Arab American University

Faculty of Graduate Studies

Department of Health Sciences

Master Program in Intensive Care Nursing

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

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20221665

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This Thesis Was Submitted in Partial Fulfilment of the Requirements for the Master Degree in Intensive Care Nursing program.

Palestine, Feb/2025

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Thesis Approval

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Declaration

I declare that, except where explicit reference is made to the contribution of others, this thesis is substantially my own work and has not been submitted for any other degree at the Arab American University or any other institution.

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Dedication

I dedicate this thesis to my beloved parents, whose endless love, support, and sacrifices have been the foundation of my success. Your unwavering belief in me has been my greatest motivation, and I am forever grateful for everything you have done. My dear brothers and sisters, who have always been my source of strength, encouragement, and unconditional support. Your love and belief in me have given me the confidence to keep pushing forward. your strength and sacrifices have been my greatest inspiration This achievement would not have been possible without you.

To my second family, my wonderful friends, and friends of this journey, who have been with me through joy and sorrow, through hardships and ease, and by my side through every challenge. Your presence has been a source of comfort and strength, and I deeply appreciate each one of you.

My second amazing house is the Arab American University where my passion for learning was nurtured, and to all my esteemed teachers at the Nursing College, whose guidance and dedication have shaped my journey.

To my wonderful workplace, Istishari Arab Hospital, To supportive soul friends.

Sincere appreciation to Dr. Samar Jallad for all of her help with finishing this project.

Haya Naseem Hussein Nofal

Acknowledgments

I'd like to start by expressing my gratitude to Dr. Samar Jallad, who served as my thesis supervisor.

My special thanks and appreciation to all the faculty members at the Graduate School of Nursing at the Arab American University.

Also, I'd express my appreciation to the All-male and female nurses who participated in this research.

To my friends, who have shared this journey with me, offering not only support but also moments of laughter and companionship during the difficult times—thank you for being a constant source of motivation and positivity.

I would also like to acknowledge Mr. Mohammad Zahran, nursing director Istishari Arab Hospital, for his continuous support and encouragement.

Finally, I extend my appreciation to everyone who has contributed in any way to the completion of this research. Your support, whether big or small, has made a difference, and I am truly grateful.

Thank you.

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Abstract

Background**:** Patients undergoing cardiac surgery in the (CICU) require postoperative care to ensure recovery, reduce the length of stay (LOS), and prevent complications. Nurses' performance, satisfaction, knowledge, and adherence to best practices are key factors influencing patient outcomes.

Purpose**:** This study evaluates the relationship between nurses' performance, satisfaction, knowledge, and practice and their impact on the LOS of post-cardiac surgery patients in Palestine.

Methodology**:** A cross-sectional predictive design was used by distributing a validated questionnaire to collect data conveniently/ or purposively from 101 nurses working in governmental, private, and educational hospitals in Palestine.

Results**:** Nurses demonstrated high levels of performance (mean = 91.19) and knowledge (mean = 92.93), while satisfaction (mean = 70.67) and practice scores (mean = 85.76), were moderate all showed positive correlations with LOS, indicating that improvements in these variables are associated with shorter LOS. better performance was significantly correlated in a moderate strength with satisfaction ($r = 0.425$, p-value < 0.001), knowledge ($r = 0.579$, p-value < 0.001) and practice ($r = 0.573$, p-value < 0.001), while satisfaction was significantly correlated in a moderate way with knowledge ($r = 0.317$, p-value $= 0.002$) and practice ($r = 0.337$, p-value $= 0.001$), and knowledge was significantly correlated with practice ($r = 0.522$, p-value < 0.001).The regression model shows that practice was the only significant predictor of LOS ($B = -0.037$, $t = -4.005$, p-value < 0.001, 95% CI = -0.055 - -0.018), which can be translated to that each 10% increase in the score of practice predicts a decrease in the LOS by 0.37 days. On the other hand, while the rest of variables are significantly correlated with LOS in the univariate side of analysis, they did not significantly predict the LOS of the patients.

Conclusion**:** The study highlights the significant impact of nurses' performance, satisfaction, knowledge, and practice on postoperative outcomes such as LOS. Findings suggest that improving nurses' knowledge and performance by, implementing training programs, and enhancing workplace satisfaction in CICU settings could contribute to reducing LOS and improving patient recovery.

Keywords**:** Nurses' performance, job satisfaction, knowledge, practice, length of stay.

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List of Definitions of Abbreviations

Abbreviation	Title
AAUP	Arab American university-Palestine
CABG	Coronary Artery Bypass Graft
CPB	cardio-pulmonary bypass
CICU	Cardiac Intensive Care Unit
LOS	Length of Stay
ICU	Intensive Care Unit
SPSS	Statistical Package for the Social Sciences
CVP	Central Venous Pressure
CVD	cardiovascular diseases
SD	Standard Deviation
IQR	Interquartile Range
N	number/frequency
IAH	Istishari Arab hospital
PMC	Palestine medical complex
B	Unstandardized B coefficient
CI	Confidence Interval of B coefficient

Chapter One: Introduction

1.1Background

Critically ill patients or those recovering from heart surgery are treated in specialized units called (CICUs), (Shunji Kasaoka, 2017) Cardiac surgery, sometimes referred to as cardiovascular surgery or heart surgery, includes operations on the heart or blood arteries that surround it to treat a variety of cardiac disorders. Heart valve problems, congenital heart abnormalities, and coronary artery disease are some of these ailments. Heart surgery's main objective is to enhance heart function and reduce the symptoms of various disorders.an important part of the treatment of many cardiovascular diseases (CVD) is open-heart surgery, which entails the care of a patient with greater complexity and acuity.. (Mousa Elsaed et al., 2020).

Globally, around 800.000 heart surgery procedures are carried out each year .(Mohamed Ali Soliman et al., 2020) Through assessment, education, and disease process management, nurses contribute significantly to the reduction of surgical complications for patients undergoing open heart surgery . Critical care nurses face a unique challenge in combining their theoretical knowledge, assessment skills, and problem-solving abilities to provide the best nursing care and maintain high-quality outcomes. (Elgazzar et al., 2023).

A prolonged (LOS) following heart surgery can have a negative impact on costs. Patients at high risk of prolonged (LOS) are a significant subgroup within hospitals because of their tendency to require an excessive amount of (CICU) resources.(Almashrafi, Alsabti, et al., 2016), A large number of patients stay in the intensive cardiac care unit following open heart surgery more than 96 hours , which increases mortality, which ranges from 11% to 35%.(Curran, 2022) causes organ failure, and necessitates the use of medical resources for longer periods of time. (Azarfarin et al., 2014). Although the exact causes of prolonged CICU stays are unknown, a number of risk factors, including advanced age, a decreased ejection fraction, pulmonary conditions, organ failure, and repeat procedures to examine the mediastinal region, may have an impact.(Curran et al., 2022) Actually, cardio-pulmonary bypass (CPB) is the primary element that defines open-heart surgery distinct from other types of surgeries. Because of the complications

connected with CPB and the lengthy anesthesia, these patients need to stay in the (CICU) for roughly 36 hours .(Sarkar & Prabhu, 2017).

The CICU intricate organization that is in a unique position to offer critically ill patients undergoing cardiac procedures top-notch care. CICU nurses are essential in tracking patients and administering care, but they are also crucial in handling any issues that may arise.(S. Kasaoka, 2017) The quality of CICU care depends on multiple factors which include nurses' knowledge base and clinical skills along with the practices they implement. Furthermore, lower nurse satisfaction, which includes insufficient work satisfaction, lack of support from the organization, and insufficient chances for personal and professional advancement, influenced the quality of care and patient outcomes. (Öztepe & Kanan, 2021; Sayej, 2016) Burnout, less than optimal performance, and turnover decreased patient care. Additionally, early recovery, complication management, and infection prevention all depended on nursing expertise and adherence to evidence-based practices. (Mohamed Ali Soliman et al., 2020).

The high patient number, staffing shortage, and resource constraints present Palestine's healthcare system with a number of particular difficulties. Investigating nursing factors and how they affect CICU length of stay in this context may provide insights that are applicable both locally and globally, particularly in settings with limited resources.

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1.2 Problem Statement

Although nurses' performance, satisfaction, knowledge, and practice are important factors in determining patient outcomes, their precise impact on length of stay (LOS) in the intensive care unit (CICU) is not well understood in Palestine. Patients undergoing cardiac surgery face a number of postoperative challenges that affect their LOS.

According to research, LOS and overall patient outcomes are greatly impacted by nurse performance and adherence to evidence-based guidelines(Sayej, 2016). Long-term hospitalization might result from problems including infections, arrhythmias, and organ dysfunction that are increased by inadequate nursing expertise or improper postoperative care (Öztepe & Kanan, 2021) Additionally, nursing job satisfaction plays a crucial role in healthcare delivery, as burnout and

low satisfaction have been linked to suboptimal patient care and extended hospital stays (Al-Haroon & Al-Qahtani, 2020).

Although international studies have demonstrated the importance of nursing care in lowering the length of stay and enhancing recovery, little is known about how these elements affect healthcare environments in Palestine. High patient loads, a lack of staff, and limited resources all make it more difficult to deliver high-quality treatment(Elateif, 2017). To increase patient care efficiency and reduce LOS, closing this gap is crucial for improving nurse education, training programs, and resource allocation.

This study examines the relationship between nurses' performance, satisfaction, knowledge, and practice with LOS in post-cardiac surgery patients in Palestine. Understanding these relationships will help healthcare institutions develop targeted interventions to improve nursing practices, reduce LOS, and optimize healthcare resource utilization. The results of this study may also be applicable to other resource-limited healthcare settings where similar challenges affect hospital efficiency and patient outcomes.

1.3 Significance of the Study

One of the most popular procedures worldwide with a high overall survival rate is open heart surgery, which is gaining popularity. Because this study it clarifies factors influencing the standard of postoperative care for patients undergoing heart surgery in Palestine, this study is significant. The study examine how nurses' performance, satisfaction, knowledge, and practice relate to length of stay, highlighting key areas for methodical intervention to improve patient outcomes.(Almashrafi, Alsabti, et al., 2016) It demonstrates how nurse advancement and patient satisfaction lengthen hospital stays and speed up recovery, recognizing the need of continuous professional development and evidence-based practice. The study describes institutional differences. demonstrating that educational hospitals typically have better access to resources for patient care than public and private hospital. Prior research in this and other areas has shown that these differences have an impact on nursing outcomes.(Elateif, 2017). The research shows that, in addition to institutions, systemic elements like training programs and financial incentives, as well

as demographic characteristics like age, education, and experience, play a part in determining nursing results. (Sayej, 2016)This will assist leaders and healthcare managers in implementing particular suggestions to enhance training initiatives, address working conditions, and implement equitable pay structures. Such study benefits nurses and patients by adding to the body of knowledge on postoperative nursing care and enabling a roadmap to strengthen healthcare systems in Palestine and other settings with low resources.

1.4 Objectives of the Study

The purpose of this study is to assess the relationship between nurses' performance, satisfaction, knowledge, and practice on the length of stay of post-operative cardiac surgery patients in Palestine.

Study' objectives were:

1- Assess the level of CICU nurses' performance, knowledge, satisfaction, and practice post cardiac surgeries.
2- To examine the relationship between performance, knowledge, satisfaction, and practice among CICU nurses post cardiac surgeries.
3- To examine the relationship between performance, knowledge, satisfaction, practice, and LOS among CICU nurses post cardiac surgeries.
4- To identify differences in means of performance, knowledge, satisfaction, and practice regarding demographic variables among CICU nurses post cardiac surgeries.
5- To investigate the predictors of LOS among CICU nurses post cardiac surgeries.

1.5 Questions of the Study

1- What is the level of CICU nurses' performance, knowledge, satisfaction, and practice among CICU nurses post cardiac surgeries?

