurses' Knowledge and Practice Concerning Post-Operative Patient Care After Open Heart Surgery in Egypt" and found that slightly more than three quarters of the studied nurses were less than 30 years old. Also, this finding was congruent with **Salem et al., (2020)** who studied "Development of clinical nurses' competency in cardiothoracic intensive care unit" and mentioned that nearly three quarters of studied nurses were less than 30 years old.

As regard to gender, the current study results showed that about three fifths of studied nurses are females. In my opinion this results may be due to greater section of nurses in Egypt was female, may also nursing in Egyptian universities were exclusive for female till few years ago. This finding was congruent with **Göktepe et al., (2021)** who conducted a study about "Views of Critical Care Nurses Participating in an Adult Intensive Care Nursing Certification Program" and pointed out that the majority of studied nurses working in intensive care units were females.

Regarding marital status, the current study revealed that more than three fifths of studied nurses are married. This was in agreement with **Ruby et al., (2023)** who illustrated that more than three fifths of studied cardiac care unit nurses are married. Similarly, **Ahmed et al., (2022)** in a study about "Level and predictors of caring behaviors of critical care nurses" and found that about three fifths of critical care nurses were married.

Regarding qualification of studied nurses, the present study indicated that nearly two thirds of studied nurses have technical institute. This finding in harmony with **Salem et al., (2020)** who studied "Development of clinical nurses' competency in cardiothoracic intensive care unit" and mentioned that three fifths of studied nurses had technical institute. Contrary, **Salama and Awad, (2020)** who reported in a study about "Advantage and limitation of nursing students' training at governmental ICU in Gaza: Nurses' perceptions" stated the majority of studied nurses had bachelor of nursing.

Concerning years of experience, the study findings revealed that more than half of studied nurses had experience from five to less than 10 years in the working units; this was in agreement with **Gad Allah and Ahmed, (2024)** who studied "Impact of Educational Program on Nurses' Knowledge and Practice Concerning Post-Operative Patient Care After Open Heart Surgery" and found that half of studied nurses had less than 10 years of experiences in ICUs.

Regarding income, the current study results revealed that the majority of nurses their income not enough. This results was in the same line with **El Desouky et al., (2020)** who conducted a study titled "Factors affecting Nurses' performance regarding the care for patients underwent coronary artery bypass graft" and found that the majority of studied nurses their income not enough. while, this finding is controversy with **Ahmed et al., (2022)** in a study "Level and predictors of caring behaviors of critical care nurses" and found that about three quarters of the studied nurses had sufficient income.

Regarding residence, the study results revealed that two thirds of studied nurses are from rural areas. This results in harmony with **Ahmed et al., (2021)** who reported that three quarters of studied nurses are from rural areas. However, this results was controversy with **Shlash and Mohammed, (2022)** in a study about "Evaluation of Academic Nurses Performance at Critical Care Unit in Hillah City/Iraq" reported that two thirds of studied nurses were from urban areas.

Regarding previous attendance of training courses, results revealed that more than half of studied nurses didn't attend training courses regard caring patients post CVRS. This result agreed with **Sharaf Eldeen et al., (2022)** in a study "Impact of Implementing Nursing Practices Scheme on Postoperative Care Provided for Patients Undergoing Valvular Heart Replacement Surgery in Egypt" who reported that the majority of nurses did not enroll in any training programs.

Regarding nurses' total knowledge about caring of patients post CVRS, the present study clarified that about three fifths of studied nurses have unsatisfactory total knowledge regarding care of patients post cardiac valve replacement surgery. This finding was in harmony with **Gad Allah and Ahmed, (2024)** who studied "Impact of Educational Program on Nurses' Knowledge and Practice Concerning Post Operative Patient Care After Open Heart Surgery" and emphasized that more than half of studied nurses had unsatisfactory total knowledge regarding care of patients post cardiac surgery. On the other hand, a study done by **Nofal et al., (2025)** in a study "The Relationship Between Nurse's Performance, Satisfaction, Knowledge, and Practice on The Length of Stay in The CICU for Post-Operative Cardiac Surgery Patients in Palestine" emphasized that the majority of studied nurses had good knowledge regarding care of patients post-surgery.

