Arab American University

Faculty of Graduate Studies

Department of Health Sciences

Master Program in Adult Medical- Surgical- Nursing

Nurses' Knowledge and Awareness of Post-Operative Wound Care for Open Heart Surgery Patients in North West- Bank Hospitals- Palestine, Cross-Sectional Study

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This Thesis Was Submitted in Partial Fulfilment of the Requirements for the Master Degree in Adult Medical- Surgical- Nursing.

Palestine, 9/2024

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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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Date of Submitting the Final Version of the Thesis: 10-12-2024

Acknowledgments

Initially, we attribute all honor to God, our ultimate source of strength, for enabling us to accomplish this significant mental and physical undertaking.

Furthermore, we are grateful to our parents for their continuous love and support throughout our educational path, giving spiritual direction and material assistance. Their sacrifices and patience have been helpful.

Acknowledgment is also extended to Dr. Abdallah Alwawi for his expert guidance, meticulous scientific direction, and generous support, which created an excellent working environment.

Finally, we thank our colleagues, students, lecturers, and doctors at Arab American University for their encouragement and support.

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Abstract

Open heart surgical site infection (SSI) is a life-threatening complication after cardiac surgery that can lead to hospitalization, increased healthcare expenses, morbidity, and mortality. Preventing infections during open-heart surgery improves patient outcomes while saving millions of dollars. Nurses should be familiar with surgical site infection, including their classifications, risk factors, risk populations, signs and symptoms, antibiotic prophylaxis, preoperative skin preparations, postoperative surgical field care, infection management, and preventative measures. Nurses should defend their patients in all circumstances. The study aims to assess nurses' knowledge and awareness of post-operative wound care for open-heart surgery patients in Northwest- Bank hospitals- Palestine.

A quantitative descriptive correlational cross-sectional study was conducted in the Surgical Cardiac Care Unite departments of five hospitals in the North West Bank. A total of 87 Surgical Cardiac Care unit nurses participated in the study. Data were collected using a self-administered questionnaire to evaluate nurses' knowledge (22 questions) and awareness (17 points) of post-operative wound care.

According to the findings, nurses had a high level of knowledge (83.39%), but only a moderate level of awareness (70.48%). Significant differences in knowledge and awareness were noted according to age, gender, marital status, level of education, and experience, among other demographic and professional variables. While awareness was less consistently impacted, training and the availability of explicit protocols were linked to better knowledge levels. The results highlight the value of specialized education, real-world experience, and encouraging work settings in improving nursing practices.

Nurses in North West Bank hospitals possess strong foundational knowledge but demonstrate varying levels of awareness regarding post-operative wound care for open-heart surgery patients. Continuous education, specialized training, and the development of clear, evidence-based protocols are essential to enhance knowledge and awareness, ultimately improving patient outcomes and reducing the incidence of surgical site infection in the region.

Keywords: Post-operative wound care, Open heart surgery, surgical site infections, Nurse Knowledge, Nurse Awareness.

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List of Definitions of Abbreviations

Abbreviations	Title
AGH	Agriculture General Hospital
CABG	Coronary Artery Bypass Graft
CCU	Cardiac Care Unite
CDC	Centers for Disease Control and Prevention
Df	Degrees of freedom
F	Frequency
HAIs	Healthcare-Associated Infections
IRB	Institutional Review Board
Maximum M	Maximum Mark
Min M	Minimum Mark
N %	Number Percentage
N	Number
NICVD	National Institute of Cardio-Vascular Diseases
P-value	Probability Value
RCTs	Randomized Controlled Trials
SCCU	Surgical Cardiac Care Unite
SD	Standard Deviations
Sig	Significant
SPSS	Statistical Package for the Social Sciences
SSI	Surgical Site Infection
VNBNCS	Vietnam's Basic Nursing Competency Standards

Chapter One: Introduction

1.1 Introduction and Background

Open heart surgery is a high-risk treatment because it exposes the heart and major blood vessels and blood veins directly and requires intraoperative procedures such as extracorporeal circulation, endotracheal intubation, and urine catheterization. As a result, the quality of postoperative care is critical (Lv et al., 2023).

Open heart surgical site infection (SSI) is a life-threatening complication after cardiac surgery that can lead to hospitalization, increased healthcare expenses, morbidity, and mortality. A study conducted in Egypt assessed nurses' knowledge and performance in preventing open heart surgery site infections. The study found that 45.5% of nurses had low total score levels of expertise (<60.00 - 69.99), whereas 41.6% had expert total score levels of performance (75 - <85%). The study found that over 75% of nurses perform expertly proficiently in preventing open-heart SSI, whereas less than half have low total knowledge scores (Abdelraouf, Mostafa, and EL-Azab, 2023). In Jordan, the annual incidence rate of SSI among coronary artery bypass graft (CABG) patients was 16.8% (Qasem & Hweidi, 2017); Regarding the Palestinian incidence rate of SSI, no study talks about it.

(Haque et al., 2018) said that healthcare-associated infections (HAIs) are a major public health concern, affecting millions every year. It is ranked as one of the top five murderers in the United States. The annual cost of HAIs in the United States is from $28 to $45 billion. Despite this funding, 90,000 people die every year. The prevalence of HAIs in the United States is 3.2% of all hospitalized patients, compared to 6.5% in the European Union/European Economic Area (Suetens et al., 2018).

Open heart deep wound infection produces serious complications, including morbidity, death, and higher costs, putting pressure on healthcare systems and payers worldwide. This emphasizes the importance of implementing preventive measures, enhancing surveillance, and appropriately diagnosing mediastinitis (Qasem and Hweidi, 2017).

Preventing infections during open-heart surgery improves patient outcomes while saving millions of dollars. Patients benefit from personalized care and direct communication with nurses. Nurses should be familiar with SSIs, including their classifications, risk factors, risk populations, signs and symptoms, antibiotic prophylaxis, preoperative skin preparations, postoperative surgical field care, infection management, and preventative measures. Nurses should defend their patients in all circumstances (Sham et al., 2021).

Since nurses are the primary caregivers for wounds after heart surgery, they must be knowledgeable about wound management to provide the best possible wound care. The following subjects should be known and aware to nurses about SSIs: classifications, risk factors, groups at risk, signs, and symptoms; preventive use of antibiotics; preoperative skin preparations; postoperative surgical field care; infection control standards; and measures for SSI prevention. Under any circumstance, nurses ought to stand up for their patients. As a result, open heart SSIs cause grave consequences such as morbidity, death, and extra expenses, which place a strain on healthcare systems and payers globally (Abdelraouf, Mostafa, and EL-Azab, 2023).

Postoperative wound infection is a major source of sickness but not the leading cause of death in surgical patients. Postoperative infection is the most common nosocomial infection. Approximately 67% of surgical site infections develop near the incision, with 33% occurring in the organ (Sattar, et al., 2019).

Surgical wound infections are usually caused by anesthesia specialists contaminating an intravenous drug (such as propofol) with bacteria from their hands, scalp, or nares. Failure to adopt aseptic techniques and single-use vials for several patients can result in surgical wound infections (Abdelraouf, Mostafa, and EL-Azab, 2023).

The incidence of postoperative superficial and deep wound infection in heart surgery ranges from 1.3% to 12.8% in China, depending on risk factors. Deep wound infection following heart surgery usually results in localized cellulitis (erythema, warmth, and soreness), purulent discharge, sternal instability, chest discomfort, and systemic disruption from deep infections (Lv et al., 2023).

Surgical site infections (SSIs) are a major worry for healthcare providers since they lead to an increase in patient readmissions following surgical procedures. SSIs in open-heart surgery can have serious consequences, increasing morbidity and mortality rates. Harvesting saphenous vein grafts during these surgeries may reduce venous drainage, resulting in complex wounds and skin infections. Mediastinitis, a severe form of surgical site infection following cardiac surgery, can hurt patients' outcomes. SSIs have a substantial influence on hospital resources and economics, as well as patient health (Teshager et al. 2015).

Surgical patient care is difficult, and as medical technology and social norms develop, the demand for nursing services increases. Nursing theory and technology are continually evolving to meet new requirements. Quality care arose in reaction to changing medical paradigms and nursing job requirements (Lv et al., 2023). Quality care is patient-centered, with nurses collaborating directly with patients to streamline the process and establish personalized metrics. This leads to improved service quality. Quality nursing services have been employed in open heart diseases, cancer, acute diseases, and surgery to improve quality of life and reduce psychological and physical discomfort (Lv et al., 2023).

A wound is a breach in the skin's continuity. It could be the result of an underlying changed physiological condition or be caused by itself. Skin damage, as the body's largest organ, can have catastrophic effects. Fortunately, most skin injuries resolve without consequences. Some wounds may take longer to heal, depending on the severity of the injury and the individual's health (AbouZaid et al., 2020).

Wounds can be categorized as acute or chronic. Acute wounds, including post-operative wounds, minor lacerations, abrasions, burns, scalds, and trauma, typically heal quickly. Chronic wounds display delayed healing, cellular senescence, and recurring infections, which diverge from the expected sequence of events. Chronic wounds are common in healthcare settings, and there is growing evidence that the burden in Ireland is significant and anticipated to increase (Nawaz and Bibi, 2023).

A clean surgical wound that is neither contaminated nor diseased will heal with the primary goal. To care for a wound, clean it thoroughly and use suture material without stress to minimize the fault. Healing takes a few days, and the suture material can be

removed after 7-10 days if the wound adhesion is strong enough. Wounds often take 6-9 months to fully heal, as the inflammatory and regulating processes normalize over time (AbouZaid et al., 2020).

Surgical incisions expose sterile tissues to non-sterile environments, resulting in contamination. Inadequate wound care might cause delayed healing. To provide quality wound care, nurses should assess the patient's overall health, relieve pressure on the wound surface, keep the wound moist, remove necrotic tissue with sterile dressing materials, clean the wound with an antiseptic solution, intervene with infection, cover the wound with a sterile gauge bandage or surgical drapes, and maintain a consistent wound temperature (Surme et al., 2016). This method usually leaves a small, clean scar. Closing a wound with excessive stress can induce tissue necrosis or infection, which can hinder healing and necessitate additional treatments. To facilitate healing, the wound must be cleaned and the infection treated. This technique is lengthy and frequently results in a large scar (Tegegne et al., 2022).