2- What is the relationship between performance, knowledge, satisfaction, and practice among CICU nurses post cardiac surgeries?
3- What is the relationship between performance, knowledge, satisfaction, practice, and LOS among CICU nurses post cardiac surgeries?
4- What is the difference in means of performance, knowledge, satisfaction, and practice regarding demographic variables among CICU nurses post cardiac surgeries?
5- What are the predictors of LOS among CICU nurses post cardiac surgeries?

1.6 Study Hypotheses

There is high levels of CICU nurses' performance, knowledge, satisfaction, and practice for post-cardiac surgery patients.

There is a high relationship between performance, knowledge, satisfaction, and practice among CICU nurses post cardiac surgeries.

There is a high relationship between performance, knowledge, satisfaction, practice, and LOS among CICU nurses post cardiac surgeries.

There is a high difference in means of performance, knowledge, satisfaction, and practice regarding demographic variables among CICU nurses post cardiac surgeries.

There is high predictors of LOS among CICU nurses post cardiac surgeries.

1.7 Conceptual Definitions

Performance: The process of carrying out a task, operation, or function. (Robb & Dietert, 2002).

Satisfaction: A pleasant or upbeat emotional state brought on by an evaluation of one's work or work-related events is known as satisfaction.(Rao & Karumuri, 2019).

Knowledge: The comprehension and awareness of facts. It stands for the collection of facts, figures, and knowledge that a person has accumulated by education and life experience.(Bakarman, 2005).

Practice: defined as doing something frequently in order to gain expertise or skill.(McCormack et al., 2002).

Length of stay (LOS) describes how long a patient stays in the hospital for a single episode.(Clarke & Rosen, 2001).

Cardiac surgery: procedures performed on the heart or its surrounding blood vessels to address various heart conditions (Vervoort, 2020).

1.8 Operational Definitions

performance: questions evaluating participants' performance for post-operative cardiac surgery Ten yes-or-no questions. covering two categories (nurse experience variables and communication skills between nurses and healthcare professionals) made up this section.

satisfaction: 22 questions Participants' satisfaction using a five-point Likert scale in a survey: 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree.

knowledge: 14 questions evaluated participants' knowledge of nursing care for surgical complications following cardiac surgery. The questions were provided as "yes" or "no," and they were broken down into five domains.

practice: 13 questions assessed the nursing care practices of patients following heart surgery. There were two possible answers to the questions: "yes" or "no, "were separated into two domains (post-operation assessment of patient and Assessment form).

Length of stay (LOS): Time cardiac surgeries ‘patients spent in hospital or CICU.

Chapter Tow: Literature Review

1.2 Introduction

To treat a range of cardiac conditions, open heart surgery is a basic procedure in the area of cardiovascular care. However, the length of stay (LOS) has a significant impact on how well patients recover, how much healthcare costs, and how resources are allocated during the critical postoperative care period after surgery. Nursing professionals are crucial at this stage due to their positive attitudes toward patient-centered care in addition to their solid knowledge base.

This study aims to clarify the impact of nurses' performance, satisfaction, knowledge, and practice on the length of stay of postoperative cardiac surgery patients in Palestine. Through literature analysis, we aim to clarify the authors. perspectives and identify areas of practice and knowledge gaps in this vital area of cardiovascular nursing.

2.2 Research Strategy

A systematic search was conducted using databases such as PubMed, CINAHL, Google Scholar, and ScienceDirect to identify relevant studies. The key search terms included "nurses' performance and LOS," "nurses' knowledge and postoperative recovery," "CICU nurses' satisfaction," and "predictors of LOS in cardiac surgery." The search was restricted to articles published between 2013 and 2025, and studies that did not focus on cardiac surgery patients or CICU nurses were excluded. 15 articles met the inclusion criteria and were reviewed in detail.

3.2 Themes in Literature

CICU Nurses' Performance, Knowledge, Satisfaction, and Practice Post-Cardiac Surgeries

Relationship between Performance, Knowledge, Satisfaction, and Practice Predictors of LOS.

A study quantitative descriptive design conducted by sayej in 2016, in **Palestine Hebron**, to look into the quality of nursing care and the factors that affect it in hospitals there. 181 nurses

from five hospitals in Hebron, including both governmental and non-governmental organizations, completed questionnaires to provide data. The majority of participants were under 39 years old, had less than ten years of experience, and 60% possessed a bachelor's degree or above. The distribution of income was uneven, with 29.8% making more than 3500 NS, 38.7% making between 2500 and 3499 NS, and 31.5% making less than 2500 NS. Nursing performance was found to be high (71%), but no significant correlations were observed between performance and factors such as gender, academic degree, experience, or qualifications at $\alpha \leq 0.05$. (Sayej, 2016).

Retrospective study conducted by Khalid S. Ibrahim, (2024) in **Jordan** examined the parameters influencing length of stay (LOS) in the intensive care unit (ICU) alone following CABG surgery in 1070 patients with a lengthy ICU stay (> 3 nights) as the main outcome of interest. Left atrial diameter (LAD) >4 cm, no beta-blocker medication prior to surgery, extended postoperative mechanical ventilation, postoperative pneumonia, and postoperative atrial fibrillation were the significant predictors on multivariate analysis for >3-night intensive care unit hospitalization. Therefore, steps must be taken to lessen these postoperative problems in order to shorten the length of the intensive care unit stay, which can improve patient outcomes and resource consumption.(Ibrahim et al., 2024).

A descriptive study was conducted by Salwa Mohamed, (2020) in **Egypt**, with the intention of assessing the variables influencing nursing skill in the treatment of patients undergoing coronary artery bypass grafting (CABG) at Zagazig University Hospital. Forty cardiothoracic and intermediate intensive care unit nurses were selected at random for this investigation. The findings demonstrated that the majority of nurses lacked appropriate practice and knowledge of CABG treatment. However, of the several elements that might affect nursing performance, some were impacted by circumstances related to the patient or the workplace. According to the study, putting up a clear job description and putting in place educational training programs can increase performance in the field of caring for CABG patients (El Desouky et al., 2020).

Descriptive explanatory was conducted by Mohamed Mousa Elsaed, (2020) in **Egypt**, to assess factors that affect the study nurses' post-operative care for patients after open heart surgery, including 36 nurses working in the post-cardiothoracic intensive care unit at Ain Shams University Hospital. A questionnaire and an observational checklist were used to gather the data. Approximately two-thirds of nurses provided good post-operative care, and more than half of them

had favorable attitudes and enough knowledge about it. creation of specialized in-service training courses to help nurses who care for patients recovering from open heart surgery.(Mohamed Ali Soliman et al., 2020).

Quasi-experimental study was conducted by Gamal Mohamed Elateif, (2017) in **Egypt**, Data was gathered through in-person interviews and observational checklists conducted both before and after the nurses' performance in an in-service training program in order to evaluate the effect of the program on the standard of nursing care provided to patients undergoing on-pump open heart surgery, including 30 nurses at Mansoura University Hospital. The majority of nurses showed improvements in their practice (60.0% of nurses) and knowledge (73.3% of nurses). Knowledge and practice scores were found to positively correlate; as knowledge scores increased, so did practice scores. The study also indicated that training programs had an extra benefit based on the performance of nurses who cared for patients undergoing open heart surgery. These tactics indicated training and feedback programs. and resources for the cardiothoracic unit of the hospital.(Elateif, 2017).

Observational retrospective study was conducted by Ahmed Almashrafi, (2016) in **Oman,** to determine the causes of extended lengths of stay (LOS) in the cardiac critical care unit (CICU) after heart surgery. About 30.5% of patients experienced prolonged postoperative length of stay, and 17% experienced prolonged CICU LOS. Longer CICU length of stay was associated with coronary artery and valve surgery, congestive cardiac failure, renal failure, non-elective surgery, and other non-isolated valve or CABG surgery. Using these variables, a prediction model was developed that, depending on three risk categories, predicted extended CICU LOS in 11% to 28% of cases. Body mass index, operation type, cardiopulmonary bypass machine use, packed red blood cell transfusions, non-elective surgery, An easily applicable score can be applied to routinely collected data to identify patients at increased risk of a prolonged CICU stay, allowing for early redirection and management improvements. (Almashrafi, Alsabti, et al., 2016).

A cross-sectional descriptive study was conducted by Hind I Al-Haroonm (2020) in **Saudi Arabia (KSA)**, 337 nurses participated; the study was designed to gauge nurses' work satisfaction and the influence of demographic factors. According to the Minnesota Satisfaction Questionnaire, which was used to evaluate work satisfaction, 48% were satisfied. Generally speaking, nurses were more content with internal factors (like relationships and personal accomplishments) than external

ones (like compensation and working conditions). also showed higher levels of satisfaction among Saudi nationals, male nurses, and senior nurses. It's noteworthy to observe that age salary and income strongly influenced work satisfaction. nurses generally reported a moderate level of job satisfaction.(Al-Haroon & Al-Qahtani, 2020).

A descriptive (correlational) study was conducted by Ameer Aqeel Al-Hasnawi, (2023) in **Iraq**, to look at the effects of nurses' sociodemographic traits on their work performance. The survey was conducted with a non-probability (convenience) sample of 350 staff nurses. The results revealed no relationship between nurses' sociodemographic traits and overall job performance.(Al-Hasnawi & Aljebory, 2023).

A descriptive, cross-sectional study was conducted by Nihal Celikturk Doruker, (2023) in **Turkey**, to Examine the attitudes and knowledge of cardiac surgery nurses, comprising 50 nurses employed at an Izmir university hospital, on the enhanced recovery after surgery (ERAS) protocol. the results showed that nurses' knowledge of the ERAS procedure was mildly favorable. The procedure attitudes received similarly positive feedback, The knowledge level and attitude score also showed a statistically significant moderate association.(Doruker et al., 2023).

Cross-sectional study conducted by Reid, Hurst, & Anderson in 2013 in **Australia to** examined how sociodemographic characteristics and work satisfaction among Australian nurses relate to one another, as well as how well these characteristics predict job satisfaction levels. included 2,000 registered nurses who belonged to a professional association. Age, years of experience, and years in the present work were shown to be moderately to strongly linked with each other (all $r > 0.40$, $p < 0.001$), but they did not substantially interact with job satisfaction, according to statistical analysis of the respondents' sociodemographic questionnaire responses. Nonetheless, there was a substantial positive correlation between employment satisfaction and the health sector and specialized areas. The majority of participants expressed satisfaction with their jobs. The results indicate that the health sector and specialist area are important determinants of nurses' job satisfaction and have to be given top priority when developing policies and strategies.(Reid et al., 2013).

A prospective case-control study was conducted by Azarfarin, (2014), **in Iran-Tehran**, 280 individuals who had elective heart surgery were gathered in order to determine risk variables

for extended stays in the intensive care unit (ICU) following heart surgery. The patients were then divided into two groups: < 96 hours and > 96 hours, depending on how long they had been in the intensive care unit. Over one-third of patients spent more than 96 hours in the intensive care unit (ICU). Blood transfusions and IV inotropes, longer anesthetic and cardiopulmonary bypass durations, a higher incidence of postoperative tamponade, re-exploration, re-intubation, hemodialysis, and hypotension failure were among the variables linked to longer hospital stays. (Azarfarin et al., 2014).

A retrospective observational cohort study of bleeding complications on hospital LOS and critical care utilization in cardiac surgery patients using a national database of all English hospitals was conducted by Nawwar Al-Attar, (2019) **in England**, included 7774 individuals who had aortic, valve replacement, or CABG operations performed between 2010 and 2016. Reoperation for bleeding occurred in 0.3% of cases, while in-hospital bleeding problems occurred in 6.7% of cases. Bleeding patients experienced longer critical care days (mean incremental difference of 2.4 days) and length of stay (mean incremental difference of 3.1 days). Reoperation for bleeding significantly increased LOS and critical care days. These findings highlight the significant impact on healthcare resources that bleeding episodes in a population undergoing heart surgery entail. Furthermore, this difficulty can be lessened by using evidence-based techniques to control and prevent bleeding.(Al-Attar et al., 2019).