The current study results revealed that the majority of studied nurses reported that their performance regarding care of patients post CVRS was affected by nurse, patient and work-related factors. This result in agreement with **Sarıköse & Göktepe, (2022)** in a study entitled "Effects of nurses individual, professional and work environment characteristics on job performance" who indicated that performance of studied nurses was affected by individual, organizational, professional, and work environmental factors. Moreover, **Ismaeil, et al., (2024)** who studied "Nurses' Performance for Patients with Implantable Cardiac Devices" and stated that that about three fifths of studied nurses their performance was affected by nurse, patient and work environment related factors.

Regarding factors related to nurse, the present study findings showed that most of studied nurses their performance was affected by factors related to nurse: physical, psychological, social, occupational and the highest percentage was related to nature of work in ICU, length of daily work, family duties, far distance from work and insufficient income. This result supported by **Mohamed, et al., (2021)** who mentioned that more than two thirds of studied nurses their performance was affected by factors related to nurse as nurses' physical health status, nurses' psychological health, nurses' social and economic status and occupational status.

Concerning factors related to patient, the current study results revealed that the majority of studied nurses their performance was affected by factors related to patient as communication with nurses. These results in accordance with **Gouda, et al., (2019)** who conducted a study entitled "Factors affecting postoperative nursing performance in the surgical units" and mentioned that most of studied nurses reported their performance was affected by factors related to patient. According to **Iqbal, et al., (2023)** who studied "Factors Affecting the Implementation of Nursing Care Plans in Patient Care" reported that uncooperative patients were the major hindrance in implementing the nursing care plan.

Regarding total factors related to work, the present study results illustrated that the majority of studied nurses their performance was affected by nurses relationship with nursing colleagues and with the other health care providers, work environment, work organization additionally the majority of nurses affected by fairness in tasks distribution, availability of supplies and equipment, availability of procedure manuals or booklets at ICU and training courses; this result in the same line with **Poudyal, et al., (2023)** who found that poor physical work environment, equipment-related issues, organizational issues such as disorganized supplies area, seeking for patient charts, and delays in receiving medications from pharmacy were associated with workload and low nurse' performance. According to **Sari, et al., (2020**) who studied "Factors affecting nurse performance in medical ward" portrayed that there were some work related factors affecting nurse performance as majority of nurses their performance was affected by workload, work environment, availability of facilities, cooperation, salaries and rewards.

Concerning the studied nurses total practice, the present study proved that more than half have unsatisfactory level of total practice regarding care of patients post CVRS. This result was in harmony with

Abdulrdha and Mansour, (2019) who found that more than half of studied nurses had unsatisfactory level of practice. On the other hand, a study done by **Soliman et al., (2020)** who disagreed with the present study by reporting that more than three fifths of participants scored satisfactory levels of total practice regarding care of patients post heart surgery.

Regarding matrix correlation between total knowledge, total practices and total factors among studied nurses, the present study results revealed that, there was statistically significant correlation between the studied nurses total knowledge and total practices. Also, there were highly statistically significant correlations matrix between the studied nurses' total knowledge, total practices and total factors affecting their performance regarding care of patients post cardiac valve replacement surgery. This finding is consistent with **Sharaf Eldeen, et al., (2022)** who proved that there were statistical significant relations between nurses' knowledge and practice regarding care of patients undergoing valve replacement indicating that nurses practices can be improved if linked with relevant scientific bases of knowledge.