Wound treatment is a dynamic and complex process that necessitates the nursing team's unique knowledge. This involves prevention and therapy. Consider how quickly wounds change, how resistant they are to therapy, and how they can be caused by pre-existing illnesses that prevent natural healing. Nursing specializes in wound care for patients and clients. Wound healing is affected by several factors, including wound condition, patient age, health, nutrition, medications, co-morbidities, and infection (Surme et al., 2018). Improving open heart nurses' knowledge of wound care can reduce healthcare costs, decrease hospital stays, and enhance patient outcomes (Nawaz and bibi, 2023).

Surgical site infections (SSIs) can have serious consequences during open heart surgery, leading to a considerable increase in rates of morbidity and mortality. The extraction of saphenous vein grafts poses a specific risk since it may compromise venous drainage, which might foster the development of complicated wounds and skin infections. Furthermore, poorer patient outcomes are caused by mediastinitis, a dangerous infection at the surgical site after heart surgery. Beyond just negatively affecting patients' health, SSIs heavily tax hospital resources and result in significant financial outlays. However, since nurses are essential to post-cardiac surgery care, it is possible to lower the incidence of

SSIs by giving them comprehensive training in wound care management (NAWAZ and BIBI, 2023).

As medical technology develops and society standards rise, caring for surgery patients has gotten more difficult, increasing the demand for nursing services. To satisfy new requirements, this has led to constant revisions in nursing theories and practices. A patient-centered approach to quality care has arisen in response to these changing needs. This concept centers on patient-centered care, streamlining nursing procedures, and putting tailored tactics into practice. The end consequence has been a notable improvement in the quality of care (Lv et al., 2023).

Having the role of both preventing and treating wounds, the nursing staff must possess specific expertise in this dynamic and complex process. It's crucial to understand that wounds can alter quickly and may not respond to certain therapies because of underlying issues that impede natural healing. Giving wound care to patients is one of nursing's specializations. Several variables affect how quickly a wound heals, such as the wound's state, the patient's age, general health, diet, some drugs, underlying medical disorders, and infections (AbouZaid et al., 2020).

The subject of nurses' understanding and awareness of post-operative wound care for patients after open heart surgery is becoming increasingly important in Palestine, especially in the North West-Bank hospitals. In order to avoid issues like infections and delayed healing, nurses must be well-versed in effective wound care techniques, which is especially important given the rise in sophisticated cardiac procedures. However, because different nurses may have different access to resources, training, and international guidelines, their degrees of knowledge and awareness may also range. Patient outcomes may be impacted by nurses' ability to effectively manage post-operative wounds due to a lack of chances for continuing education and systemic limitations. To guarantee that nurses are sufficiently equipped to manage the intricacies of post-operative wound care and, ultimately, improve recovery rates and lower complications for patients undergoing open heart surgery in the area, there is a recognized need for more targeted educational programs, protocols, and resources.

Some hospitals that have obtained JCI or ISO accreditation prioritize patient safety and use surgical site infections as a key indicator of healthcare provider competence, particularly in open heart surgeries, which require meticulous wound care. For instance, An-Najah National University Hospital (NNUH) implements a specific protocol for wound care in open heart surgery patients to ensure the highest standards of care and infection prevention.

1.2 Problem Statement

Surgical site infections (SSIs) cause up to 20% of HAIs and affect at least 5% of patients having surgical procedures in Turkey. The Centers for Disease Control and Prevention (CDC) (2020) defines SSIs as infections that arise within 30 days or a year of a surgical procedure, depending on whether an implant is used (Abdelraouf, Mostafa, and EL-Azab, 2023).

Surgical complications include pain, weariness, atelectasis, wound infections, wound dehiscence, paralytic ileus, urine retention, and infection. Surgical interventions cause primary wound issues. Common postoperative wound problems include hematomas, seromas, and surgical site infections, wound dehiscence, and delayed healing (Surme et al., 2018). This emphasizes the importance of implementing preventive measures, enhancing surveillance, and appropriately diagnosing mediastinitis.

Surgical site infections (SSIs) are a major concern for healthcare providers, leading to patient readmissions after surgeries (Adeyemi and Trueman, 2019). SSIs in open-heart surgery can have severe effects, increasing morbidity and mortality rates (Al-Ebrahim et al., 2023; Garner and Anderson, 2016).

Healthcare-associated infections raise hospitalization rates, healthcare costs, morbidity, and mortality. Infection prevention and control are critical for a functioning healthcare system. Additional research and practice changes are required to improve hospital safety and infection prevention. Nurses lacked an understanding of wound care for post-operative open heart patients, highlighting the need for rapid supplementation. However, there is still a gap between the best research and practice for wound management in open-heart patients (Nawaz and Bibi, 2023).

The knowledge and awareness of nurses regarding post-operative wound management for patients undergoing open heart surgery are influenced by multiple factors. Years of experience, educational background, on the other hand, wound care training. Research has indicated that nurses with greater education and experience levels typically possess superior wound care knowledge and skills. In addition, a nurse's capacity to prevent and treat wound infections is greatly impacted by their workload, the resources at their disposal, and the caliber of their training courses.

In Palestine, there is a lack of standardized wound care protocols for open-heart surgery patients. Although some Palestinian hospitals have advanced heart centers and perform daily open-heart surgeries, they lack a specific protocol to guide healthcare providers in delivering consistent, high-quality wound care. This absence of a protocol affects patient outcomes, leading to variability in post-operative wound management. The lack of standardization highlights the need to establish a comprehensive wound care protocol in Palestinian hospitals to improve patient care after open heart surgery.

1.3 Significant of Study

Nursing care focuses on anticipating and avoiding wound complications through accurate assessment and appropriate interventions. Patients with wound-related disorders benefit from timely management, which can reduce morbidity and mortality. To provide the best results, healthcare providers must collaborate. Creating a nursing care clinical practice plan can assist prevent and treat wound complications, which are a hard element of patient care (Lv et al., 2023).

Nursing care prioritizes predicting and preventing wound complications through accurate assessment and appropriate measures. Timely intervention can lower morbidity and mortality rates for patients with wound-related problems. To achieve the best results, healthcare providers must work together. Developing a nursing care clinical practice plan can help prevent and treat wound complications, a challenging aspect of patient care AbouZaid et al., 2020).

Surgical Site Infections have a significant impact on hospital resources and financial expenditures, in addition to patient health (Nelson et al., 2015). Equipping

healthcare workers, especially nurses, with extensive wound management expertise can reduce the occurrence of SSIs in post-cardiac surgery treatment (Pearse et al., 2021).

Proper post-operative dressing regimens, such as a 48-hour dressing period, can reduce the risk of SSIs. This is especially important in resource-poor settings, where the prevalence of SSIs and healthcare resources are restricted. Improving open heart nurses' knowledge of wound care can reduce healthcare costs, decrease hospital stays, and enhance patient outcomes (Abdelraouf, Mostafa, and EL-Azab, 2023).

This study's findings can benefit nursing practice, education, and research in the following ways, developing and organizing training programs to improve nurses' knowledge and practice regarding wound care. On the other hand, guiding the development of nursing curricula and training courses related to the topic.

The provision of organizational support—such as adequate staffing, clear instructions, and access to ongoing education—is also essential to improving nurses' expertise in managing wound care. Despite these advantages, there are frequently gaps in practical knowledge, emphasizing the necessity of institutional upgrades and regular training to guarantee high standards of care.

This study covers a variety of industries. It draws attention to important gaps in nurses' post-operative wound care practices and knowledge for patients undergoing open heart surgery, highlighting the necessity of standardized procedures and focused education to enhance patient outcomes and lower complications for healthcare facilities. To improve patient safety and provider competency and to guide better resource allocation and policy formulation, the study emphasizes the significance of developing and implementing wound care protocols for decision-makers. By incorporating these findings into the nursing curriculum, universities, and other educational institutions can better prepare upcoming medical professionals for the challenges of post-operative care. The study also offers a foundation for cooperation between foreign partners and professional associations to raise healthcare standards and aid in Palestine's capacity-building initiatives.

1.4 Study Objective

1.4.1 General Objective

- To assess nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West- Bank hospitals- Palestine.

1.4.2 Specific Objective

1. Assess the knowledge level of nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine.
2. Assess the awareness level of nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine.
3. Determine the extent of differences in nurses' knowledge levels regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, in Palestine, attributed to the following variables:
    - Age
    - Sex
    - Marital status
    - Educational level
    - Service experience
    - Working experience in this surgical CCU/years
    - Job title in surgical CCU
    - Training regarding Post-operative Wound Care for Open Heart Surgery Patients
    - Training regarding Surgical Wound Care in general
    - Overall confidence in providing post-operative wound care to open-heart surgery patients
    - Hours per week typically worked in the surgical CCU.
    - A clear protocol for dealing with open heart wounds in your workplace.
4. Determine the extent of differences in nurses' awareness levels regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, in Palestine, attributed to the following variables:
    - Age

- Sex
- Marital status
- Educational level
- Service experience
- Working experience in this surgical CCU/years
- Job title in surgical CCU
- Training regarding Post-operative Wound Care for Open Heart Surgery Patients
- Training regarding Surgical Wound Care in general
- Overall confidence in providing post-operative wound care to open-heart surgery patients
- Hours per week typically worked in the surgical CCU.
- A clear protocol for dealing with open heart wounds in your workplace.

5. To assess the extent of the relationship between the level of knowledge and the level of awareness among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine.

1.5 Research Questions

1. What is the level of knowledge among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?
2. What is the awareness level among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?
3. How do demographic and professional factors such as age, sex, marital status, educational level, service experience, years of working experience in the surgical CCU, job title within the surgical CCU, completion of training in post-operative wound care for open-heart surgery patients, training in surgical wound care in general, overall confidence in providing post-operative wound care, and average weekly working hours in the surgical CCU influence differences in nurses' knowledge levels regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, Palestine?
4. How do demographic and professional factors such as age, sex, marital status, educational level, service experience, years of working experience in the surgical

CCU, job title within the surgical CCU, completion of training in post-operative wound care for open-heart surgery patients, training in surgical wound care in general, overall confidence in providing post-operative wound care, and average weekly working hours in the surgical CCU influence differences in nurses' awareness levels regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, Palestine?

5. To what extent is there a relationship between the level of knowledge and the level of awareness among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?