A systematic review study conducted by Ahmed Almashrafi, (2016), this study attempts to compile these elements and outline the extent to which they have been used in patient and resource management. Research Older age, atrial fibrillation, COPD, poor ejection fraction, renal impairment, and non-elective surgery were all associated with longer ICU stays.(Almashrafi, Elmontsri, & Aylin, 2016).

Systematic review conducted by Woo, Lee, & Tam in 2017 to examine how advanced practice nursing affects clinical outcomes, patient satisfaction, cost, and quality of care in emergency and critical care settings. The necessity for creative workforce initiatives, such giving advanced practice nurses (APNs) more autonomy, is underscored by the rising rates of chronic disease and multimorbidity as well as the physician shortage. Fifteen articles that met the inclusion criteria were found through a systematic search of two journals and nine internet databases between 2006 and 2016. These studies were then critically evaluated and examined. APNs are found to

improve patient outcomes, including as shorter hospital stays, faster consultation and treatment times, decreased death rates, increased patient satisfaction, and cost savings. (Woo et al., 2017).

This study aims to enhance patient outcomes post open-heart surgery, develop areas for improvement, and educate evidence-based practice by systematically reviewing the literature about the attitudes and knowledge among nursing professionals in cardiovascular care. Nurses can then use this in-depth understanding of the complex factors that influence length of stay to improve patient care, efficiency of care delivery, and standards of cardiovascular nursing practice.

Chapter Three: Methodology

1.3 Introduction

This chapter outlines the techniques used to analyze the relationship between the duration of post-operative cardiac surgery patients and aspects of nurses' performance, satisfaction, knowledge, and practice. It contains research design, population, setting, sampling (including size, method, and criteria), study variables, data collection (including tools, validity, and reliability), quality control (including control procedures), data analysis, and ethical considerations. To guarantee the validity and reliability of the study's findings, a thorough and methodical approach is required.

2.3 Study Design

A cross-sectional predictive study design was used to investigate the impact of nurses' performance, satisfaction knowledge, and performance on the length of stay (LOS) of patients who had heart surgery after surgery.

3.3 Site and Setting

The study was carried out in the Jerusalem West Bank's all-cardiac surgical unit (n=7), which included the Palestine Medical Center (PMC), established in 1963 in (Ramallah), with 490 beds, 10 beds in CICU. The Occupancy Rate is around 22 cases per month. Istishari Arab Hospital was established in 2016 in the Al-Rehan Suburb (Ramallah), with 220 beds, 10 of which are in CICU. The Occupancy Rate is around 22 cases per month. Alahli Hospital was established in 1988 in Hebron with 250 beds and 4 beds in CICU. The Occupancy Rate is around 12 cases per month. Al-Mezan Hospital was established in 1996 in Hebron, with 80 beds, 10 of which are in the CICU. The Occupancy Rate is around 15 cases per month. Bethlehem Arab Society was established in 1960 in Bethlehem with 103 beds and 11 beds in

the CICU. The Occupancy Rate is around 5 cases per month. University Hospital al-Najah was established in 2014 with 120 beds, 5 of which are in CICU. The Occupancy Rate is around 10 cases per month, and al-Makassed Hospital was established in 1968 in Jerusalem with 300 beds and 7 beds in CICU. The occupancy Rate is around 26 cases per month, they were selected due to their extensive post-operative care program and high volume of heart surgeries, which made them the perfect place to study the connection between nursing practices and patient outcomes.

4.3 Population, Sample and Sampling

The target population was the 120 CICU nurses who worked in the heart surgery unit. A total of 113 nurses from each of these institutions make up the sample size. A power analysis was conducted to ensure adequate statistical power. Purposive sampling was used to select nurses based on their experience and involvement in post-operative care; 12 were chosen for the pilot study, and 101 were included in the study sampling (10 nurses from al-Makassed Hospital, 20 from al-Mezan Hospital, 12 from Bethlehem Arab Society, 20 from PMC, 20 from IAH, 10 from Alahli, and 9 from Al Najah).

5.3 Inclusion criteria for nurses

All registered nurses who work in the cardiac intensive care unit.

All nurses with at least one year of experience providing post-operative cardiac care.

All nurses who have been authorized to participate in the study.

6.3 Exclusion criteria for nurses

All nurses on temporary or rotational assignments.

Administrative nurses who do not provide direct care in CICU.

7.3 Demographic Variables

Age, gender, type of hospital, years of experience, marital states, income, training.

8.3 Data Collection Tools

The questionnaires in English language of five separate parts that were used as a study tool in this research. The questionnaire was created based on two previous studies to assess the relationship between nurses' performance, satisfaction, knowledge, practice, and length of stay in the pediatric intensive care unit in Palestine who underwent cardiac surgery. The questionnaire consists of five parts with a total of 71 items. This tool was extracted from previous research, and its validity and reliability rates were confirmed.(Salwa Mohamed Ali Soliman*, 2020). (Nesma Ibrahim El desouky (1), 2020) , (Hamed, 2023).

1.8.3 Part One - Demographics Data

This part consists of 12 items regarding participants' demographic data of the participant (age, gender, marital status, Level of education, Years of Experience in CICU, Workload hours, Previous training courses on post-open heart- surgery nursing care, Income, Residence, Type of hospital, Number of pt. cases per/month, length of stay in CICU) this instrument self-developed on based on previous literature. (Salwa Mohamed Ali Soliman*, 2020).

2.8.3 Part two - Performance Nursing Questionnaire

This part consisted of 10 questions YES or NO assessing the level of performance of participants' for Post-Operative Cardiac Surgery Patients in Palestine, which were divided into 2 domains (Nurse experience factors, and Communication skills between nurses and healthcare

providers) this instrument self-developed on based on previous literature. (Salwa Mohamed Ali Soliman*, 2020).

3.8.3 Part Three - Nurses satisfaction Questionnaire

This part assessing the participants' level nurse's satisfaction which were rated on a five-point Likert scale ranging. Respondents rate each item using a(5-point scale, where 1 Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree, and 5 Strongly Agree) , the scale developed from this author (Hamed, 2023) This scale consists of 55 questions. In my study, 22 questions were asked that cover and fulfill the purpose of the study, and the validity and reliability of this study were confirmed.

4.8.3 Part four - Knowledge level to nurses about nursing care for post operatives' surgery complication

This part consisted of 14 questions assessing the participants' level of knowledge about nursing care for post operatives' surgery complication questions were presented in a 'yes or no, this questions were divided into 5 domains (Bleeding post open heart surgery , Arrhythmia post open-heart surgery , Cardiac tamponade post open-heart surgery , Acute kidney injury post open-heart surgery ,and Infection post open heart surgery) this instrument self-developed on based on previous literature.(Nesma Ibrahim El desouky (1), 2020)

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5.8.3 Part five - Nursing practice post operation open heart surgery

This part consisted of 13 items assessing the practice of the participants, also the items were presented yes or no, these questions were divided into 2 domains post-operation assessment of patient and Assessment form) this instrument self-developed on based on previous literature (Nesma Ibrahim El desouky (1), 2020) .

9.3 Validity

The validity of a questionnaire refers to the extent to which the questionnaire accurately measures the intended variable. In this case, the validity of the questionnaire was assessed by consulting three research experts and PhD holders in nursing Dr. Maha Sobh at Al-Zaytoonah University in Jordan, Dr. Imad Abu Khader at the Arab American University, and Dr. Ebaa, who holds a PhD in Quality Management and is the Head of the Quality Management Department at the Arab Consultant Hospital. Their assessments and insightful recommendations were combined to improve the questionnaire.

10.3 Reliability

A pre-test of the assessment tool questionnaire was conducted on 12 nurses. Consistency was assessed using Cronbach's alpha for each questionnaire domain independently; a Cronbach's alpha of 0.70 or above is considered acceptable for research purposes, while a value of 0.90 or higher is considered excellent. Therefore, a Cronbach's alpha of 0.927 indicates that the scale or test has excellent internal consistency and is a reliable measure of the construct it is intended to measure. performance Cronbach's alpha was 0.751, satisfaction Cronbach's alpha was 0.951, knowledge Cronbach's alpha was 0.826, and practice Cronbach's alpha was 0.775.

11.3 Pilot study

Prior to the actual data collection, a pilot study was conducted on 12 nurses who met the same inclusion criteria as the sample. This was done to determine the tools' relevance, clarity, and applicability, test the question phrasing, and estimate the amount of time needed for the interview. No changes are required in light of the results that have been achieved. The study sample did not include these nurses.

12.3 Data collection procedure

Following the Arab American University IRB's ethical approval, the managers of the hospitals were contacted, briefed on the study's goal, and invited to assist with data collecting. After that, the management set up a meeting with the head nurses in charge of the units where CABG patients are hospitalized. After head nurses helped select participants who fit the inclusion criteria, the researcher clarify to nurses and informed them in writing and verbally of the study's goals as well as their freedom to discontinue participation at any time without facing consequences. The informed consent form and questionnaires were to be completed by those who were eligible and consented to participate.

13.3 Ethical Considerations

The Palestinian Ministry of Health's Institutional Review Board (IRB) gave its approval to the study. **With the code number** "R-2024/A/57/N". Following an explanation of the study and the individuals' rights, written, informed permission was acquired for research participation. To preserve anonymity and confidentiality, participant data was de-identified and safely kept. Additionally, the participants were made aware of their freedom to leave the research at any moment and without facing any repercussions.

14.3 Data Analysis

Frequency and percentage for description of categorical variables including demographics and responses of scales' items Median and IQR for description of scale variables Mann-Whitney for mean rank differences of scores across dichotomous variables Kruskal-Wallis fir mean rank differences across non-dichotomous variables Spearman correlation for correlations between scale variables Linear regression analysis for the prediction of LOS In general, non-parametric tests were used because the distribution was not normally distributed**.**

15.3 Summary

This chapter provided a detailed overview of the methodological approach for investigating the impact of nurses' performance, satisfaction, knowledge, and practices on the length of stay for post-operative cardiac surgery patients in a Palestinian hospital. The study design, setting, population and sampling, inclusion and exclusion criteria, variables, data collection tools, validity and reliability measures, data analysis methods, and ethical considerations were comprehensively described. This robust methodological framework ensures the reliability and validity of the study's findings, paving the way for meaningful analysis and interpretation.

Chapter Four: Results

1.4 Introduction

The following chapter provides the descriptive and analytical results of the current study, where the descriptive results are concerned with the frequencies and percentages of nurses' responses to questions related to their demographic data, performance, satisfaction, knowledge and practice scales, as well as the description of their scores in terms of medians and interquartile ranges (IQR), based on the distribution that did not follow the normal curve and assumption. On the other hand, the analytical results are concerned with assessing the relationship between nurses' demographic factors and their performance, satisfaction, knowledge and practice scores, as well as the intercorrelations between study outcomes.

2.4 Demographic data

The demographic data of the participated nurses (N = 101) are distributed in Table 1, which shows that their median age was 28 years old (IQR = 5), ranging from 22 to 60 years old, with slightly higher males' proportion than females (54.5% vs. 45.5%, respectively), and more unmarried nurses (58.4%). Most of the nurses had bachelor's degree (72.3%), with a median experience of 5 years in CICU (IQR = 5), ranging from 1 to 35 years.

In terms of the professional factors, there were approximate percentages between nurses who work for 8 hours and 16 hours of workload (47.5% vs. 48.5%, respectively), with more nurses who reported not receiving a specific course or training related to post-open-heart surgery nursing care (54.5%). In addition, more than half of the nurses (52.5%) stated that their income is enough, with 40.6% living in urban areas. More than half of the sampled nurses work at private hospitals

(53.5%), compared to approximate percentages between nurses who work at governmental (23.8%) and educational (22.8%) hospitals, with a median of 22 patient cases per month (IQR = 4), ranging from 2 to 50, and a median of 4 days of LOS (IQR = 2), ranging from 1 to 8 days.