Also, this study finding at the same line with **Ameen, et al., (2021)** who indicated that there were a positive correlation between level of knowledge and practice regarding care of patients undergoing valve replacement. From the researcher point of view this may be due to high percentage of nurses under study had got unsatisfactory level of knowledge that was reflected negatively on their practice

Conclusion

From the results of the present study, it can be concluded that about three fifths of the studied nurses had unsatisfactory total knowledge regarding care of patients post CVRS, the majority of studied nurses' performance affected by nurses related factors, patients related factors and work related factors. Also, more than half of studied nurses had unsatisfactory total practices regarding care of patients post cardiac valve replacement surgery. There was a statistical significant relation between studied nurses' knowledge, practice and factors affecting nurses performance regarding care of patients post CVRS.

Recommendations

Based upon the results of this study, the following recommendations are proposed:

- Establish training courses, lectures and workshops to improve nurses knowledge and practice regarding care of patients post cardiac valve replacement surgery and evaluating its effect on nurses performance.
- Standard nursing procedures booklet should be available to guide nurses giving the adequate care for patients post CVRS.
- Develop simplified and comprehensive manual guidelines about nursing care for patients post CVRS.
- The factors affecting nurses' performance should be evaluated by the nursing management and hospital administration to avoid or correct such factors.

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Authors' contributions

A.A.M; suggested the research concept, drafted the proposal, performed data collection and analysis, and drafted the manuscript. N.M.T., H.K.Z., and M.H.A; contributed to the study by drafting, editing, and summarizing the article; comparing the findings with recent research in the subject; analyzing and interpreting the data; and modifying and helping to build the research technique. Every author has reviewed and approved every section of the thesis.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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Table1: Percentage Distribution of Demographic Characteristics for Studied Nurses Regarding Care of Patients post Cardiac Valve Replacement Surgery (n=50)

Demographic Characteristics for Studied Nurses	No.	%
Age		
< 30	37	74.0
≥ 30	13	26.0
Min –Max	25-42	
Mean ±SD	30.08±5.04	
Gender		
Male	22	44.0
Female	28	56.0
Marital status		
Married	31	62.0
Un married	19	38.0
Qualification		
Nursing Diploma	5	10.0
Technical Institute	32	64.0
Bachelor of Nursing	13	26.0
Nursing experience		
< 5	14	28.0
5 - < 10	28	56.0
≥ 10	8	16.0
Min –Max	3-29	
Mean ±SD	7.76±7.21	
Income		
Enough	7	14.0
Not enough	43	86.0
Residence		
Rural	33	66.0
Urban	17	34.0
Training		
Yes	23	46.0
No	27	54.0

Table 2: Percentage Distribution of Total Nurses's Knowledge Regarding Care of Patients post Cardiac Valve Replacement Surgery.

Total knowledge Regarding Care of Patients post Cardiac Valve Replacement Surgery	Satisfactory ≥75%		Un satisfactory < 75%	
	No.	%	No.	%
Total heart anatomy and function	31	62.0	19	38.0
Total valvular heart diseases and treatment	20	40.0	30	60.0
Total patient care post heart valve replacement surgery	17	34.0	33	66.0
Total complications of heart valve replacement surgery and follow-up	24	48.0	26	52.0