1.6 Null Hypotheses

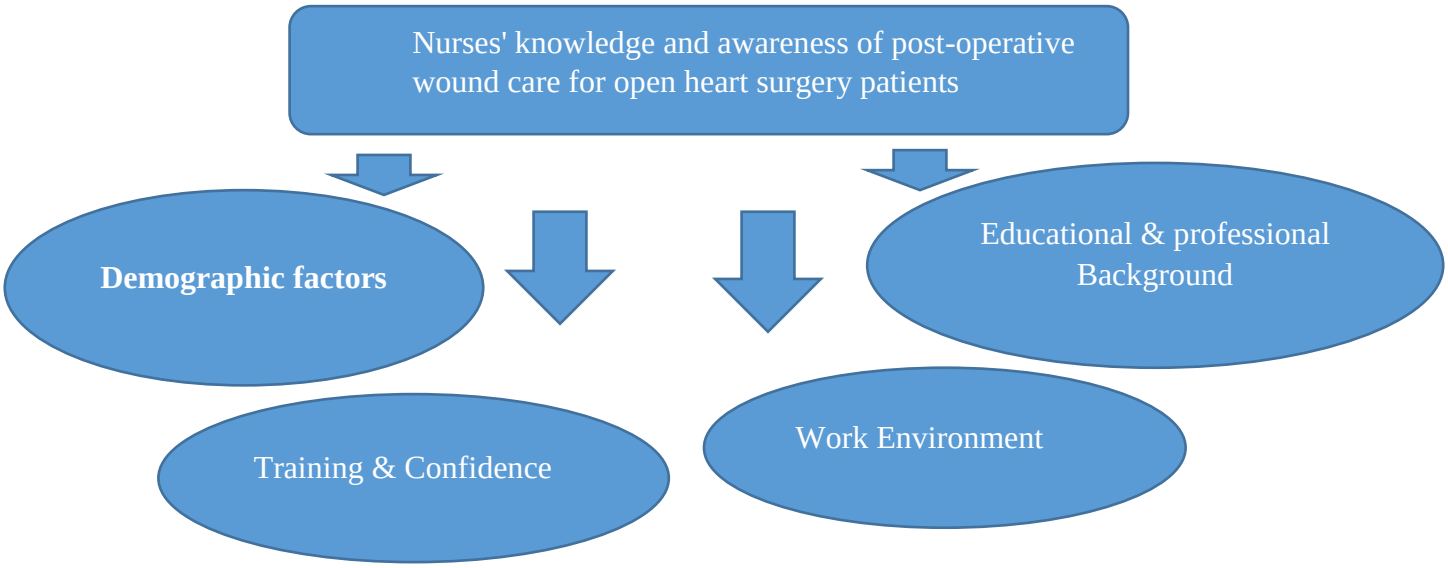
1. There are no statistically significant differences at the level of $\alpha \leq 0.05$ in the average knowledge of nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine.
2. There are no statistically significant differences at the level of $\alpha \leq 0.05$ in the average awareness of nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine.
3. There are no statistically significant differences at the level of $\alpha \leq 0.05$ in the knowledge levels of nurses regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, in Palestine, across various demographic and professional factors.
4. There are no statistically significant differences at the level of $\alpha \leq 0.05$ in the awareness levels of nurses regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, in Palestine, across various demographic and professional factors.
5. There is no statistically significant correlation at the level of $\alpha \leq 0.05$ between the level of knowledge and the level of awareness among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine.

1.7 Study Variables

1.7.1 Dependent Variables: nurses' knowledge and awareness of post-operative wound care for open heart surgery patients.

1.7.2 Independent Variables: Demographic factors (Gender, Age, Marital Status, Educational Level, service experience, experience in this surgical CCU, , job title in surgical CCU); professional Factors (Training program regarding post open heart wound care, training program regarding surgical wound care in general, confidence in providing post-operative wound care to open-heart surgery patients, hours per week do you typically work in the surgical CCU, a clear protocol for dealing with a open heart wound in your workplace).

1.8 Variable Framework



1.9 Conceptual Framework

To guide the methods, analyze the data, and interpret the findings on nursing knowledge and awareness in post-operative wound care for patients undergoing open heart surgery, the conceptual framework for this study is essential.

The framework organizes the data-gathering process, guides the creation of surveys and interviews, and guarantees a diverse sample approach by incorporating components like Gender, Age, educational level, service experience, experience in this surgical CCU, marital status, job title in surgical CCU, Training program regarding post open heart wound

care, training program regarding surgical wound care in general, confidence in providing post-operative wound care to open-heart surgery patients, hours per week do you typically work in the surgical CCU, a clear protocol for dealing with open heart wound in your workplace.

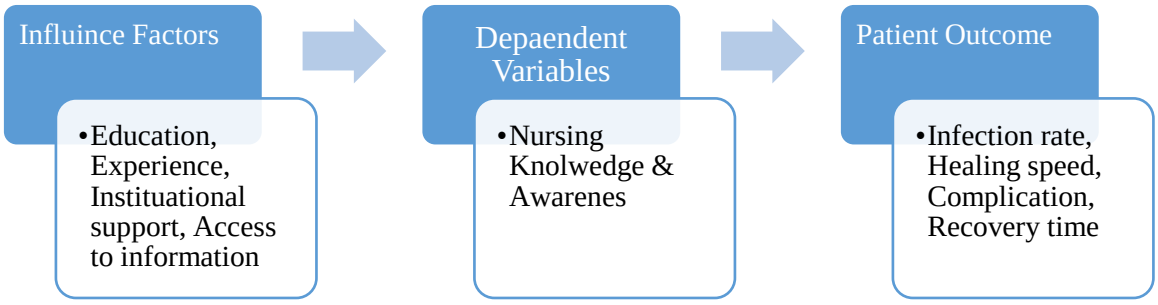
The framework makes it easier to analyze data by classifying responses, using statistical techniques to find relationships, and doing comparison analyses between various nurse demographics. By linking observed data to theoretical concepts—such as confirming the influence of ongoing education on wound care practices—this organized method facilitates the interpretation of The findings.

The conceptual framework's significance stems from its capacity to elucidate the connections among variables, direct the emphasis of the study, and augment comprehension of the elements impacting nursing practices. It guarantees that the goals of identifying knowledge gaps and variables influencing wound care are directly addressed by the research.

Furthermore, the framework facilitates the development of focused improvement initiatives and the formulation of precise research questions by emphasizing crucial aspects like resource allocation and training requirements.

All things considered, the conceptual framework is essential to fully comprehending the research topic, bolstering the goals of the study, and guaranteeing that the research successfully tackles fundamental concerns.

The factors that affect nursing knowledge and awareness regarding wound care for patients undergoing open heart surgery, together with the consequent consequences on patient outcomes, are depicted in the figure below. Education, experience, institutional backing, and information availability are among the determining factors. By affecting infection rates, healing rates, problems, and recovery times, these factors have an impact on patient outcomes.



1.10 Conceptual Definition

Knowledge: Information that is organized, summarized, and synthesized to increase comprehension, understanding, or awareness (Bergeron, 2003).

Awareness: The understanding and perception of nurses' actions in the prevention and management of wounds. This includes their understanding, acknowledgment, and utilization of procedures in both pre- and post-operative care. Pre-operative care involves prophylactic antibiotic administration, skin preparation, nutritional status, and management of underlying medical disorders. Using aseptic techniques for wound care, wound assessment, infection monitoring, and making sure the patient receives enough nutrition are all part of post-operative care. Higher awareness reflects better adherence to standard practices in wound care, and awareness levels are usually measured through systematic examinations (EL-Azab, Mostafa, and Abdelraouf, 2023).

1.11 Operational Definition

Knowledge: refers to the cognition of nurses regarding the prevention of wound care as elicited using multiple choice questions (22 questions) by choosing one best answer. Correct responses received one mark, while incorrect responses received a zero. The score will convert to a percentage. The researcher categorized the transformed scores into three levels: bad (< 60.00 - 69.99%), fair (70.00 - 79.99%), and good (80.00 - 100.00%).

Awareness: the level of nurses' perception of their action in preventing wound care (EL-Azab, Mostafa, and Abdelraouf, 2023). The awareness was measured using a point. The researcher used the Likert scale as Strongly Disagree, Disagree**,** Neutrally**,** Agree, Strongly Agree. The researcher categorized the transformed scores into three levels: bad (< 60.00 - 69.99%), fair (70.00 - 79.99%), and good (80.00 - 100.00%).

Chapter Two :Literature Review

2.1 Introduction

Post-operative wound care is a critical aspect of recovery for open-heart surgery patients, directly impacting their healing and overall outcomes. This chapter delves into the current understanding of how nurses' knowledge and awareness shape the quality of care provided, synthesizing research from diverse healthcare settings.

To fully grasp the nuances of post-operative wound care, it is essential to explore several key concepts. This chapter will individually address demographic data, the specifics of open-heart surgery, the breadth of nursing knowledge and awareness, and the intricacies of wound care. By examining each concept, we can build a comprehensive understanding of the factors that influence effective wound management.

2.2 Literature Review Strategy

The collection of literature was conducted utilizing a computerized search of databases. Databases including Pub Med were used for relevant articles and journals. The studies reviewed were published from 2012 to 2023. Keywords used during the search included open heart surgery, nursing knowledge and awareness, and wound care.

2.3 Post-operative Wound Care in Open Heart Surgery

In a study conducted by Sadaf et al. (2018) in Pakistan, the multidisciplinary problem of wound care mainly affects nursing practice by considering patients as biopsychosocial entities and moving beyond simple dressing changes. Because wounds are dynamic and resistant to many medicines, effective wound care requires the nursing team's specialized understanding of both prevention and treatments. To promote innovation and guarantee patient safety, nurses must use scientific evidence while treating wounds. Furthermore, aging of the skin is brought on by both environmental and intrinsic factors, and it impacts wound healing by decreasing collagen formation and boosting matrix-degrading enzymes. Platelets, neutrophils, macrophages, keratinocytes, fibroblasts, and endothelial progenitor cells are important cellular participants in wound healing, and they each contribute to a distinct stage of the healing process. The purpose of this study was to

assess the Allied Hospital Faisalabad nurses' knowledge and procedures related to surgical site infections. A straightforward sample strategy was used to pick 111 female nurses for a descriptive cross-sectional design. The results demonstrated that the participants' knowledge and experience with surgical site infections was lacking. The research demonstrated a strong positive link between practice and knowledge, suggesting that surgical ward nurses are not sufficiently knowledgeable about preventing surgical site infections.