Table 4.1 Distribution of nurses' demographic and professional factors

Variables	**Values**	**N**	**%**
Age	Median (IQR), min – max	28 (5), 22 – 60	
Gender	Male	55	54.5%
	Female	46	45.5%
Marital status	Married	42	41.6%
	Unmarried	59	58.4%
Level of education	Bachelor	73	72.3%
	Graduate study	28	27.7%
Years of experience in ICCU	Median (IQR), min – max	5 (5), 1 – 35	
Workload hours	8 hours	48	47.5%
	12 hours	4	4.0%
	16 hours	49	48.5%
Previous training courses on post-open-heart surgery nursing care	Yes	46	45.5%
	No	55	54.5%
Income	Enough	53	52.5%
	Not enough	48	47.5%
Residence	City	41	40.6%
	Village	39	38.6%
	Camp	21	20.8%
Type of hospital	Private	54	53.5%
	Government	24	23.8%

	Educational	23	22.8%
Number of patient cases/month	Median (IQR), min – max	22 (4), 2 – 50	
Length of stay in ICCU	Median (IQR), min – max	4 (2), 1 – 8	

IQR = Interquartile range, CICU = cardiac Intensive c care unit, N = number/frequency.

3.4 Level of performance of CICU nurses towards postoperative care for cardiac surgery patients

The responses of the sampled nurses towards statements of their performance are shown in Table 2. For the domain related to nurse experience factors, almost all of the nurses stated that they have the sufficient experience in medication administration (99.0%), as well as in the area of continuous supervision and observation during nursing care for open heart surgery patients (99.0%), compared to 93.1% for the availability of procedural manual within the unit regarding related nursing care, as well as for keeping job-related knowledge and skills up-to-date and (93.1% each). Lastly, all nurses reported the ability to manage time to finish nursing care for open heart surgery patients, while 61.4% reported they have continuous education and training courses to develop the staff's experience and skills in the field of nursing care within the intensive care unit.

For the domain of communication skills between nurses and other healthcare providers, 87.1% of the nurses stated that physicians' requests are illegible, where handwriting is clear, with 92.1% stating that their requests are clear in details, as there is no ambiguity, compared to 94.1% who stated that nurses have the access to medical recorded that are ordered by all other healthcare providers.

Table 4.2 Distribution of responses on statements related to performance towards postoperative care for cardiac surgery patients

Statement	Yes		No	
	N	%	N	%
Nurse experiences factors				
The nurse has sufficient experience on how to administer the medication	100	99.0%	1	1.0%
Continuous supervision and observation are available during nursing care for the post-open-heart surgery patient	100	99.0%	1	1.0%
There is a procedural manual within the intensive care unit regarding nursing care of open heart /cardiac surgery	94	93.1%	7	6.9%
I worked on keeping my job-related knowledge up-to-date	94	93.1%	7	6.9%
I worked on keeping my work skills up-to-date	94	93.1%	7	6.9%
I manage time to finish nursing care of cardiac surgery on time	101	100.0%	0	0.0%
Continuous training courses are conducted to develop the experiences and skills of the nursing staff within the intensive care unit	62	61.4%	39	38.6%
Communication skills between nurses and healthcare providers				
physicians' request are illegible (Hand writing is clear)	88	87.1%	13	12.9%
physicians' request are clear in details (there is no ambiguity)	93	92.1%	8	7.9%
The nurses had access to medical records that all healthcare providers' orders are in .	95	94.1%	6	5.9%

4.4 Level of satisfaction towards postoperative care for cardiac surgery patients

The level of satisfaction among the participated nurses is shown in frequencies and percentages in Table 3. The table shows that the most areas where the nurses are satisfied (according to the individual mean score out of 5 for each statement) were related to the respect of other healthcare providers to the care they provide (78.2% agree, mean = 3.78 ± 0.6), followed by the perception of the patients to their activities and respect to their work (75.2%, mean = 3.76 ± 0.7), nursing care assigned to them in their departments (73.3% agree, mean = 3.74 ± 0.6), new skills that are implemented in their workplace (76.2% agree, mean = 3.73 ± 0.7) and the superiors' respect of their work (73.3% agree, mean = 3.73 ± 0.7). Other satisfying areas include the level of trust from co-workers (72.3% agree, men = 3.71 ± 0.7) and the superiors' encouragement to participate in training (72.3% agree, mean = 3.64 ± 0.7).

On the other hand, the least satisfying areas were related to salary compared to the tasks they perform (40.6% agree, mean = 3.00 ± 1.0), followed by salary compared to skills and knowledge (41.6% agree, mean = 3.03 ± 1.0), how much superiors allow them to participate in training courses and projects (42.6% agree, mean = 3.22 ± 0.9), training opportunities that are available at their workplace (49.5% agree, mean = 3.29 ± 0.9) and workload at their workplace (66.3% agree, mean = 3.48 ± 0.9). It is shown that the least satisfying areas are related to salary and training opportunities in general.

Table 4.3 Distribution of responses on statements related to satisfaction towards postoperative care for cardiac surgery patients

Statement	SD		D		N		A		SA		Mean	SD
	N	%	N	%	N	%	N	%	N	%		
I am satisfied with the other health professionals' respect for the care I provide.	2	2.0%	0	0.0%	18	17.8%	79	78.2%	2	2.0%	3.78	0.6
I am satisfied with the patients' perception of my activities and respect my work	2	2.0%	3	3.0%	16	15.8%	76	75.2%	4	4.0%	3.76	0.7
I am satisfied with the nursing assigned to me in my department	2	2.0%	1	1.0%	21	20.8%	74	73.3%	3	3.0%	3.74	0.6
I am satisfied with the new skills implement at my workplace	2	2.0%	5	5.0%	14	13.9%	77	76.2%	3	3.0%	3.73	0.7
I am satisfied with my superiors' respect for my work	2	2.0%	4	4.0%	17	16.8%	74	73.3%	4	4.0%	3.73	0.7
I am satisfied with the level of trust that I have with my co-workers	1	1.0%	5	5.0%	19	18.8%	73	72.3%	3	3.0%	3.71	0.7
I am satisfied with the spirit of collaboration between me and my co-workers.	5	5.0%	4	4.0%	16	15.8%	73	72.3%	3	3.0%	3.64	0.8
I am satisfied with my superiors' encouragement to participate in training	2	2.0%	6	5.9%	19	18.8%	73	72.3%	1	1.0%	3.64	0.7
I am satisfied with the ICCU environment (space) during applying nursing care	3	3.0%	4	4.0%	24	23.8%	66	65.3%	4	4.0%	3.63	0.8
I am satisfied with the followed system my workplace	3	3.0%	7	6.9%	18	17.8%	70	69.3%	3	3.0%	3.62	0.8

I am satisfied with my superiors' effort to improve my working conditions	4	4.0%	7	6.9%	16	15.8%	73	72.3%	1	1.0%	3.59	0.8
I am satisfied with the nurse-to-patient ratio in my shift	4	4.0%	11	10.9%	13	12.9%	68	67.3%	5	5.0%	3.58	0.9
I am satisfied with the equipment/ materials at my unit	2	2.0%	12	11.9%	16	15.8%	68	67.3%	3	3.0%	3.57	0.8
I am satisfied with how protocols/guidelines are well organized and elaborated in my unit	3	3.0%	7	6.9%	23	22.8%	65	64.4%	3	3.0%	3.57	0.8
I am satisfied with the number of tasks to be performed in the shift	2	2.0%	11	10.9%	17	16.8%	70	69.3%	1	1.0%	3.56	0.8
I am satisfied with the level of colleagues' competence in the same field	2	2.0%	8	7.9%	24	23.8%	66	65.3%	1	1.0%	3.55	0.7
I am satisfied with promotion policies in my work place	3	3.0%	8	7.9%	22	21.8%	66	65.3%	2	2.0%	3.55	0.8
I am satisfied with the workload at my workplace.	3	3.0%	19	18.8%	9	8.9%	67	66.3%	3	3.0%	3.48	0.9
I am satisfied with the training opportunities provided at my workplace	2	2.0%	19	18.8%	29	28.7%	50	49.5%	1	1.0%	3.29	0.9
I am satisfied with how my superiors allow me to participate in training courses/projects	1	1.0%	23	22.8%	32	31.7%	43	42.6%	2	2.0%	3.22	0.9
I am satisfied with my salary taking into account my skills/knowledge	5	5.0%	31	30.7%	22	21.8%	42	41.6%	1	1.0%	3.03	1.0
I am satisfied with my salary, taking into account the tasks I perform	5	5.0%	33	32.7%	21	20.8%	41	40.6%	1	1.0%	3.00	1.0

5.4 Level of knowledge about postoperative care for cardiac surgery patients

The level of knowledge for the participated nurses was assessed on their competence with specific interventions in specific domains of postoperative open-heart surgery, as shown in Table 4. In the domain of postoperative bleeding, 92.9% of the nurses stated that they are competent in identifying the postoperative massive bleeding, compared to 88.9% for the competence in dealing or controlling bleeding and reducing potential complications.

Additionally, in the field of postoperative arrhythmias, 95.0% of the nurses stated they are competent in identifying types of arrhythmias and differentiate stable from unstable ones, while 85.1% stated they are competent in identifying their causes, whether they are related to reperfusion, electrolytes, ischemia or hypoxemia issues, with 87.1% competence in dealing or treating these arrhythmias using pharmacological and/or defibrillation device.

The third domain was related to postoperative cardiac tamponade, where 93.1% of the nurses stated they are competent in identifying its signs and symptoms, compared to 79.2% for identifying its causes, and 90.1% for dealing with and treating it. Moreover, in the area of postoperative acute kidney injury (AKI), 98.0% of the nurses stated they are competent in assessing kidney function, whether using laboratory tests or abdominal ultrasound, compared to 99.0% who stated that they are competent in dealing with or treating its complications, like fluid resuscitation, using of support or medications. Lastly, in the area of postoperative infection, 96.0% of the nurses stated that they are competent in identifying nosocomial infections in their department, while 98.0% of them stated they are competent in identifying its signs and symptoms, and 93.1% for working with infection control policies, in addition to 97.0% for the dealing with preventable procedures for infection control.

Table 4.4 Distribution of responses on statements related to knowledge about postoperative care for cardiac surgery patients

Statement	Yes		No	
	N	%	N	%
Bleeding post open-heart surgery				
Competent to identify the massive bleeding post-operative	92	92.9%	7	7.1%
Competent to deal with or control bleeding and reduce complications that may occur	88	88.9%	11	11.1%
Arrhythmia post open-heart surgery				
Competent to identity types of arrhythmias	96	95.0%	5	5.0%
Competent to identity causes of arrhythmias	86	85.1%	15	14.9%
Competent to deal with or treat arrhythmias	88	87.1%	13	12.9%
Cardiac tamponade post open-heart surgery				
Competent to identity Sign and symptoms of cardiac tamponed	94	93.1%	7	6.9%
Competent to identity causes of cardiac tamponed	80	79.2%	21	20.8%
Competent to deal with or treat cardiac tamponed	91	90.1%	10	9.9%
Acute kidney injury post open-heart surgery				
Competent to assess kidney function	99	98.0%	2	2.0%
Competent to deal with or treating this complication	100	99.0%	1	1.0%
Infection post open-heart surgery				
Competent to identify nosocomial infection in ICCU	97	96.0%	4	4.0%
Competent to identity signs and symptoms of infection	99	98.0%	2	2.0%
Competent to work with infection control policy	94	93.1%	7	6.9%
Competent to deal with preventable procedures for infection control	98	97.0%	3	3.0%

6.4 Level of practice towards postoperative care for cardiac surgery patients

The level of practice among the nurses was assessed for their awareness about specific postoperative assessment-related areas, and the availability of specific assessment procedures and tools, as shown in Table 5.

Majority of the nurses were aware about all of the provided areas of postoperative assessment, including the awareness about the surgery's indications, whether being urgent or elective (96.0%), the common arteries and veins used as grafts (95.0%), the early warning signs of postoperative complications (96.0%), the explanation of postoperative impact of surgery on patient (97.0%), as well as the topics that the patient need to be taught about the postoperative period (96.0%).