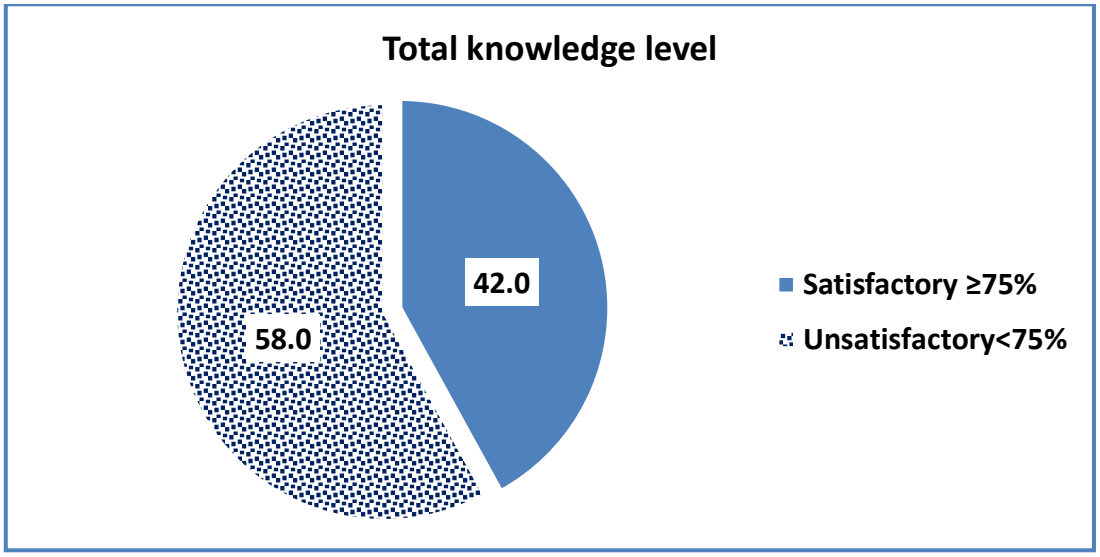

Figure 1: Percentage Distribution of Studied Nurses about Total Knowledge Level Regarding Care of Patients post Cardiac Valve Replacement Surgery (n=50).

Table 3: Percentage Distribution of Total Factors Affecting Studied Nurses's Performance Regarding Care of Patients post Cardiac Valve Replacement Surgery

Total Factors Affecting Nurses's Performance Regarding Care of Patients post Cardiac Valve Replacement Surgery	Affect ≥60%		Not affect < 60%	
	No.	%	No.	%
Nursing factors				
Nursing physical factors	47	94.0	3	6.0
Nursing psychological factors	21	42.0	29	58.0
Nursing socio-economic factors	47	94.0	3	6.0

Nursing occupational factors	40	80.0	10	20.0
Total nursing factors	45	90.0	5	10.0
Patient factors				
Total patient factors	42	84.0	8	16.0
Work factors				
Relationship with nursing colleagues	47	94.0	3	6.0
Relationship with health care providers	42	84.0	8	16.0
Work organizational factors	44	88.0	6	12.0
Hospital factors	36	72.0	14	28.0
Total work factors	42	84.0	8	16.0

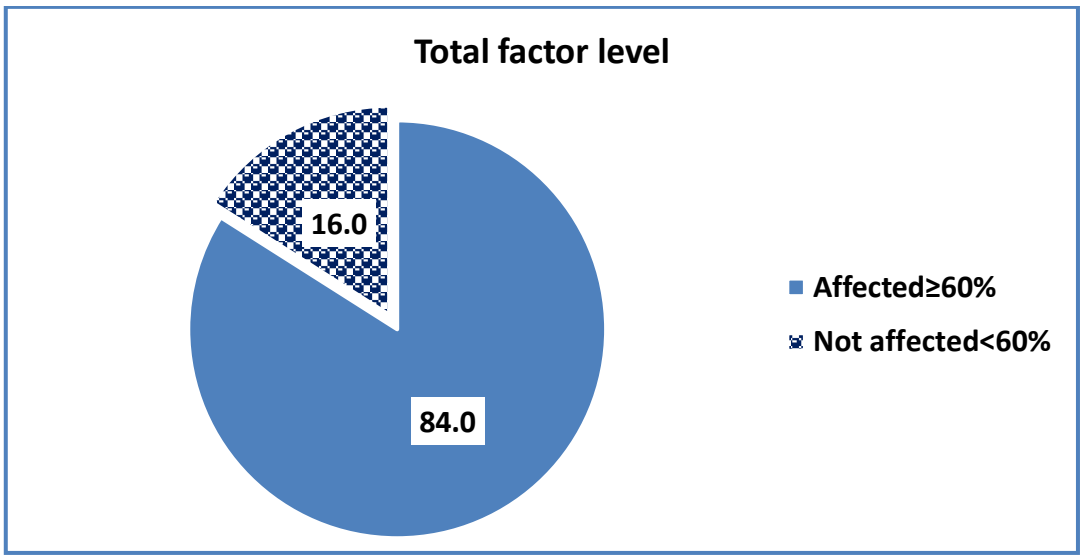

Figure 2: Percentage Distribution of Total Factors Affecting Studied Nurses's Performance Regarding Care of Patients post Cardiac Valve Replacement Surgery (n=50).