To assess how well nurses prevent open-heart surgical site infections (SSI), a major complication following cardiac surgery, EL-Azab et al. (2023) conducted a study in Egypt. 77 nurses from the CCU at Mansoura University Hospital participated in the study, study applied checklists to monitor the nurses' performance and questionnaires to evaluate their expertise. The findings revealed that 45.5% of the nurses had low knowledge scores, even though over 75% of them did a good practice of preventing infections. The study's comprehensive methodology, which incorporates both self-evaluation and observation, is one of its main advantages. The small sample size and possible bias from the self-reported data are drawbacks, though. The findings suggest that continuous education for nurses is essential to improve their knowledge and performance. Future research should look into what influences nurses' adherence to preventive measures to create more effective strategies.

The goal of the Chinese study by Lv et al. (2023) was to determine the effects of high-quality nursing on wound infections and complications following open heart surgery. The researchers carried out a comprehensive search of the literature in several databases to find randomized controlled trials (RCTs) about high-quality nursing in open heart surgery, a total of 18 RCTs involving 1,742 individuals were among the several databases that the researchers examined through October 2023. Patients having these procedures, comparing high-quality nursing interventions with standard care, and tracking outcomes like wound infections and postoperative complications were the main inclusion criteria. Two researchers independently screened and reviewed studies for data extraction and quality assessment; differences were settled by conversation or by consulting a third reviewer. They discovered that postoperative wound infections and complications were much

decreased by high-quality nursing as opposed to standard care. The large sample size and meticulous research methodology of this study are its main features. Nevertheless, there are certain limitations, such as different definitions of excellent nursing and possible biases in the included research. The findings indicate that high-quality nursing has a critical role in enhancing postoperative patient outcomes, and hospitals ought to use these strategies. Future research should focus on standardizing quality nursing practices and identifying which specific aspects are most effective in reducing complications.

The goal of the Dublin study by Moran & Byrne (2018) was to determine how successfully the city's open heart nurses handled their patients' wounds following heart surgery. Additionally, they sought to compare the nursing specialties of public and private institutions. They used a questionnaire to ask the nurses about their wound care skills. These questionnaires were distributed to 503 nurses in six different Irish hospitals. Thirteen percent of them answered. The findings demonstrated that a large number of nurses low level of knowledge on wound healing and infection symptoms. Additionally, they discovered variations in the way post-operative nurses cleansed wounds and took off bandages. According to the study, nurses' skills in wound care may use some improvement with more training. It also suggests examining the wound care products and wound assessment methods. The study has certain limitations, but it does a decent job of identifying areas in which nurses require additional help. For example, not all nurses completed the survey, and the data gathered was derived from the nurses' self-reports, which may not always be entirely true. In the future, researchers might concentrate on training nurses and evaluating the efficacy of various wound care solutions.

To compare staff nurses in public and private hospitals about their knowledge and proficiency in managing cardiac wounds, Nawaz & Bibi (2023) conducted a study in Pakistan. 156 nurses were evaluated using a descriptive approach and self-reported questionnaires; 87 of the nurses responded. The findings indicated serious knowledge gaps, particularly in the areas of wound healing, infection detection, and appropriate wound management procedures. The best cleaning products to use and when to replace post-operative dressings were questions that nurses had. The study's comparative methodology and thorough analysis are strengths, but self-reporting biases and a moderate response rate

are limitations. To keep nurses abreast of the most recent advancements in wound care techniques, the study emphasizes the necessity of ongoing education through seminars and workshops. To enhance wound care and patient outcomes, future studies should investigate the reasons behind these knowledge gaps and evaluate the efficacy of focused training initiatives.

2.3.1 Summary

Because wounds are dynamic, providing wound care in nursing entails considering patients as biopsychosocial entities and specific expertise for both prevention and therapy. Research indicates that ongoing education is necessary to enhance the knowledge and performance of nurses, since even with high practice rates, many nurses have notable knowledge gaps. Postoperative wound infections and complications are greatly decreased by high-quality nursing, highlighting the need for standardized procedures and focused training. According to comparative studies, continuing education in the form of seminars and workshops is crucial for keeping nurses abreast of developments in wound care, filling in knowledge gaps, and enhancing patient outcomes.

2.4 Nurses' Roles and Responsibilities in Post-operative Care

In a study conducted by AbouZaid et al (2020) in Egypt, to determine if a new wound care protocol may enhance nurses' understanding and patients' healing results at Mansoura University and emergency hospitals, the study also assessed how well nurses cared for open wounds in surgical units. Before, after, and 12 weeks after the protocol's implementation, they observed 53 patients with open wounds and conducted interviews with 55 nurses. The results showed promise, patients' wounds healed better, and improvement in the nurses' expertise. This emphasizes how crucial it is to provide nurses with continual training and to regularly examine hospital infection control procedures. Even if the study offers insightful information, it's important to take potential biases and investigate the long-term effects of such techniques. It emphasizes the necessity of ongoing education and protocol adherence for nursing practice to improve patient outcomes. In the future, studies may examine the efficacy and sustainability of comparable regimens in various hospital environments.

Famakinwa et al. (2014) conducted a study in Nigeria to assess nurses' understanding and use of strategies to avoid post-operative wound infections at Obafemi Awolowo University Teaching Hospital. They surveyed one hundred surgery unit nurses using a questionnaire. The study finds whereas 66% of the nurses demonstrated a solid understanding of infection management, a greater percentage (68%) lacked the skills required to successfully avoid post-operative wound infections. The nurses generally adhered to stringent hygiene guidelines and used sterile dressings, but some of the limitations including excessive workloads and unfavorable attitudes made their task more difficult. On the other hand, this study emphasizes how crucial it is for nurses to continue their education to increase their understanding of infection control and how to approach it, which will eventually enhance patient care. Like any research, this one has certain limitations, though. Future studies could expand on this work by investigating workable remedies for the obstacles found and assessing how they affect patient outcomes. Additionally, it might go further into figuring out the particular training requirements that nurses have in this field, opening the door to customized training initiatives that genuinely improve patient safety and care quality.

Abdallah & Jarelnape (2019) conducted a study in Saudi Arabia to evaluate the preparedness of surgical department nurses in Sudanese military hospitals to prevent postoperative infections. It is important to evaluate nurses' knowledge and practices in this area because infections of this kind represent a serious risk to patients and affect the quality of healthcare. A knowledge gap was discovered when they used a questionnaire for 122 nurses, the result was that only 37.6% of them properly answered questions on postoperative infection prevention. On the other hand, about 63.2% of them showed evidence of good infection prevention practices. The study found several obstacles that prevented the best possible infection prevention, including a lack of staff, poor facilities, and low experience. Additionally, it emphasized how well-received practices and better education might raise knowledge levels. Although the study limited information, its narrow focus and dependence on self-reported data may restrict its generalizability. To remove this limitation and enhance postoperative infection prevention techniques among nurses in diverse healthcare settings, customized training initiatives and system-level modifications are required to go forward.

Hweidi & Qasem (2017) study conducted a study in Jordan to assess the knowledge of Jordanian nurses regarding evidence-based protocols for preventing surgical site infections (SSIs). SSIs jeopardize patient safety and increase recovery times and medical costs. To assess their knowledge, 200 registered nurses from four hospitals in Jordan participated in the study. The result of the study shows that the average score for nurses' knowledge was only 3 out of 9. The researchers could not discover any connections between the knowledge scores of nurses and their background characteristics, even with this beneficial influence. This emphasizes the importance of effective infection control practices, and continuous education campaigns, particularly for the prevention of SSIs. Further investigation is required to examine additional risk factors that may impact nurses' knowledge in acute care settings.

Sham et al. (2020) conducted a study in Malaysia to evaluate the preparedness of nurses in preventing surgical site infections (SSIs). They surveyed 306 nurses working in two public hospitals about their knowledge and practices in SSI prevention. The majority of nurses showed good practices (97.7%) and knowledge (85.3%) in preventing SSIs, with no discrepancies difference between the two. To effectively infection control, the study emphasized the significance of having clear guidelines, continuing education, supportive supervision, and availability of necessary supplies. Although the study offers insightful information, limitations may have been introduced because it relied on self-reported responses from nurses. However, it highlights how crucial it is for nurses to have ongoing training and assistance to apply high standards for infection prevention. In the future, studies may examine particular interventions to improve nurses' knowledge and application of SSI prevention.

2.4.1 Summary

In post-operative care, nurses have a critical role, especially in preventing wound infections. New wound care regimens have been shown in studies to improve patient healing and increase nurses' expertise. Although a lot of nurses are knowledgeable about infection management, they frequently lack the practical skills needed to avoid infections. Obstacles and knowledge gaps including a lack of employees and subpar facilities emphasize the need for system-level adjustments and improved training. Improving the

infection control practices of nurses and, eventually, the results for patients requires ongoing education, unambiguous guidelines, encouraging monitoring, and availability to necessary supplies.

2.5 Knowledge and Awareness of Nursing about Wound Care

Tegegne et al. (2022) studied the quality of wound care provided by nurses in government hospitals in the South Wollo Zone in Ethiopia. They discovered that many nurses lacked sufficient knowledge and experience in wound care. Only 40.3% exhibited a strong understanding, and 51.0% exhibited efficient practices. Improved knowledge and practices were associated with variables such as years of experience, training, workload, and educational level. Although the study clarifies significant limitations, it may have had biases in participant selection as it depended on self-reported responses from nurses. The results emphasize that to enhance wound care practice, nurses must continue receiving training and exchanging knowledge. Future studies could look into more effective teaching strategies and ways to reduce the nursing-patient ration, which will eventually improve wound care in hospitals.

Saeed et al. (2021) conducted a cross-sectional descriptive study in Iraq to assess nurses' understanding of post-operative wound care and the impact of age or experience on their knowledge. Between March and September 2020, 70 nurses working in the surgical ward of Al Diwaniya Teaching Hospital participated in the study. The researchers assessed the nurses' answers to questions regarding wound care. They note that nurses' knowledge of postoperative wound care varied, and around half of them had a solid comprehension of it. Remarkably, their level of knowledge on wound care seems to be insignificant by variables such as age, gender, or years of experience. The study's small sample size and dependence on self-reported data may have affected the findings. Nevertheless, it highlights the necessity of ongoing training to enhance nurses' abilities in managing surgical wounds. To help patients recover more effectively, it would be helpful to investigate various teaching strategies in the future and observe how well nurses retain this knowledge over time.

Mohamed et al. (2018) conducted an Egyptian study to determine the impact of a training program on nurses' infection control procedures for surgical patients in recovery.