In the domain of assessment forms, more than half of the nurses stated that sheets/tools are available in their organization for the postoperative cardiac care (57.4%), with a similar percentage for their inclusion of specific data related to history, physical examination, respiratory, cardiovascular, neurological, … etc. data (56.4%), while a higher percentage stated that an assessment tool for the postoperative care of chest tubes are available (62.4%). Also, majority of the nurses stated that an assessment tool for the mechanical ventilator weaning process is available (85.1%), with a higher percentage related to the availability of a procedure manual regarding post-extubation care. Almost all nurses stated the availability of a flow sheet to monitor vital signs, intake, output, arrhythmias and complications on an hourly basis (98.0%), as well as for the implementation of early mobilization (95.0%) and the availability of an assessment tool regarding postoperative arterial line and central line care (92.1%).

Table 4.5 Distribution of responses on statements related to practice towards postoperative care for cardiac surgery patients

Statement	Yes		No	
	N	%	N	%
Post-operation assessment of patient				
Are you aware about the indication for surgery	97	96.0%	4	4.0%
Are you aware about common arteries or veins used in grafting	96	95.0%	5	5.0%
Are you aware about the early warning signs (complications) can occur post operatives	97	96.0%	4	4.0%
Are you aware about Explaining procedure impact on patient post-operative	98	97.0%	3	3.0%
Are you aware about the education topics needed for patient post open-heart surgery	97	96.0%	4	4.0%
Assessment form				
Is there a sheet or tool (checklist) in your organization regarding post-operative cardiac care	58	57.4%	43	42.6%
If yes, does it include history, vital signs, physical examination and systemic assessment	57	56.4%	44	43.6%
Is there an assessment tool regarding post-operative chest tube care (such as milking, and dressing)?	63	62.4%	38	37.6%
Is there an assessment tool regarding the weaning of ventilators?	86	85.1%	15	14.9%
Is there a procedure manual regarding post-extubation care of mechanical ventilators?	89	88.1%	12	11.9%
Is there a flow sheet monitoring hourly vital signs, intake and output, arrhythmia, complications?	99	98.0%	2	2.0%
Is there implementation of early mobilization principle?	96	95.0%	5	5.0%
Is there assessment tool regarding arterial line and CVP line care postoperatively?	93	92.1%	8	7.9%

7.4 Description of performance, satisfaction, knowledge and practice scores

The following table (Table 6) describes the overall scores of the study variables out of 100% to facilitate the comparison between them. Three of the main variables had an overall high score, which were the nurses' knowledge (mean = 92.93 ± 14.00, median = 100), followed by performance (mean = 85.76 ± 16.44, median = 92.3) and performance (mean = 91.19 ± 11.77, median = 90.0), while the scores of satisfactions were moderate in general (mean = 70.67 ± 11.19, median = 73.9).

Table 4.6 Description of nurses' performance, satisfaction, knowledge and practice scores towards postoperative care for cardiac surgery patients.

Domain	Mean	SD	Median	IQR	Minimum	Maximum
Performance	91.19	11.77	90.0	10.0	40.0	100.0
Satisfaction	**70.67**	11.19	73.9	12.6	20.0	86.7
Knowledge	92.93	14.00	100	7.1	28.6	100
Practice	85.76	16.44	92.3	23.1	30.8	100

SD = Standard deviation, IQR = Interquartile range

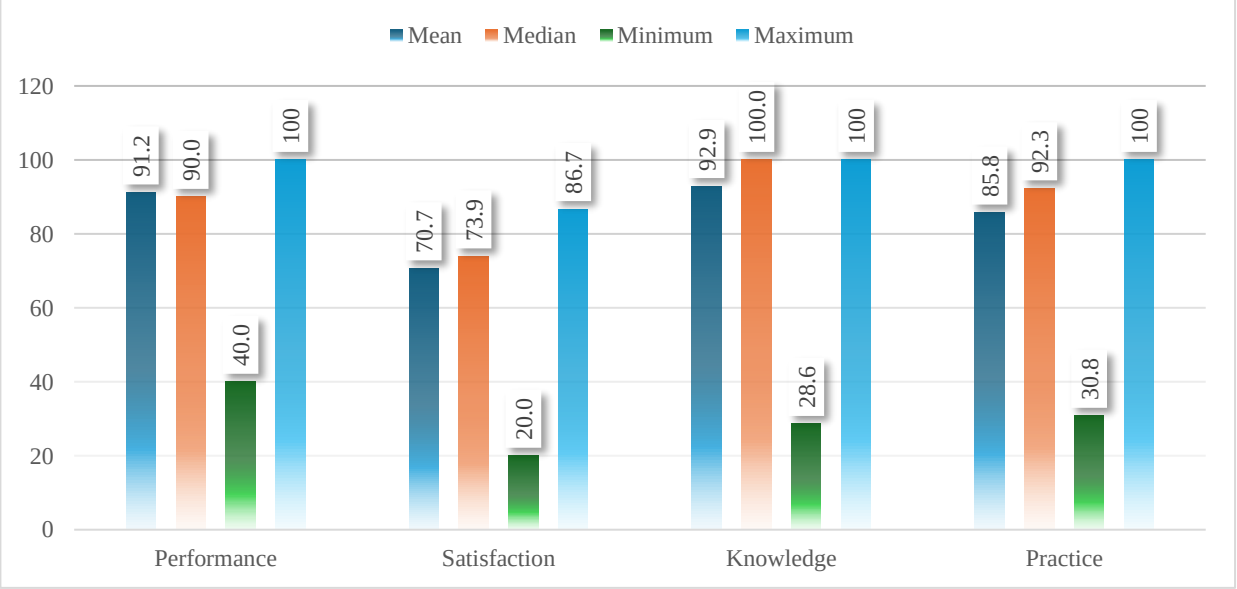

Figure 1: Description of nurses' performance, satisfaction, knowledge and practice scores

8.4 Analytical results

The analytical part of the analysis investigated the relationships between nurses' demographic factors and their performance, satisfaction, knowledge and practice of postoperative cardiac surgery care, using the suitable non-parametric test, as the distribution of data is not normal, where the mean ranks of the scores were compared across the categories of demographic factors, using Mann-Whitney U test for the comparison with dichotomous factors, and Kruskal-Wallis for the non-dichotomous variables, while Spearman correlation test was used to test the correlation between scale factors and the domains' scores.

For the relationship between nurses' demographic factors and their scores of performances, Table 7 shows that the performance scores were significantly correlated with nurses' age ($r = 0.308$, p-value = 0.002) and experience ($r = 0.341$, p-value < 0.001), indicating a moderate significant correlation between older and more experienced status and higher performance of nurses in postoperative nursing care. Also, the performance was significantly higher among married compared to unmarried nurses (mean = 94.52 vs. 88.81, mean rank = 58.92 vs. 45.36, respectively, $U = 906.5$, p-value = 0.013), who have graduate than undergraduate degree (mean = 96.07 vs. 89.32, mean rank = 65.04 vs. 45.62, respectively, $U = 629.0$, p-value = 0.001), who received prior training than who did not (mean = 94.78 vs. 88.18, mean rank = 63.48 vs. 40.56, respectively, $U = 691.0$, p-value < 0.001), who reported having enough than not enough income (mean = 94.53 vs. 87.50, mean rank = 58.75 vs. 42.45, respectively, $U = 861.5$, p-value = 0.003) and who work in an educational type of hospital (men = 96.52, mean rank = 66.87) than both private and governmental hospitals (mean = 90.37 and 87.92, mean rank = 50.27 and 37.44, respectively, $H = 13.942$, p-value = 0.001). Lastly, there was a significantly negative correlation between LOS and performance scores ($r = - 0.305$, p-value = 0.002), indicating significantly lower performance scores with higher LOS days.

Table 4.7 Relationship between demographic factors of nurses and their performance towards postoperative care for cardiac surgery patients.

Factors	Values	Mean score	Mean rank	Test value	p-value
Age	Correlation	r = 0.308			0.002
Gender	Male	90.91	49.81	1199.5	0.629
	Female	91.52	52.42		
Marital status	Married	94.52	58.92	906.5	0.013
	Unmarried	88.81	45.36		
Level of education	Undergraduate	89.32	45.62	629.0	0.001
	Graduate	96.07	65.04		
Experience	Correlation	r = 0.341			< 0.001
Workload hours	8 hours	93.54	55.56	2.903	0.234
	12 hours	75.00	39.63		
	16 hours	90.20	47.46		
Training	Yes	94.78	63.48	691.0	< 0.001
	No	88.18	40.56		
Income	Enough	94.53	58.75	861.5	0.003
	Not enough	87.50	42.45		
Residence	City	90.49	49.89	0.276	0.871
	Village	91.28	50.73		
	Camp	92.38	53.67		
Type of hospital	Private	90.37	50.27	13.942	0.001
	Government	87.92	37.44		
	Educational	96.52	66.87		
LOS	Correlation	r = - 0.305			0.002

In terms of the relationship between nurses' demographic factors and their satisfaction levels, Table 8 shows that the satisfaction levels were significantly higher among nurses who have graduate

than undergraduate degrees (mean = 72.76 vs. 69.86, mean rank = 61.82 vs. 46.85, respectively, U = 719.0, p-value = 0.021), who received training than who did not (mean = 72.57 vs. 69.08, mean rank = 59.17 vs. 44.16, respectively, U = 889.0, p-value = 0.010), who reported having enough than not enough income (mean = 74.37 vs. 66.58, mean rank = 66.33 vs. 34.07, respectively, U = 459.5, p-value < 0.001) and who work at educational type of hospital (mean = 74.44, mean rank = 70.11) than both private and governmental settings (mean = 70.72 and 66.92, mean rank = 50.10 and 34.71, respectively, H = 17.374, p-value < 0.001). In addition, there was a significantly negative correlation between LOS and satisfaction scores (r = - 0.300, p-value = 0.002), indicating significantly lower satisfaction scores with higher LOS days.

Table 4.8 Relationship between demographic factors of nurses and their satisfaction towards postoperative care for cardiac surgery patients

Factors	**Values**	**Mean score**	**Mean rank**	**Test value**	**p-value**
Age	Correlation	r = 0.053			0.599
Gender	Male	70.02	48.60	1133.0	0.366
	Female	71.44	53.87		
Marital status	Married	72.03	55.24	1061.0	0.218
	Unmarried	69.70	47.98		
Level of education	Undergraduate	69.86	46.85	719.0	0.021
	Graduate	72.76	61.82		
Experience	Correlation	r = 0.023			0.816
Workload hours	8 hours	70.42	49.47	3.852	0.146
	12 hours	61.96	25.75		
	16 hours	71.62	54.56		
Training	Yes	72.57	59.17	889.0	0.010
	No	69.08	44.16		
Income	Enough	74.37	66.33	459.5	< 0.001
	Not enough	66.58	34.07		

Residence	City	70.03	50.41		
	Village	71.86	51.38	0.028	0.986
	Camp	69.69	51.43		
Type of hospital	Private	70.72	50.10		
	Government	66.92	34.71	17.374	< 0.001
	Educational	74.44	70.11		
LOS	Correlation	r = - 0.300			0.002

In Table 9, the relationships between nurses' demographic factors and their knowledge level regarding postoperative care for open-heart surgery patients are shown. There were moderate significant correlations between both age (r = 0.406, p-value < 0.001) and experience (r = 0.523, p-value < 0.001) and knowledge, indicating an overall significantly higher knowledge levels among older and more experienced nurses. Also, the knowledge levels were significantly higher among married than unmarried nurses (mean = 96.52 vs. 90.31, mean rank = 56.38 vs. 43.60, respectively, U = 845.5, p-value = 0.006), who have graduate than undergraduate degrees (mean = 98.68 vs 90.71, mean rank = 60.06 vs. 44.74, respectively, U = 646.5, p-value = 0.003), who work for 8-hour workload (mean = 97.52, mean rank = 55.23) than 12-hour or 16-hour workloads (mean = 83.93 and 89.21, mean rank = 26.88 and 44.79, respectively, H = 8.829, p-value = 0.012), who received prior training than who did not (mean = 97.30 vs. 89.15, mean rank = 56.42 vs. 42.58, U = 836.0, p-value = 0.003), and who work at educational type of hospital (mean = 98.76, mean rank = 58.22) than both private and governmental hospitals (mean = 93.00 and 86.96, mean rank = 48.25 and 41.46, respectively, H = 6.351, p-value = 0.042). Moreover, there was a significantly negative correlation between LOS and knowledge scores (r = - 0.227, p-value = 0.025), indicating significantly lower knowledge scores with higher LOS days.