Table 4: Frequency and Percentage Distribution of Total Nurses's Practice Regarding Care of Patients post Cardiac Valve Replacement Surgery (n=50).

Total Practices Regarding Care of Patients post Cardiac Valve Replacement Surgery	Satisfactory ≥80%		Unsatisfactory < 80%	
	No.	%	No.	%
Total vital signs monitoring	27	54.0	23	49.0
Total pain assessment and management	21	42.0	29	58.0

Total measuring central venous pressure	24	48.0	26	52.0
Total mechanical ventilator care	31	62.0	19	38.0
Total mechanical ventilator weaning	33	66.0	17	34.0
Total care of chest tube	21	42.0	29	58.0
Total care of central line	23	46.0	27	54.0
Total wound care	23	46.0	27	54.0
Total breathing exercises	23	46.0	27	54.0

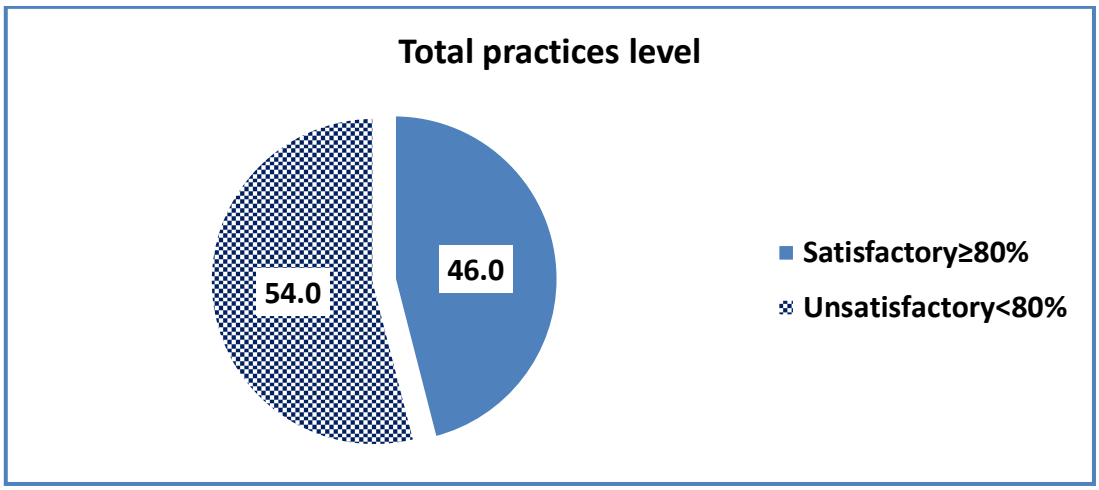

Figure 3: Percentage Distribution of Total Nurses's Practice Regarding Care of Patients post Cardiac Valve Replacement Surgery (n=50).

Table 5: Correlation Matrix Between Total Knowledge, Total practices and Total Factors Among Studied Nurses Regarding Care of Patients post Cardiac Valve Replacement Surgery.

Variables		Total knowledge	Total practices	Total factors
Total knowledge	**R**	1	.470	-.039
	p-value		.010*	.790
	n	50	50	50
Total practices	**R**	.470	1	.870
	p-value	.010*		.000**
	n	50	50	50
Total factors	**R**	-.039	.870	1
	p-value	.790	.000**	
	n	50	50	50

****. Correlation is significant at the 0.01 level (2-tailed). (*) Statistically significant**

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