They examined the outpatient clinics and surgical units in three general hospitals located in Port-Said City, which employed forty nurses. They used observational checklists to see how nurses cared for post-surgical patients and a questionnaire to assess nurses' knowledge to collect data. The findings demonstrated a high correlation between nurses' practice and their knowledge level before, immediately, and some time after the training. The training greatly increased the nurses' knowledge and practice in caring for surgical wounds. Additionally, there was a definite correlation between the nurses' post-operative wound care and their level of education. According to the study, by emphasizing infection control and routine monitoring, continuous follow-up programs for nurses at general hospitals in Port-Said City may improve their performance in postoperative wound care. The study's narrow focus and small sample size may limit its wider relevance, despite its insightful findings.

Sadia et al. (2017) study conducted a study in Pakistan focusing on Surgical Site Infections (SSIs), a serious risk to patient safety. They aimed to assess the level of knowledge and implementation of SSI prevention strategies by nurses at two major hospitals in Lahore, Pakistan. Using a survey completed by 131 nurses. Although a large number of nurses were following effective infection control procedures. This implies that even if nurses are doing appropriately, it's possible they don't understand why. Targeted education programs and awareness campaigns could assist close this knowledge gap and guarantee that nurses are well-versed in the safe procedures for SSI prevention. It's crucial to take into account the study's shortcomings, too, such as its reliance on self-reported data and the particular demographics of the nurses it examined. Future studies may concentrate on developing and evaluating specially designed curricula to provide nurses with the know-how and abilities required to successfully address SSIs, hence improving patient safety and healthcare results.

Surme et al. (2016) conducted a descriptive study in Turkey to better understand nurses' approaches to incisional wound healing in surgical clinics. Understand nurses' approaches to incisional wound healing in surgical clinics. They used a questionnaire designed by specialists following a comprehensive study of the literature on 393 nurses working in both public and private institutions. According to the findings, nurses had a

moderate degree of understanding of wound healing, with an average score of 62.0. It's interesting to note that nurses with greater education levels typically scored higher on knowledge level. However troubling gaps in practice were found, more than half of the nurses failed to provide discharge instructions about wound care, and almost half acknowledged irregular wound healing techniques. These results emphasize how crucial it is for nurses to have ongoing education and training to advance their abilities and comprehension of wound healing and care. Subsequent investigations may delve into how particular training initiatives can augment the comprehension and methodologies of nurses.

Akter et al. (2020) conducted a study in Bangladesh to evaluate the preparedness of nurses at the National Institute of Cardio-Vascular Diseases Hospital (NICVD) in Dhaka to prevent post-operative infections. Between April and July 2015, they participate in 120 nurses to gauge their proficiency in this field. Less than half of the nurses showed a high degree of knowledge regarding managing post-operative infections, even though many had received infection control training and were familiar with the bacteria causing these infections. Nonetheless, the majority of the nurses were knowledgeable about appropriate handwashing techniques, and nearly half of them demonstrated a high commitment to infection control measures. While the study offers insightful information, its reliance on self-administered questionnaires and small sample sizes may be considered a limitation. However, the findings highlight how crucial it is for nurses to get continuing education and training to improve their capacity to successfully avoid post-operative infections. Future studies may examine methods to raise nurses' knowledge and practice with this crucial component of patient care, which could enhance patient outcomes and lower the number of infections linked to healthcare.

Aldousari et al. (2021) investigated how Saudi Arabian nurses manage wound care, a critical nursing intervention that can prevent life-threatening consequences such as infections and amputations. They carried out a comprehensive analysis of 15 papers that were written between 2015 and 2020 and looked at nurses' beliefs, behaviors, and knowledge on dressing wounds in various hospital environments. What they discovered was alarming: a lot of nurses didn't have a thorough grasp of wound dressing, which may have contributed to the shortcomings in their procedures. Nurses suffered despite their

training, experience, and attendance at programs; they attributed their problems to staffing shortages, severe workloads, and limited time. The study emphasizes how crucial continuing education and training are to enhancing nurses' wound care abilities. However, given the difficult circumstances nurses frequently encounter in clinical settings, there is still much to learn about how to effectively improve nurses' knowledge and behaviors in wound dressing care.

Berhe et al. (2018) study conducted in North Ethiopia was to learn more about the nursing care given to postoperative wounds, especially those of pediatric patients in public hospitals. They wanted to make sure nurses were properly trained and equipped to manage these cases, given the serious consequences that surgical complications can have for patients—especially in settings with low resources. After surveying 158 nurses from various hospitals in Mekelle City, they discovered that although nurses' knowledge levels were reasonable (64%) their actual practices were superior (84.3%). On the other hand, problems with inadequate documentation, unfamiliarity with certain antiseptics, and hierarchical factors influencing practice were observed. It's interesting to note that there was no correlation between the nurses' actual wound care practices and their level of expertise. This implies that although nurses did a fair job, there is still potential for growth, pointing to the necessity of additional training and assistance in this crucial area of nursing. Notwithstanding its limitations, such as depending solely on self-reported data, the study offers potential directions for future research to further explore these influential elements.

Dung et al. (2020) investigated the effects of a new wound care training program at Agriculture General Hospital (AGH) on nurses, based on Vietnam's Basic Nursing Competency Standards (VNBNCS). Between April 2018 and June 2019, a 12-month training period, 43 nurses from five departments had their knowledge, practice, and confidence levels compared. The outcomes were encouraging: following the training, nurses' understanding and application of wound care significantly improved. Additionally, they had greater faith in their capacity to handle different facets of wound care. This implies that the training program based on VNBNCS was successful and might help other healthcare facilities as well. Even if the study offers insightful information, it's important to take into account its limitations, including the small sample size and possible biases.

This study emphasizes the value of specialized training programs for nurses in the practice of nursing by enhancing their competence and self-assurance in wound care. Future studies may examine the scalability and sustainability of these training programs in various healthcare environments, both inside and outside of Vietnam.

Faria et al. (2016) conducted a study in Brazil to evaluate nurses' practical clinical practices and their comprehension of wound assessment and treatment. During a hospital public education event, they conducted interviews with 55 nurses using a 34-item validated and translated tool. Using descriptive statistics to analyze the data, they discovered several unsettling trends: 92.7% of subjects had frequent or insufficient knowledge about wound care. Remarkably, 67.3% of graduates acknowledged not knowing enough about this field. These results demonstrate a pervasive lack of understanding of wound care procedures among nurses. This study has limitations even if it offers insightful information. Subsequent investigations may delve into the fundamental causes of these knowledge deficiencies and devise efficacious approaches to augment nurses' competencies in wound management. To improve patient care outcomes in wound management, this may entail focused educational initiatives and continuing training programs.

Nishu & Riaz (2021) investigated how medical professionals manage surgical site infections, a prevalent postoperative care problem, in their cross-sectional study. To complete their research, they interviewed 90 respondents, including medical professionals, nurses, and support staff, at Dhaka Medical College and Hospital throughout 2015. They learned about hospital executives' approaches to infection control through in-person interviews and conversations. The majority of professionals showed a solid grasp of illnesses, identifying their causes, modes of transmission, and preventative measures, which was a promising finding. However, there were significant shortcomings, especially in making sure the devices were properly sterilized. The results of the study emphasize how crucial it is for healthcare professionals to get continuing education on infection control procedures. Although the study offers insightful information, it should be acknowledged that it has limitations, such as a small sample size. In the future, studies may examine various training approaches to improve healthcare providers' infection control practices.

Saeed et al. (2021) conducted a study to assess nurses' understanding of wound care before and after surgery and look for any relationships with demographic factors. The study included fifty nurses from the surgical ward of Al Diwaniya Teaching Hospital and used a quasi-experimental methodology. Between March 1st and September 1st, 2020, data were gathered using a survey instrument that had two sections: knowledge evaluation and demographics. The majority of nurses had undergone training, but only 52% showed a high level of expertise in postoperative wound care, according to the results. There was no discernible relationship between the nurses' knowledge level and demographic characteristics. The study's quasi-experimental approach and thorough assessment of nurses' knowledge are its strongest points; yet, its small sample size and dependence on self-reporting are significant drawbacks. The implications for nursing practice highlight the requirement of continual education to improve nurses' comprehension of wound care, and future studies should examine more potent pedagogical approaches and gauge nurses' long-term memory recall.

2.5.1 Summary

The knowledge and awareness of nurses regarding post-operative wound management for patients undergoing open heart surgery are influenced by multiple factors. Years of experience, educational background, on the other hand, wound care training. Research has indicated that nurses with greater education and experience levels typically possess superior wound care knowledge and skills. In addition, a nurse's capacity to prevent and treat wound infections is greatly impacted by their workload, the resources at their disposal, and the caliber of their training courses. The provision of organizational support—such as adequate staffing, clear instructions, and access to ongoing education—is also essential to improving nurses' expertise in managing wound care. Despite these advantages, there are frequently gaps in practical knowledge, emphasizing the necessity of institutional upgrades and regular training to guarantee high standards of care.

2.6 Gaps in the Literature

Research from a variety of nations, including Saudi Arabia, Malaysia, Vietnam, Bangladesh, Egypt, Pakistan, China, Ethiopia, Iraq, and Bangladesh,(Faria et al. (2016); Dung et al. (2020); Berhe et al. (2018); Aldousari et al. (2021); Akter et al. (2020); Surme

et al. (2016); Sadia et al. (2017); Mohamed et al. (2018); Sham et al. (2020); Hweidi & Qasem (2017); AbouZaid et al (2020)) shows notable discrepancies in nurses' knowledge and practice regarding wound care for patients after open-heart surgery. There is a general trend that shows up despite differences in study techniques and healthcare systems, many nurses lack the practical skills and knowledge required for providing appropriate wound care. Although some nurses exhibit excellent infection control techniques, there is frequently a gap between their theoretical understanding and practical application.

There are no studies that have examined the research variables in Palestine concerning this category of nurses and the specific variables of this research. Consequently, we lack a clear and in-depth understanding of the situation compared to other countries. Understanding the level of knowledge and awareness among nurses could contribute to developing improvement programs that positively impact this category of patients and influence various aspects of care.

Conducting this research in Palestine is particularly important for several reasons, CCU nurses are crucial in providing wound care to patients following cardiac surgery. However, there is limited research on their knowledge and competency in wound management especially in Palestine, despite the high incidence of wound infections observed in previous studies.