Table 4.9 Relationship between demographic factors of nurses and their knowledge about postoperative care for cardiac surgery patients

Factors	Values	Mean score	Mean rank	Test value	p-value
Age	Correlation	r = 0.406			< 0.001
Gender	Male	92.20	46.68	1035.5	0.260
	Female	93.85	51.92		
Marital status	Married	96.52	56.38	845.5	0.006
	Unmarried	90.31	43.60		
Level of education	Undergraduate	90.71	44.74	646.5	0.003
	Graduate	98.68	60.06		
Experience	Correlation	r = 0.523			< 0.001
Workload hours	8 hours	97.52	55.23		
	12 hours	83.93	26.88	8.829	0.012
	16 hours	89.21	44.79		
Training	Yes	97.30	56.42	836.0	0.003
	No	89.15	42.58		
Income	Enough	93.43	50.49	1100.5	0.506
	Not enough	92.40	47.41		
Residence	City	90.41	43.99		
	Village	95.68	53.95	3.637	0.162
	Camp	92.52	49.12		
Type of hospital	Private	93.00	48.25		
	Government	86.96	41.46	6.351	0.042
	Educational	98.76	58.22		
LOS	Correlation	r = - 0.227			0.025

Lastly, the relationships between nurses' demographic factors and their levels of practice are shown in Table 10, where the practice levels were significantly correlated with both age (r = 0.217, p-

value = 0.029) and experience (r = 0.249, p-value = 0.012), indicating a significantly better experience among older and more experienced nurses. Also, the experience levels were significantly higher among graduate than undergraduate nurses (mean = 90.66 vs. 83.88, mean rank = 60.00 vs. 47.55, respectively, U = 770.0, p-value = 0.043), who had previous training than who did not (mean = 94.82 vs. 78.18, mean rank = 67.32 vs. 37.35, respectively, U = 514.5, p-value < 0.001), who reported having enough than not enough income (mean = 91.00 vs. 79.97, mean rank = 59.13 vs. 42.02, respectively, U = 841.0, p-value = 0.002), and who work at educational hospitals (mean = 93.98, mean rank = 69.22) than both private and governmental hospitals (mean = 87.18 and 74.68, mean rank = 53.20 and 28.58, respectively, H = 26.023, p-value < 0.001). Lastly, there was a significantly negative correlation between LOS and practice scores (r = - 0.478, p-value < 0.001), indicating significantly lower practice scores with higher LOS days.

Table 4.10 Relationship between demographic factors of nurses and their practice towards postoperative care for cardiac surgery patients.

Factors	**Values**	**Mean score**	**Mean rank**	**Test value**	**p-value**
Age	Correlation	r = 0.217			0.029
Gender	Male	86.15	52.34	1191.5	0.596
	Female	85.28	49.40		
Marital status	Married	89.01	56.52	1007.0	0.091
	Unmarried	83.44	47.07		
Level of education	Undergraduate	83.88	47.55	770.0	0.043
	Graduate	90.66	60.00		
Experience	Correlation	r = 0.249			0.012
Workload hours	8 hours	88.78	54.42		
	12 hours	71.15	28.88	3.436	0.179
	16 hours	83.99	49.46		
Training	Yes	94.82	67.32	514.5	< 0.001

	No	78.18	37.35		
Income	Enough	91.00	59.13	841.0	0.002
	Not enough	79.97	42.02		
Residence	City	82.93	46.23		
	Village	87.77	55.63	2.319	0.314
	Camp	87.55	51.71		
Type of hospital	Private	87.18	53.20		
	Government	74.68	28.58	26.023	< 0.001
	Educational	93.98	69.22		
LOS	Correlation	r = - 0.478			< 0.001

The correlations between the scores of variables are shown in Table 11, which shows that all study variables are significantly inter-correlated in a positive way, where better performance was significantly correlated in a moderate strength with satisfaction (r = 0.425, p-value < 0.001), knowledge (r = 0.579, p-value < 0.001) and practice (r = 0.573, p-value < 0.001), while satisfaction was significantly correlated in a moderate way with knowledge (r = 0.317, p-value = 0.002) and practice (r = 0.337, p-value = 0.001), and knowledge was significantly correlated with practice (r = 0.522, p-value < 0.001).

Table 4.11 Correlations between nurses' performance, satisfaction, knowledge and practice levels.

Factor	**Performance**		**Satisfaction**		**Knowledge**	
	R	**P**	**r**	**p**	**r**	**p**
Satisfaction	0.425	< 0.001	-	-		
Knowledge	0.579	< 0.001	0.317	0.002	-	-
Practice	0.573	< 0.001	0.337	0.001	0.522	< 0.001

To investigate the impact of study variables on the length of stay (LOS), a linear regression model was performed, and shown in Table 12. The regression model shows that practice was the only

significant predictor of LOS (B = -0.037, t = -4.005, p-value < 0.001, 95% CI = -0.055 - -0.018), which can be translated to that each 10% increase in the score of practice predicts a decrease in the LOS by 0.37 days.

Table 4.12 Impact of nurses' performance, satisfaction, knowledge and practice on the length of stay.

Factors	**Beta**	**T**	**p-value**	**95% CI**
Intercept	7.325	7.073	**<0.001**	5.268 – 9.382
Performance	-0.011	-0.837	0.405	-0.037 – 0.015
Satisfaction	-0.011	-0.938	0.351	-0.035 – 0.013
Knowledge	0.019	1.837	0.069	-0.002 – 0.039
Practice	-0.037	-4.005	<0.001	-0.055 - -0.018
Model summary	R = 0.482	R^2 = 0.232		Adj. R^2 = 0.199

B = Unstandardized B coefficient, CI = Confidence Interval of B coefficient

9.4 Summary

The study sample consisted of ICCU nurses with a median age of 28 years and experience of 5 years, who were more males (54.5%), unmarried (58.4%), having bachelor's degree (70.3%), not receiving previous training (54.5%), reported to have enough income (52.5%), living in urban areas (40.6%), working in private settings (53.5%), and reported dealing with a median of 22 patient cases per month with a median LOS of 4 days.

The highest domain scored a median of 100% (knowledge), which was significantly higher with older, more experience, married, graduate, trained, in educational hospitals and who work for 8 hours, followed by 92.3% for practice, which was significantly higher in older, more experienced, graduate, trained, enough income reporting and educational hospitals nurses.

The median score of performance was 90.0%, which was significantly higher in older, more experienced, married, graduate, trained, enough income reporting and educational hospitals nurses, while the median satisfaction was 73.9%, which was significantly higher in graduate, trained, enough monthly income reporting and educational hospital nurses.

All domains were significantly correlated in a positive moderate way, while shorter LOS of the patients was only significantly predicted by better practices of the nurses in the postoperative open-heart surgery care.

Chapter five: Discussion

1.5 Introduction

The analytical results covered in this chapter provide insight into assessing the correlation between nurses' demographic characteristics and their performance, satisfaction, knowledge, and practice in postoperative cardiac surgery care, on the length of stay in CICU.

1.5 What is the level of CICU nurses' performance, knowledge, satisfaction, and practice among CICU nurses post cardiac surgeries?

1.1.5 Level of nurses' performance towards postoperative care for cardiac surgery patients

Although, this study's findings showed high scores of nurses performed well, and they could do nursing care duties within allotted time frames as their competence in time management, and medication administration considered standard post-operative duties in CICU settings, aiding in preventing complications and shortening the length of stay. In addition, the findings showed nurses received supervision and observation during care, and there are good communication skills among healthcare providers, (such as the clarity of medical records and physician handwriting instructions), which is in line with studies of (Reid et al., 2013) and (Mohamed Ali Soliman et al., 2020), that pointed the collaborative workplaces enhance nursing performance by lowering ambiguities in care protocols, and strong communication between healthcare teams is linked to improved patient outcomes in cardiac surgery settings (Reid et al., 2013) (Mohamed Ali Soliman et al., 2020) So, this study's emphasis on open lines of communication is how crucial it is to promote cooperation and information sharing to guarantee quality postoperative treatment.

The study findings revealed there was significance in the relationship between nurses' performance towards post-operative care for cardiac surgery patients and continuous training courses which are considered a must to develop the experiences and the skills of the nursing staff in the intensive care unit, which it reported 61.4% of nurses having access to training, indicating a gap that needs to be filled, in contrast with studies of (Elateif, 2017) and (Woo et al., 2017), that showed nurses skill noticeable increases following training, indicating that in-service training programs greatly

enhanced nurses' performance in cardiac care units (Elateif, 2017), and nurses who receive continual education perform better and are more satisfied with their jobs, which benefits patients (Woo et al., 2017). Thus, this study contributes to the body of knowledge by quantitatively relating performance gaps and training availability, indicating that focused interventions may be able to further improve nursing performance. It suggests training programs are necessary because the comparatively limited availability to training indicates a lost chance to improve skills, particularly in intricate or changing areas of cardiac care, including handling new protocols or technology.

2.1.5 Level of nurses' satisfaction towards postoperative care for cardiac surgery patients

The study findings have highlighted the presence of challenges faced by nurses' satisfaction regarding the lack of opportunities and unavailability of training courses at nurses' work, workplaces way allow them to participate in training courses and programs, their salary obtained with comparable their skills and knowledge, all of these results are consistent with the study of (Öztepe & Kanan, 2021) and(Sayej, 2016), that overlap highlights the significance of addressing areas of dissatisfaction and raises the possibility that improved patient experiences could result from nurse satisfaction, related to the least satisfying areas for employees were found to be salary compared to tasks, skills, knowledge, training opportunities, and workload at the workplace, indicating that financial compensation is a major source of concern, which is financial dissatisfaction can negatively affect long-term retention and job commitment, even while it might not have a direct effect on performance in the short term (Öztepe & Kanan, 2021; Sayej, 2016). Also, this study's findings expressed nurses' dissatisfaction with the availability of formal training programs opportunities for improving their skills In professional development and training, which are consistent with those of (Elateif, 2017)and (Mohamed Ali Soliman et al., 2020), who stress the value of structured training programs, that higher satisfaction ratings from nurses in educational hospitals point to a favorable correlation between job satisfaction and institutional support for training, nurses who had access to ongoing education demonstrated improved attitudes and behaviors, which raised their levels of satisfaction (Mohamed Ali Soliman et al., 2020).

However, this study showed nurses are most satisfied with aspects like respect from superiors, patient viewpoint, assigned care, new workplace skills, and respect from healthcare providers. Coworker trust and supervisor support for training participation are additional sources of satisfaction. In general, nurses are satisfied with their jobs and the regard they obtain from their managers.