Various difficulties, such as poor information, inappropriate sterilizing practices, and severe workloads, can hinder nurses' capacity to provide the best possible wound care. These results highlight the critical need for ongoing training and education initiatives to close these gaps and improve patient outcomes. To maintain high levels of infection control, they also stress the significance of standardized nursing practices, unambiguous rules, and supporting monitoring. To overcome particular hurdles and create customized training interventions that improve nurses' competence in wound care, more research is necessary. This will eventually improve patient safety and the standard of care given

2.7 Summary

The combined results of investigations carried out in several nations highlight the urgent need to address serious gaps in nurses' understanding of and experience with wound care, especially in the setting of open heart surgery. Notwithstanding differences in healthcare environments and approaches, a recurring pattern appears: a considerable

proportion of nurses have deficits in their understanding and application of wound care. Although there are nurses who conduct appropriate infection control, knowledge scores and actual practices frequently differ. Obstacles connected to workload, insufficient sterilizing procedures, and gaps in knowledge make it difficult for nurses to give the best possible wound care.

To close these gaps and enhance patient outcomes, these findings emphasize how vital it is for nurses to receive continual education and training. They also emphasize the necessity of clear instructions, supporting monitoring, and consistent nursing procedures to maintain high standards for infection prevention. Subsequent investigations ought to concentrate on formulating focused educational programs and tackling particular obstacles to augment nurses' expertise and competence in wound management, consequently enhancing patient security and care caliber.

Chapter Three : Methodology

3.1 Introduction

This chapter aims to get a holistic of the research methods used in this thesis. It covers the following sections: study design, study setting, study duration, study population, sampling, and sample size, inclusion and exclusion criteria, study instruments, validity of questionnaire, reliability of questionnaire, pilot study, data collection, ethical considerations, and data analysis.

3.2 Study Design

It is defined as a process plan for how you intend to conduct the research. A quantitative, descriptive, correlational, cross-sectional study design was conducted to describe the Surgical CCU nurse's knowledge and awareness about post-open heart operative wound care.

3.3 Study Setting

It was done in the Surgical CCU Department at Hospitals in North-West Bank. (Specialized Arab Hospital, Nablus Specialized Hospital, An-Najah National University Hospital, Al-Razi Hospital, Ibn Sina Hospital) which contains an advanced heart center.

- Nablus Specialized Hospital is a private hospital in the city of Nablus, in the West Bank, established in 2000. It is considered one of the most important private Palestinian medical institutions in the northern West Bank, with a bed capacity of 54 beds. The hospital includes several departments, namely: emergency, obstetrics and gynecology, nursery, children, operations, daily cases, internal medicine, intermediate care, intensive care (ICU), intensive care (CCU), cardiac surgery and catheterization, outpatient clinics, neurology, nutrition, physiotherapy, radiology, laboratory, and pharmacy. Nablus Specialized Hospital is considered one of the leading health institutions whose staff provides distinguished medical services, the hospital contains advance heart center with capacity 6 bed for open heart surgery and 14 staff nurse.

- Specialized Arab Hospital (SAH) is a private hospital in Nablus, established in 1997. It is considered one of the most important private Palestinian medical institutions in the northern West Bank, with a bed capacity of 94 beds. The hospital includes several departments, namely: emergency, radiology, maintenance department, laundry, reception, outpatient clinics, emergency, laboratory, pharmacy, cafeteria, Razan Center for Infertility and IVF Treatment, operations, men's medical & surgical department, intensive care unit (ICU), intensive care unit (CCU), registration and accounting, women's medical &surgical department, cardiology department, maternity department, kitchen, lecture hall. Al-Arabi Specialized Hospital aims to provide the highest levels of medical and therapeutic services to all members of society, as this medical edifice includes a select group of high-level doctors and consultants according to scientific branches and their precise specializations. Al-Arabi Hospital has obtained the Quality Management Certificate. The SAH contains an advance heart center include SCCU with bed capacity 8 and 14 staff nurse.
- An-Najah National University Hospital was established in 2013 in partnership with the Faculty of Medicine and Health Sciences at An-Najah National University. It is located in the northwestern mountainous region of Nablus, on the exit leading to the town of Asira al-Shamaliya . An-Najah National University began building An-Najah National University Hospital in 2008, and opened its first phase in 2014 with a capacity of 127 beds in an area of 17,000 square meters. Construction work on the second phase began in early 2018 to cover an area of 65,000 square meters. The hospital received the Joint Commission International accreditation for quality healthcare services in August 2020. The hospital provides its treatment services through its various departments, which are: Radiology, Pediatrics, Tissues, Ear, Nose and Throat, Oncology, Anesthesia, Intensive Care and Pain Management, Sterilization, Nutrition, General Surgery, Pharmacy, Preventive Medicine, Emergency, Physiotherapy, Internal and Surgical Intensive Care, Cardiology and Catheterization, Artificial Kidney, Medical Laboratories, Urology, National Institute of Heart and Lung Surgery and Transplantation , Flexible Diagnostic and Therapeutic Endoscopy, Neurosurgery, Vascular and Orthopedic Surgery, Bone

Marrow Transplantation, Ophthalmology, and Cardiology. In addition, as a teaching hospital, the hospital provides educational services to university students, providing education and health care and providing space for medical research and training. The hospital contains an advance heart center with capacity of 8 be of SCCU and 12 bed of Intermediate care unite in which follow up and continuous treatment for open heart surgery patient in it, with a total 31 staff nurse.

- Al-Razi Hospital is a Palestinian private hospital affiliated with the Jenin Central Zakat Committee. It is located on Nablus Street in the city of Jenin, north of the West Bank. Its bed capacity is approximately 45 beds according to the Palestinian Annual Health Report for 2022. The hospital provides its services through several departments, most notably: emergency, intensive care, obstetrics, orthopedics, radiology, laboratory, endoscopy and catheterization. In addition to eye surgery and stone crushing, which was opened in 2008. The hospital contains a heart center (Medical and Surgical CCU in same unite) with capacity of 8 beds and have 14 staff nurse.
- Ibn Sina Specialized Hospital is one of the hospitals of the Arab Specialized Medical Complex in the State of Palestine. The hospital, which was opened on October 11, 2021, is located in the city of Jenin in the northern West Bank and has a bed capacity of 55 beds. The hospital contains an advance heart center include SCCU with 8 bed capacity and 14 staff nurse.

3.4 Study Duration

The study was conducted from February- 2024 to August- 2024. The initial phase included preparation and planning, which took place from [February to the end of March - 2024. Data collection occurred during May 2024. Followed by data analysis during June 2024. The study was concluded with the final reporting and review completed by August 2024.

3.5 Study Population

The study population is a collection of subjects or departments with certain traits that meet the inclusion requirements, and from whom data can be collected. (Polit& Beck 2014). In this study, the target population was all surgical CCU nurses in hospitals in the

North West Bank, who met the inclusion criteria. The accessible populations are those surgical CCU nurses who were on duty work at targeted hospitals while collecting data through May -2024. It was (87).

3.6 Sample and Sampling

The total number of participants was 87 CCU nurses, representing the entire population of CCU nurses at the study site. All 87 CCU nurses participated in the study during the data collection period. Data were directly collected by the researcher. The interviews began by providing the nurses with detailed instructions and explanations about the study, its aims, and the importance of giving accurate responses. All ethical considerations were carefully observed to ensure the comfort of the participants and to avoid any potential discomfort during the interviews.

3.7 Inclusion Criteria

1. Age ≥ 21 and < 50 years old.
2. Both Male and Female
3. Nurses work in CCU surgical
4. Experience Years more than 1 year

3.8 Exclusion Criteria

1. Volunteer students

3.9 Sample Size

The total number of participants was 87 CCU nurses, representing the entire population of CCU nurses at the study site. All 87 CCU nurses participated in the study during the data collection period.

3.10 Study Instruments

To achieve the aim of the study, the survey was developed and implemented based on the literature review from different studies (EL-Azab, Mostafa & Abdelraouf, 2023, Moran & Byrne, 2018; Sickder, 2010) and with five experts (professional nursing academy with PhD degree) opinions.

The data abstraction sheet: Part one (socio-demographic data) was constructed based on the literature review. This part is used to collect socio-demographic data which include 12 variables, including Gender, Age, Educational Level, service experience, experience in this surgical CCU, Marital Status, job title in surgical CCU, Training program regarding post open heart wound care, training program regarding surgical wound care in general, confidence in providing post-operative wound care to open-heart surgery patients, hours per week do you typically work in the surgical CCU, a clear protocol for dealing with open heart wound in your workplace.

Part two (Nurses' knowledge evaluation) is a self-administered structured questionnaire. The researcher created a questionnaire based on a literature review to evaluate nurses' knowledge about wound care for patients post-open heart surgery. The questionnaire covered post-operative care such as (surgical wound care, wound assessment, surgical site infection monitoring, and nutritional support) which included 22 questions.

Nursing knowledge scoring system. Correct responses received one mark, while incorrect responses received a zero. The score will convert to a percentage. The researcher categorized the transformed scores into three levels: Poor (< 60.00 - 69.99%), fair (70.00 - 79.99%), and good (80.00 - 100.00%) (Sickder, 2010).

In part three (Nurses' awareness evaluation) the researcher created a checklist based on literature analysis to assess nurses' awareness of wound care for patients post-open heart surgery which includes 17 points.

Nurses' awareness rating system. The researcher used the Likert scale as Strongly Disagree, Disagree**,** Neutrally**,** Agree, Strongly Agree. The researcher categorized the transformed scores into three levels: Poor (< 60.00 - 69.99%), fair (70.00 - 79.99%), and good (80.00 - 100.00%) (Sickder, 2010).

3.11 Study Validity and Reliability

The questionnaires were shown to a statistician to measure reliability (calculating Cronbach's Alpha coefficient). The data survey was validated for included 5 nursing academic experts, and the experts distributed to Different Universities in West Bank. The academic experts were contacted via email, and the questionnaire along with the study

objectives were attached for them. Reliability and internal consistency of the used tool developed by the researcher showed very good reliability with a Cronbach alpha of 0.644 in all 51 variables of the used tool, data were tested for normality and results showed that the data were normally distributed, parametric analysis was used in the analysis to test the research hypothesis and answer our research questions (alpha = 0.05).

3.12 Pilot Study

The researcher conducted a pilot study with 15 nurse participants to evaluate the survey's validity and reliability, identify any ambiguities, estimate the time required to complete the survey, predict the response rate, and refine the wording based on the feedback received. The participants considered the questionnaire to be clear and did not provide additional comments. Due to the limited population size and the need for comprehensive data, these participants were also included in the actual study. However, their prior exposure to the survey was taken into account when analyzing the results.