3.1.5 Level of nurse’s knowledge about postoperative care for cardiac surgery patients

The findings of the study have revealed that there was no difference in the relationship between the level of knowledge about postoperative care for cardiac surgery patients and the competence to identify the causes of cardiac tamponade in open heart surgery after surgery, treating postoperative cardiac tamponade, and recognizing its signs and symptoms. In addition, this study showed nurses ,know control bleeding and minimize problems, are proficient in recognizing severe bleeding ,demonstrate proficiency in recognizing arrhythmias, differentiate between stable and unstable ones and use medication or defibrillation techniques to treat them, able to diagnose and treating Renal problems, proficient in putting infection control procedures into practice, proficient in recognizing) symptoms, and proficient in diagnosing nosocomial infections, which agree with studies ofMohamed Ali Soliman et al., 2020) and (Elateif, 2017 that pointed nurses who possess a solid foundation of ,(knowledge is essential for recognizing and treating post-operative problems, especially in patients .undergoing high-risk heart surgery demonstrate the proficiency of nurses in critical care settings According to in-service training increased ICU nurses' knowledge by 73.3%, which enhanced their ,ability to manage critically ill patients. These investigations are supported by the study's findings which show that knowledge directly affects better patient outcomes and efficient complication treatment.

4.1.5 Level of nurses practice towards postoperative care for cardiac surgery patients

The study findings showed the nurses' level of practice was evaluated based on their knowledge of particular postoperative assessment-related areas and the availability of particular assessment methods and resources. The majority of nurses were knowledgeable about every area of postoperative assessment that was offered, such as the indications of the surgery, whether it was urgent or elective, the common arteries and veins used as grafts, the early warning signs of postoperative complications, the topic that the patient needed to be taught about the postoperative period, and the explanation of the postoperative impact of surgery on the patient, which is line with studies of (Elateif, 2017)and (Mohamed Ali Soliman et al., 2020) that demonstrated that patient outcomes are enhanced by nurses

who are well-versed in and trained in post-operative care protocols, emphasizing the crucial education and training are to nursing practice (Elateif, 2017) (Mohamed Ali Soliman et al., 2020).

In assessment forms, over half of the nurses reported having assessment forms for postoperative cardiac care, including specific data, a higher percentage had tools for chest tube care, mechanical ventilator weaning, and post-extubation care. Most nurses had flow sheets for monitoring vital signs, early mobilization, and postoperative arterial and central line care, these findings line up with (Mohamed Ali Soliman et al., 2020)and (Mallinson, 2015) who emphasized the use of standardized instruments in nursing practice and the necessity of uniformity in post-operative care, also pointed out the possibility of consistent documentation and patient follow-ups, which may improve patient safety and consistency of care (Mohamed Ali Soliman et al., 2020) and (Mallinson, 2015) Consequently, nursing practice can be enhanced by enhancing resources and training, emphasizing institutional support, and addressing particular areas for improvement. It also emphasizes the necessity of systemic investments in healthcare infrastructure and the significance of having excellent nursing expertise in attaining better results, using patient outcome data and observational evaluations.

7.5 What is difference and relationship in means of performance, knowledge, satisfaction, practice regarding demographic variables among CICU nurses post cardiac surgeries?

The difference and relationship between nurses' demographic factors and their performance, satisfaction, knowledge, and practice in postoperative cardiac surgery care.

The findings of this study showed a moderate correlation between older and more experienced nurses and higher performance. The performance was significantly higher among married nurses, those with a graduate degree, those with prior training, those with enough income, and those working in educational hospitals.

The study reveals that nurses with graduate degrees, those who received training, those with sufficient income, and those working in educational hospitals have significantly higher satisfaction levels compared to those in private and governmental settings.

The findings of this study showed that age and performance were positively correlated, with older nurses showing greater performance levels ($r = 0.308$, $p = 0.002$). In addition, it showed that Years of experience and performance were positively correlated ($r = 0.341$, $p < 0.001$); their experience

ranged with a median of five years (IQR = 5), which supports previous research indicating that age and experience significantly improve nursing performance, leading to fewer mistakes and better } handling of complicated situationsBeier,)Beier, 2023) . in shorter lengths of stay (LOS((Arviolla et al., 2023) while studies of(Al-Hasnawi & Aljebory, 2023 showed no significant correlation between (experience and performance, or demographic factors and as nursing job satisfaction .

Also, marital status showed significant findings; married nurses outperformed unmarried ones in terms of performance and knowledge scores (U = 906.5, p = 0.013), with married nurses doing considerably better (mean = 94.52%) than unmarried nurses (mean = 88.81%), which it attributes to married nurses may have more life experience or a larger degree of responsibility, which could improve their dedication to their jobs and ability to make decisions. which agrees with the study of sayej 2016 ,revealed similar findings, indicating that personal characteristics, such as marital status have an impact on nursing job performance (Sayej, 2016).

Furthermore, regarding educational level, study findings indicated that nurses who have graduate-level degrees performed noticeably better than those with bachelor's degrees (M= 96.07; M=89.32, respectively), which agrees the studies provided strong evidence to support the conclusions that better patient outcomes are associated with higher degrees of nursing education, like studies of (Elateif, 2017), and (Rosseter, 2014), which assertion that exposure to advanced theoretical concepts and evidence-based procedures at higher educational levels enhances nurses' performance and understanding (Elateif, 2017), and hospitals with high percentage of nurses with BSN had reduced mortality and failure-to-rescue rates (Rosseter, 2014). On the other hand, this study's findings showed there was no significant correlation between workload and satisfaction or performance, which might point to staffing practices, support networks, or efficient coping strategies that lessen the stress caused by a heavy workload. In contrast to studies by (Ross et al., 2023) and (Al-Hasnawi & Aljebory, 2023), that found higher nursing workload is linked to worse patient outcomes and nursing performance in intensive care units (Ross et al., 2023) (Al-Hasnawi & Aljebory, 2023). Also, In terms of hospital types, this study findings showed nurses working at educational hospitals reported better levels of job satisfaction and performance scores (M = 96.52%) than nurses working in private and public hospitals, which are consistent with studies of (Arsat et al., 2023), (Almashrafi, Alsabti, et al., 2016), that highlighted nurses' caring behaviors—which are directly related to their performance and job satisfaction—are greatly impacted by their work environments. So, higher performance and satisfaction levels may result from educational hospitals' increased access to resources and opportunities for professional growth. As a result, institutional support must enhance nursing outcomes.(Arsat et al., 2023) (Almashrafi, Alsabti, et al., 2016).

3.5 What is the relationship between performance, knowledge, satisfaction, practice and LOS among CICU nurses post cardiac surgeries?

The study findings showed significant positive correlations between study variables, with better performance being moderately correlated with satisfaction, knowledge, and practice. Satisfaction was moderately correlated with knowledge and practice, and knowledge was significantly correlated with practice. Practice and satisfaction showed a somewhat favorable connection ($r = 0.337$, $p = 0.001$), indicating that nurses who follow care standards are more satisfied with their jobs, which agrees study of (Reid et al., 2013), nurses who follow care standards express greater job satisfaction because they feel proud of their work and accomplished. In addition, line in with the study by (Almashrafi, Alsabti, et al., 2016), encouraging work environments improves job satisfaction and practice adherence, which indicates that following care procedures improves nurses' satisfaction and morale .

A linear regression model revealed that practice was the only significant predictor of length of stay (LOS), with a 10% increase in practice score reducing LOS by 0.37 days. In the univariate analysis, other variables were correlated with LOS but did not significantly predict patient LOS.

Additionally, the study examined the relationship between postoperative cardiac surgery patients' length of stay (LOS) and nurses' performance, satisfaction, knowledge, and practice. This study pinpoints crucial areas to maximize patient recovery and healthcare resources through:

1.3.5 Performance and LOS:

Performance scores and LOS showed a significant negative connection ($p< 0.405$), suggesting that shorter LOS is linked to better performance.

2.3.5 Satisfaction and LOS:

A somewhat negative association ($p = 0.315$) was seen between satisfaction levels and LOS, indicating that contented nurses help to lower LOS.

3.3.5 Knowledge and LOS:

Nursing knowledge has a crucial role in maximizing recovery durations, as evidenced by the strong negative association found between knowledge scores and LOS ($p= 0.069$).

7.6 What are the predictors of LOS among CICU nurses post cardiac surgeries?

1.4.5 Practice and LOS:

Practice scores and LOS showed a significant predictor of LOS (p-value < 0.001), indicating that reduced LOS is a result of following care protocols, which agrees with studies by (Mallinson, 2015) and (Woo et al., 2017), emphasized that by reducing variability in care delivery, consistent adherence to care protocols lowers the length of stay (LOS), and nurses who regularly adhere to best practices enhance patient outcomes, such as reducing intensive care unit stays. Thus, a crucial regular practice must be for lowering LOS by following evidence-based treatment guidelines increasing the likelihood that nurses will guarantee a speedy recovery and avoid problems.

So, this study recommended enhancing nurse performance, conducting regular training sessions, focusing on patient care and time management, increasing job satisfaction by addressing pay and training issues, and emphasizing ongoing education and care compliance.

5.5 Conclusion

This study aimed to investigate the association between nurses' performance, satisfaction, knowledge, and practice and the LOS of postoperative cardiac surgical patients at a Palestine hospital. Results Nurses showed high Knowledge and performance but moderate Satisfaction and practice adherence. Continuous education and training were recognized as significant factors that could increase knowledge and practice. The outcome showed that factors such as age, education level, and years of experience had a significant impact on nurses' results, while the differences between institutions emphasized the benefits that educational hospitals have in terms of available resources and training. Higher performance, satisfaction, knowledge, and practice were associated with reduced patient LOS, highlighting the relationship of the quality-of-care parameters. Systemic interventions to fill this gap may include formal training programs, economic incentives, and standardized model care protocols. Policymakers and healthcare administrators striving to enhance nursing practices and patient outcomes in Palestine and similar contexts would benefit from these findings.

6.5 Recommendations

1.6.5 Recommendations for Research

Enhancing nursing performance, holding frequent training sessions, concentrating on patient care and time management, improving work satisfaction by resolving concerns with compensation and training, and placing a strong emphasis on continuing education and care compliance were all suggested by this study.

2.6.5 Recommendations for Researchers

1.Longitudinal Studies: Future research should focus on conducting long-term studies to examine the impact of nursing performance, satisfaction, knowledge, and practice on patient outcomes over extended periods.

2.Interventional Research: Design and implement training programs to assess their direct impact on nursing performance and patient care quality.

3. Comparative studies: Investigate differences in nursing performance across various hospital types (educational, private, public) to identify best practices.

3.6.5 Recommendations for Education

1 Initiatives for Training Reinforce in-service training regularly: Large hospitals should routinely host seminars on how to care for patients following heart surgery, especially when it comes to managing complications like bleeding, infectious diseases, and arrhythmias.

4.6.5 Recommendations for practice

1. Strengthen Financial Rewards Provide Competitive Pay: Reducing pay discrepancies, particularly those that exist in government hospitals, may increase adherence to care standards and decrease patient discontent. Introduce incentives depending on performance: Make monetary rewards reliant on quality indicators like patient outcomes and procedure compliance.

2. Deal with Workplace Satisfaction: Improve working conditions: Provide enough personnel, resources, and a helpful management to help staff members sustain work satisfaction.

5.6.5 Recommendations for Administration

1. Emphasis on Ongoing Education: Provide financial aid or support to nurses who want to advance their education in order to get more expertise.

2. Enhancements to the Institution: Create protocols for standardized care: Every hospital must implement evidence-based procedures consistently.

7.7 Limitations

1. Social desirability bias and recall bias are two examples of self-reporting bias that might have affected self-reported statistics.
2. The cross-sectional study methodology makes it impossible to determine the causative linkages between variables, and because the study was limited to certain hospitals in Palestine, it is challenging to extrapolate the findings to other settings.
3. Sample Size Restrictions: Statistical power to identify associations or subtle differences between subgroups may be limited by the relatively small sample size. The sample size was small in the study because the study targeted a specific group of nurses, namely, cardiac intensive care unit nurses. This group is small because of the small number of centers specializing in cardiac surgery.
4. The results may not apply to nurses who care for other patient groups or specializations since the research population was restricted to nurses who were caring for patients who had undergone heart surgery in the intensive care unit.

5. Time Restrictions: Seasonal or systemic changes that may affect nursing practices and patient outcomes may not have been sufficiently documented within the study's data collecting period.