3.13 Data Collection

Data collection begins immediately after obtaining the approval to conduct the study from the Arab American University-Palestine IRB code number (R-2024 /A/ 83/ N), private hospital administrations. Participants and their head nurse were asked to fill out the self-reported questionnaire.

The researcher began data collecting by introducing herself to the individuals and creating confidence with them. Participants were then given instructions and explanations about the research, its objectives, and the need to deliver actual responses. Creating a separate space for data collecting offered an acceptable setting. The information collection was done at an appropriate time and adhered to all ethical principles, with a round of 10 minutes needed for each participant to fill out the questionnaire.

The researcher helped the CCU nurses by providing explanations and answering their questions if needed. Data collection took place in May 2024.

3.14 Ethical Considering

The researcher was committed to all research ethics and general ethical principles. Ethical approval was obtained from the Arab American University Ethical Committee Institutional Review Board (IRB) before data collection with the code number (R-2024 /A/ 83/ N), and then permission to conduct the study in private hospitals was taken from their administrative departments. Upon approval, a prospective CCU nurse's follow-up occurs after signature in the constant form to participate in research. During the prospective follow-up, risks to CCU nurses were minimal and the nurse's identification was kept anonymous.

Personal identification was not used to protect the nurses' identity. Without the identity of names, ID numbers, or other health information, all data gathered was registered on a researcher-developed platform. All information was kept in a locked cabinet and all information was used just for research purposes. Nurses in the study were voluntary. Participants were given the right to withdraw from the study at any moment.

3.15 Analysis Plan

The Statistical Package for the Social Sciences (SPSS) version 23 was used to analyze the acquired data in this study. SPSS is a software package used for statistical analysis, data manipulation, and the generation of tables and graphs utilizing descriptive and inferential statistics. Cronbach's Alpha was used to measure internal consistency ("reliability"). Data is summarized using means and standard deviations. As a result, the survey results were instantly loaded into the database, and data cleaning was performed.

This allowed the existence of potentially statistically significant correlations between the relevant variables to be identified. Frequency tables were used to describe the frequency of certain characters. Some statistical tests were used as needed, such as percentages (%), means, and standard deviations (SD), the t-test to determine whether the means of 2 groups are statistically different, and the one-way analysis of variance (ANOVA) test to determine whether there are any significant differences between the means of more than 2 independent groups.

In addition, the researcher employed Person correlation® to examine the relationship between numerical data. Finally, a probability value (P-value) less than or equal to 0.05 was deemed statistically significant.

Chapter Four: Results

4.1 Introduction

This chapter presents the findings of the study which involved a sample of 87 nurses, whose responses were collected using a structured questionnaire designed to assess various dimensions of their knowledge and awareness. The data were tested for normality and found all variables to be normally distributed Kolmogorov-Smirnov test was used as shown in (Table 4.2) , parametric analysis was used.

The results are presented in a structured manner, beginning with the demographic distribution of the participants, followed by a detailed analysis of each research question.

In this chapter we will aim to answer the following research questions:

1. What is nurses' knowledge level regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?

2. What is the awareness level among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?

3. How do demographic and professional factors such as age, sex, marital status, educational level, service experience, years of working experience in the surgical CCU, job title within the surgical CCU, completion of training in post-operative wound care for open-heart surgery patients, training in surgical wound care in general, overall confidence in providing post-operative wound care, and average weekly working hours in the surgical CCU influence differences in nurses' knowledge levels regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, Palestine?

4. How do demographic and professional factors such as age, sex, marital status, educational level, service experience, years of working experience in the surgical CCU, job title within the surgical CCU, completion of training in post-operative wound care for open-heart surgery patients, training in surgical wound care in general, overall confidence in providing post-operative wound care, and average weekly working hours in the surgical CCU influence differences in nurses' awareness levels regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, Palestine?

5. To what extent is there a correlation between the level of knowledge and the level of awareness among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?

4.2 Demographics Distribution:

The demographic distribution of the study participants as shown in (Table 4.3) below reveals that the majority of the nurses fall within the age ranges of 26-30 years (42.5%) and 31-35 years (39.1%), with younger nurses aged 20-25 making up 13.8% of the sample. The gender distribution shows that most participants are male (87.4%), with females comprising 12.6%. There is a nearly even split regarding marital status, with 51.7% of the nurses being single and 48.3% married. In terms of educational background, a substantial portion of the nurses hold a B.Sc. in Nursing (80.4%), while 13.8% have obtained a Master's degree or higher. There are no participants with only a diploma in nursing. Service experience varies, with 39.1% having 0-5 years of experience, 33.3% with 6-10 years, 23.0% with 11-15 years, and a smaller group (4.6%) with 16-20 years of experience. No participants reported having more than 20 years of service experience.

Table 4.3: participants' demographic distribution.

Variables	Categories	N	N %
1. Age	20-25	12	13.8 %
	26- 30	37	42.5 %
	31-35	34	39.1 %
	36-40	4	4.6%
	41-45	0	0.0%
	> 45	0	0.0%
2. Sex	Male	76	87.4 %

	Female	11	12.6 %
3. Marital status	Single	45	51.7 %
	Married	42	48.3 %
	Divorced	0	0.0%
	Widow	0	0.0%
4. Educational level	Diploma in Nursing	5	5.8%
	B.Sc. in Nursing	70	80.4 %
	Masters and above	12	13.8 %
5. Service experience	1-5 years	34	39.1 %
	6-10 years	29	33.3 %
	11-15 years	20	23.0 %
	16 -20 years	4	4.6%
	Above 20 years	0	0.0%

The working environment distribution of the participants as shown in (Table 4.4) below shows that regarding experience in the surgical CCU, 39.1% of the nurses have worked for 1-3 years, followed by 31.0% with 7-10 years, 17.2% with 4-6 years, and 12.6% with over 10 years. No nurses have less than one year of experience. In terms of job titles, the majority are senior nurses (51.7%), while junior nurses account for 27.6%, and both assistant head nurses and head nurses each make up 10.3%. Training on post-operative wound care for open heart surgery patients has been received by 37.9% of the participants,

while 62.1% have not had this specific training. More generally, 52.9% have undergone training in surgical wound care, compared to 47.1% who have not. Confidence levels in providing post-operative wound care are high, with 78.2% feeling confident and 13.8% very confident; none reported feeling unconfident. Work hours in the surgical CCU are fairly balanced, with 52.9% working 40 hours per week and 47.1% working less than 40 hours. Lastly, a clear protocol for open heart wound care is available to 35.6% of the participants, whereas 64.4% do not have access to such a protocol in their workplace.

Table 4.4: Participants working environment distribution.

Variable	Categories	N	N %
6. Working experience in this surgical CCU/ years?	<1	0	0.0%
	1-3	34	39.1 %
	4-6	15	17.2 %
	7-10	27	31.1 %
	>10	11	12.6 %
7. Your job title in surgical CCU	Junior nurse	24	27.6 %
	Senior nurse	45	51.8 %
	Assistant head nurse	9	10.3 %
	Head nurse	9	10.3 %
8. Any training regarding Post-operative Wound Care for Open Heart Surgery Patients	No	54	62.1 %
	Yes	33	37.9 %

9. Any training regarding Surgical Wound Care in general	No	41	47.1 %
	Yes	46	52.9 %
10. Overall confidence in providing post-operative wound care to open-heart surgery patients.	Not at all confident	0	0.0%
	Not confident	0	0.0%
	Neutral	7	8.0%
	Confident	68	78.2 %
	Very confident	12	13.8 %
11. Typical weekly working hours in the surgical CCU	Less than 40 hours	41	47.1 %
	40 hours	46	52.9 %
	More than 40 hours	0	0.0%
12. Presence of a clear protocol for open heart wound management in the workplace.	No	56	64.4 %
	Yes	31	35.6 %

4.3 Nursing Knowledge participants' responses distribution

The data on nursing knowledge of post-operative wound care for open heart surgery patients in (Table 4.5) below shows that the vast majority of participants correctly answered most of the questions. Specifically, 89.7% knew the best antiseptic solution to disinfect the surface of the dressing trolley, and all nurses correctly identified the purpose of surgical hand washing and the benefit of wound dressing. However, only 42.5% correctly identified the steps of hand washing. While 94.3% understood the importance of

maintaining normal nutritional status and the appropriate diet for post-operative patients, 81.6% were aware of infection prevention methods for patients with immunodeficiency disorders. Knowledge about the diagnosis and signs of surgical site infection was high, with 95.4% and 94.3% correct responses, respectively. All participants knew the laboratories used to ensure no surgical site infection and the correct blood sugar levels for enhancing white blood cell function. Nonetheless, only 59.8% could identify signs of wound infection.

Most participants (94.3%) were knowledgeable about managing wound pain, while 82.8% knew the essential elements of patient education on wound care. Understanding surgical techniques for wound closure and recognizing risk factors for surgical site infections was also high, with correct responses from 81.6% and 90.8%, respectively. Lastly, 95.4% correctly identified the healthcare team member to notify about wound concerns, and 87.4% knew the initial action for managing wound dehiscence.

The nursing awareness of post-operative wound care for open heart surgery patients shown in (Table 4.6) below shows that a majority of nurses agree or strongly agree with key practices: 62.1% wash their hands before and after changing dressings, and 67.8% wash their hands before wearing surgical gloves. All nurses' use sterilized dressing materials and 100% employ aseptic techniques.

Monitoring surgical site conditions and separating infected from non-infected dressings are common, with 81.6% and 89.6% agreement, respectively. However, only 44.8% use face masks during wound cleaning. Awareness of evidence-based guidelines is high, with 86.2% agreement, yet only 37.9% frequently receive updates or training. Confidence in wound management is strong, with 94.2% agreement.

Additionally, 94.3% understand the importance of pain assessment tools, and 92% recognize signs of wound complications. Comprehensive documentation and effective communication are prioritized by 94.3%, while cultural sensitivity is universally acknowledged at 100%. Lastly, 51.7% utilize technology for wound care, showing room for improvement in integrating digital tools.

Based on the previous data we calculated the mean for correct answers in the knowledge section and the result was out of 22 which is the total question assessing the level of knowledge, regarding awareness the data collection tool used a Likert scale out of

4 to assess Nursing Awareness of Post-operative Wound Care for Open Heart Surgery Patients since there are 17 points with each point weighing 4 the mean was out of 68, (Strongly Disagree given 0 and Strongly Agree given 4), the following table 6 present the nursing knowledge and awareness results of the taken samples. The final result response of each variable converted to percentage to categorize as an operational definition and scoring.