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Appendices

Appendix A: Questionnaire

***Part One (Demographics Data). Please fill in the following**

1. Age (years)……

2. Gender

Male

Female

3. Marital status

Married

Unmarried

4. Level of education

Nursing Diploma

Bachelor

master or PHD degree

5. Years of Experience in CICU …….

6. Work load hours

8

12

16

7. Previous training courses on post open heart- surgery nursing care

Yes

No

8. Income

Not enough

Enough

9. Residence

City

Village

Camp

10. Type of hospital

Private

Government

Educational

11. Number of pt. cases per/month…….

12. length of stay on CICU …….

Part two –(Performance Nursing Questionnaire)

Items		Yes	No
Nurses experience factors			
1.	The nurse has sufficient experience on how to administer the medication		
2.	Continuous supervision and observation are available during nursing care for the post-open-heart surgery patient		
3.	There is a procedural manual within the intensive care unit regarding nursing care of open heart /cardiac surgery		
4.	I worked on keeping my job-related knowledge up-to-date		
5.	I worked on keeping my work skills up-to-date		
6.	I manage time to finish nursing care of cardiac surgery on time		
7.	Continuous training courses are conducted to develop the experiences and skills of the nursing staff within the intensive care unit		
Communication skills between nurses and healthcare providers			
8.	physicians' request are illegible (Hand writing is clear)		

9.	physicians' request are clear in details (there is no ambiguity)		
10.	The nurses had access to medical records that all healthcare providers' orders are in.		

Part Three- (Nurses satisfaction Questionnaire)

NO.	Items	strongly disagree 1	Disagree 2	Natural 3	Agree 4	Strongly Agree 5
1.	I am satisfied with the spirit of collaboration between me and my co-workers.					
2.	I am satisfied with the workload at my workplace.					
3.	I am satisfied with my superiors' effort to improve my working conditions.					
4.	I am satisfied with the nurse-to-patient ratio in my shift.					
5.	I am satisfied with the level of trust that I have with my co-workers.					
6.	I am satisfied with how my superiors allow me to participate in training courses/projects.					
7.	I am satisfied with the number of tasks to be performed in the shift.					

8.	I am satisfied with the CICU environment (space) during applying nursing care). .					
9.	I am satisfied with the nursing assigned to me in my department.					
10.	I am satisfied with the training opportunities provided at my workplace.					
11.	I am satisfied with the level of colleagues' competence in the same field.					
12.	I am satisfied with the new skills implement at my workplace.					
13.	I am satisfied with the equipment/ materials at my unit.					
14.	I am satisfied with the followed system my workplace.					
15.	I am satisfied with how protocols/guidelines are well organized and elaborated in my unit					
16.	I am satisfied with promotion policies in my work place.					
17.	I am satisfied with my superiors' respect for my work.					
18.	I am satisfied with my salary, taking into account the tasks I perform.					
19.	I am satisfied with my salary taking into account my skills/knowledge.					
20.	I am satisfied with the patients' perception of my activities. And respect my work					

21.	I am satisfied with my superiors' encouragement to participate in training.					
22.	I am satisfied with the other health professionals' respect for the care I provide.					

Part four -Knowledge level to nurses about nursing care for post operatives' surgery complication

Bleeding post open heart surgery		**Yes**	**No**
1.	Competent to identify the massive bleeding post-operative		
2.	Competent to deal with or control bleeding and reduce complications that may occur		

Arrhythmia post open-heart surgery		**Yes**	**No**
3.	Competent to identity types of arrhythmias (stable or unstable arrhythmia)		
4.	Competent to identity causes of arrhythmias (reperfusion, electrolytes imbalance, ischemia, hypoxemia)		
5.	Competent to deal with or treat arrhythmias (medication, DC shock/cardioversion)		

Cardiac tamponade post open-heart surgery		**Yes**	**No**
6.	Competent to identity Sign and symptoms of cardiac tamponed		
7.	Competent to identity causes of cardiac tamponed		

8.	Competent to deal with or treat cardiac tamponed		

Acute kidney injury post open-heart surgery		**Yes**	**No**
9.	Competent to assess kidney function (lab test, Abdominal ultrasound)		
10.	Competent to deal with or treating this complication (fluid resuscitation, support, medication)		

Infection post open-heart surgery		**Yes**	**No**
11.	Competent to identify nosocomial infection in CICU		
12.	Competent to identity signs and symptoms of infection		
13.	Competent to work with infection control policy		

14.	Competent to deal with preventable procedures for infection control		

Part five- Nursing practice post operation open heart surgery

Post-operation assessment of patient		**Yes**	**No**
1.	Are you aware about the indication for surgery (Urgent or elective)		
2.	Are you aware about common arteries or veins used in grafting		
3.	Are you aware about the early warning signs (complications) can occur post operatives		
4.	Are you aware about Explaining procedure impact on patient post-operative		
5.	Are you aware about the education topics needed for pt post open-heart surgery		

A**ssessment form**		**Yes**	**No**
6.	Is there a sheet or tool (checklist) in your organization regarding post-operative cardiac care		
7.	If yes, does it include (Hex, v/s, physical examination respiratory, cardio, and neuro) other		

8.	Is there an assessment tool regarding chest tube care (such as milking, and dressing) post-operative		
9.	Is there an assessment tool regarding the weaning of ventilators		
10.	Is there a procedure manual regarding post-extubation care of mechanical ventilators		
11.	Is there a flow sheet monitoring hourly (v/s, intake, and output, arrhythmia, complications)		
12.	Is there implementation of early mobilization idea		
13.	Is there assessment tool regarding arterial line and CVP line care postoperatively		

Appendix B: IRB approval

Arab American University
Institutional Review Board – Ramallah

الجامعة العربية الأمريكية
مجلس اخلاقيات البحث العلمي – رام الله

IRB Approval Letter

Study Title: "A Descriptive Cross-Sectional Study on Factors that Affect Length of Stay Post Open Heart Surgery".

Submitted by: Haya Naseem Hassian Nofal

Date received: 30th March 2024

Date reviewed: 6th May 2024

Date approved: 6th May 2024

Your Study titled **"A Descriptive Cross-Sectional Study on Factors that Affect Length of Stay Post Open Heart Surgery"** with the code number **"R-2024/A/57/N"** was reviewed by the Arab American University Institutional Review Board – Ramallah and it was approved on the 6th of May 2024.

Sajed Ghawadra, PhD
IRB-R Chairman
Arab American University of Palestine

الجامعة العربية الأمريكية، فلسطين
مجلس اخلاقيات البحث العلمي، رام الله
IRB-R
ARAB AMERICAN UNIVERSITY PALESTINE
INSTITUTIONAL REVIEW BOARD - RAMALLAH

General Conditions:

1. Valid for 6 months from the date of approval.
2. It is important to inform the IRB-R with any modification of the approved study protocol.
3. The Bord appreciates a copy of the research when accomplished.

Appendix C: Facilitate the task

Arab American University
Faculty of Graduate Studies

الجامعة العربية الأمريكية
كلية الدراسات العليا

2024/7/20

إلى من يهمه الأمر

تسهيل مهمة بحثية

تحية طيبة وبعد،

أهديكم كلية الدراسات العليا في الجامعة العربية الأمريكية أطيب التحيات، وبالإشارة إلى الموضوع أعلاه، تشهد كلية الدراسات العليا في الجامعة أن الطالبة هيا نسيم حسين توفاق والتي تحمل الرقم الجامعي 202216650 في طالبة ماجستير في برنامج تمريض العناية المكثفة وتعمل على رسالة الماجستير الخاصة بها بعنوان:

"The Relationship Between Nurses Performance, Satisfaction, Knowledge and Practice on The Length of Stay in The ICCU for Post-Operative Cardiac Surgery Patients in Palestine"

تحت إشراف الدكتورة سمر الجلاد. نأمل من حضرتكم الإيعاز لمن يلزم لمساعدتها للحصول على المعلومات اللازمة للدراسة، علماً أن المعلومات ستستخدم لغاية البحث فقط وسيتم التعامل معها بغاية السرية، وقد أعطيت هذه الرسالة بناءً على طلبها.

وتفضلوا بقبول فائق الاحترام

عميد كلية الدراسات العليا

د. نوار قطب

كلية الدراسات العليا
FACULTY OF GRADUATE STUDIES

Appendix D: Facilitate the task

State of Palestine
Ministry of Health
Education in Health and Scientific
Research Unit

دولة فلسطين
وزارة الصحة
وحدة التعليم الصحي
والبحث العلمي

Ref.: .....
Date: .....

الرقم ...
التاريخ ...

عطوفة الوكيل المساعد لمجمع فلسطين الطبي المحترم،،،

تحية واحترام،،

الموضوع: تسهيل مهمة بحث

يرجى تسهيل مهمة الطالبة: هيا نسيم حسين نوفل – ماجستير تمريض العناية المكثفة– الجامعة العربية الامريكية، بعنوان:

"The Relationship Between Nurses Performance, Satisfaction, Knowledge and Practice on The Length of Stay in The ICCU for Post-Operative Cardiac Surgery Patients in Palestine"

حيث ستقوم الطالبة بجمع معلومات عن حول موضوع البحث من خلال تعبئة استبانة، وذلك في:

- مجمع فلسطين الطبي

مع العلم ان مشرف الدراسة: د. سمر جلاد.

على ان يتم الالتزام بالمحافظة على اخلاقيات البحث العلمي وسرية المعلومات، وعدم التعرض للمعلومات التعريفية للمشاركين.

على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث، التعهد بعدم النشر لحين الحصول على موافقة وزارة الصحة.

مع الاحترام،،

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

نسخة: عميد كلية الدراسات العليا المحترم/ الجامعة العربية الامريكية

Telfax.:09-2333901 scientificresearch.dep@gmail.com تلفاكس: 09-2333901

العلاقة بين أداء الممرضات ورضاهنّ ومعرفتهن وممارستهن التمريضية على مدة الإقامة في وحدة العناية المركزة للأطفال بعد جراحة القلب في فلسطين

هيا نسيم حسين نوفل

لجنة الإشراف: د. سمر جلاد

د. عماد أبو خضر

د.مها صبيح

ملخص

الخلفية :تمثل رعاية ما بعد جراحة القلب عنصرًا حيويًا في تعافي المرضى، حيث تؤثر عدة عوامل تتعلق بالممرضين، مثل الأداء، والرضا الوظيفي، والمعرفة، والممارسة، بشكل مباشر على نتائج المرضى، بما في ذلك مدة الإقامة في وحدة العناية المركزة.

الهدف :هدفت هذه الدراسة إلى فحص العلاقة بين أداء الممرضين، ورضاهم، ومعرفتهم، وممارساتهم السريرية، وتأثير هذه العوامل على مدة الإقامة بعد جراحة القلب في المستشفيات الفلسطينية.

المنهجية :اعتمدت الدراسة تصميمًا مقطعيًا تنبؤيًا، باستخدام استبيان مُعتمد جُمعت بياناته من عينة ملائمة مكونة من 101 ممرض/ة يعملون في مستشفيات حكومية، وخاصة، وتعليمية في فلسطين.

النتائج :أظهرت النتائج مستويات عالية من الأداء والمعرفة، ومستويات متوسطة من الرضا والممارسة، مع وجود ارتباطات إيجابية بين جميع المتغيرات ومدة الإقامة. كانت الممارسة العامل الوحيد الذي تنبأ بشكل معنوي بمدة الإقامة، حيث تشير كل زيادة بنسبة 10% في درجة الممارسة إلى انخفاض بمقدار 0.37 يومًا في مدة الإقامة.

الاستنتاج :تؤكد النتائج أهمية تعزيز أداء ومعرفة ورضا الممرضين في وحدات العناية المركزة، من خلال التدريب والتطوير المهني، كوسيلة لتحسين نتائج المرضى وتقليل مدة الإقامة بعد الجراحة.

الكلمات المفتاحية :أداء الممرضين، الرضا الوظيفي، المعرفة، الممارسة السريرية, مدة الإقامة.