The mean score for the level of knowledge is 19.18 out of a possible 22, equating to 83.39%, with a standard deviation of 2.04. This suggests that, on average, nurses possess a good level of knowledge regarding post-operative wound care for open-heart surgery patients, with relatively low variability in their responses. On the other hand, the mean score for nursing awareness is 47.93 out of a possible 68, which translates to 70.48%, with a standard deviation of 3.49 indicating a fair level of awareness, with slightly greater variability compared to the knowledge scores.

Table 4.7: Level of Knowledge and Nursing Awareness

Dependent Variable	Mean (%)	S.D	Level	Min M – Maximum M
Level of Knowledge	19.18 (83.39%)	2.04	High	14 - 22
Nursing Awareness	47.93 (70.48%)	3.49	Moderate	42 - 53

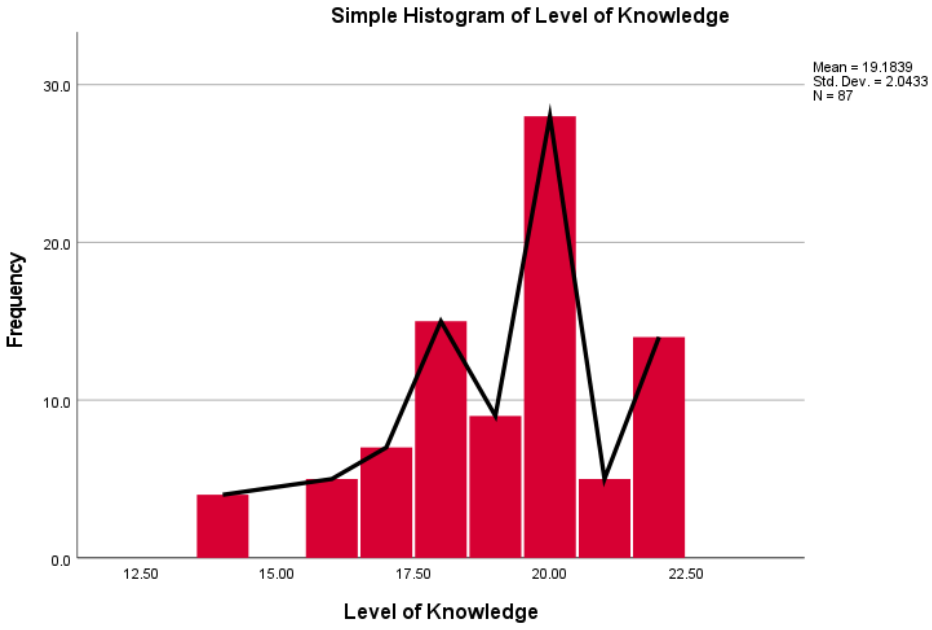


Figure 4.1, Nursing Knowledge of Post-operative Wound Care for Open Heart Surgery Patients

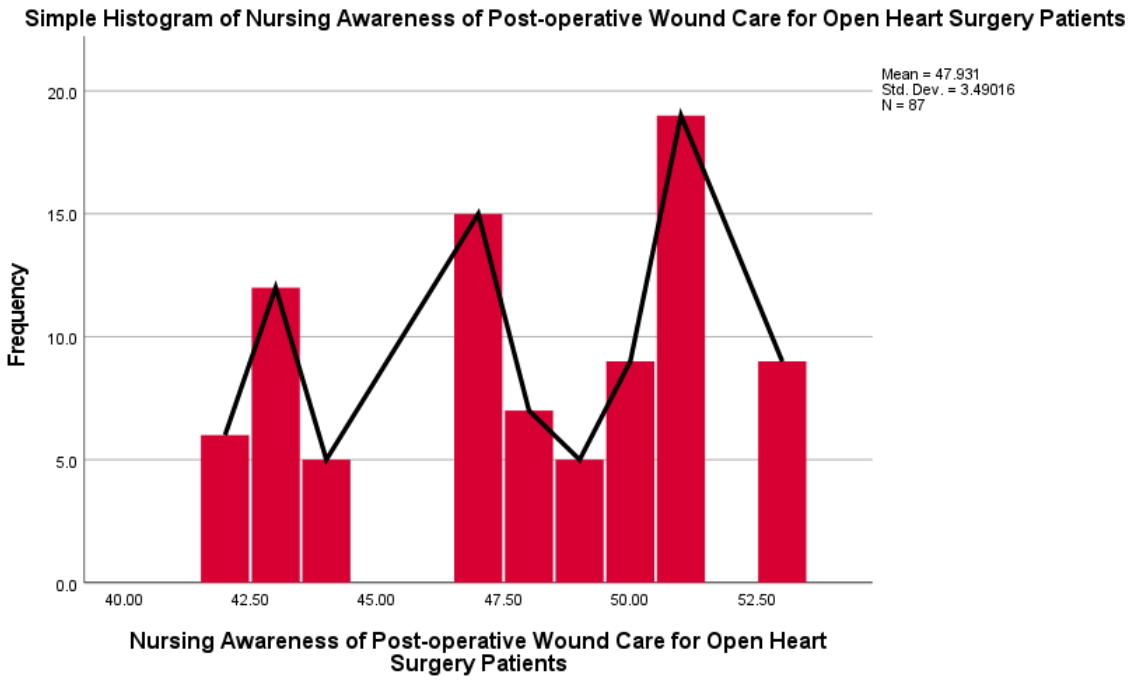


Figure 4.2, Nursing Awareness of Post-Operative Wound Care for Open Heart Surgery Patients

4.4 Answering the research questions:

In this section, we will be focusing on answering the previously mentioned research questions, by setting the hypothesis then testing according to the suitable test to make a decision, and then interrupting the result of the test.

Regarding the first and second research question which says:

1. What is the level of knowledge among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?
2. What is the awareness level among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?

We calculated the mean of Nursing knowledge and nursing awareness as shown previously in Table 6 then found the percentage, and found that the taken sample had an 83.39% level of knowledge and 70.48% nursing awareness, which can be interrupted as high and moderate respectively, with a mean of 19.18 ± 2 with a minimum 14 and maximum of 22 for nursing knowledge, regarding nursing awareness the mean was 47.93 ± 3.5 with a minimum 42 and maximum 53.

As for the third and fourth research questions, about the influence of differences in nurses' level of knowledge and nurses' awareness levels regarding post-operative wound care for open-heart surgery patients in North West Bank hospitals, in Palestine, we will set the following hypothesis then testing for significance for each hypothesis.

1- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and Age.

The following (Table 4.8) below shows the distribution of nursing awareness and level of knowledge among different age groups.

The below (Table 4.9) shows ANOVA between age with level of knowledge and nursing awareness, the result showed that at alpha 0.05 we have enough evidence to conclude that age had a significant effect on both level of knowledge and awareness (P-vale less than alpha).

Moreover, (Table 4.10) showed a Tukey post-test also shows that the age group 36-40 has the highest level of knowledge, as indicated by the positive and significant mean differences when compared with the other age groups. Specifically, the mean differences for the 36-40 group compared to the 20-25, 26-30, and 31-35 groups are 3.83333, 4.64865, and 6.85294, respectively, all with a significance level of p = .000. These positive mean differences indicate that the 36-40 group has a higher level of knowledge than the other groups.

Regarding nursing awareness, the age group 36-40 has the highest nursing awareness. This is evident from the positive and significant mean differences when compared with the other age groups. The 36-40 group shows significant differences in nursing awareness compared to the 26-30 group (mean difference = 5.54054, p = .010) and the 31-35 group (mean difference = 5.64706, p = .009). These significant positive mean differences indicate that the 36-40 age group has a higher level of nursing awareness compared to these other age groups.

2- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and Gender.

The following (Table 4.11) below shows the distribution of nursing awareness and level of knowledge according to gender

Based on the following independent sample T-test shown in Table (4.12) below we can conclude that at a level of significance 0.05, we have enough evidence to report that the level of knowledge is affected by gender, moreover, female nurses had a significantly higher level of knowledge than a male nurse, awareness shows no significant at 0.05 with gender.

3- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and Marital Status.

The following (Table 4.13) shows the distribution of nursing awareness and level of knowledge according to marital status

The ANOVA test results for marital status showed in (Table 4.14) reveal the following:

Level of Knowledge: The F-value is 3.768 with a significance level of .014. This indicates a statistically significant difference in the level of knowledge across different marital status groups, suggesting that marital status affects knowledge levels.

Nursing Awareness: The F-value is 4.087 with a significance level of .009. This indicates a highly significant difference in nursing awareness between marital status groups, implying that marital status has a substantial impact on nursing awareness.

The Tukey post-test results for marital status in (Table 4.15) show the following significant differences in both Level of Knowledge and Nursing Awareness:

Single individuals have significantly lower levels of knowledge compared to married individuals, with a mean difference of -1.256 ($p = .023$).

Nursing Awareness:

Single individuals have significantly higher nursing awareness compared to married individuals, with a mean difference of 2.475 ($p = .006$).

No significant differences were found between other marital status groups.

4- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and the Educational Level.

The following (Table 4.16) shows the distribution of nursing awareness and level of knowledge according to educational level

The following (Table 4.17) shows that the p-value for the level of knowledge is less than 0.05, indicating a statistically meaningful difference in the level of knowledge based on educational level. This means that educational level significantly influences nurses' knowledge regarding post-operative wound care for open heart surgery patients, individual testing for each category showed that participants with a master's degree or above had the highest level of knowledge.

The p-value for nursing awareness is less than 0.05, indicating a statistically meaningful difference in the level of awareness with higher educational levels. This suggests that educational level also significantly influences nurses' awareness of post-operative wound care for open heart surgery patients, individual testing for each category showed that participants with a master's degree or above had the highest level of knowledge.

5- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and Service experience

The following (Table 4.18) shows the distribution of nursing awareness and level of knowledge according to Service experience

The ANOVA (Table 4.19) shows significant differences in both the "Level of Knowledge" and "Nursing Awareness" among different groups. For the "Level of Knowledge," the between-group sum of squares is 229.941, with an F-value of 49.271 and a significance level (p-value) of .000, indicating a highly significant difference between groups. Similarly, "Nursing Awareness" has a between-group sum of squares of 199.928, an F-value of 6.525, and a significance level of .001, also indicating a significant difference.

Post-test in (Table 4.20) showed that for "Level of Knowledge," the group with 16-20 years of service experience had the highest mean score, as indicated by the positive mean differences compared to all other groups.

For "Nursing Awareness," the group with 16-20 years of service experience also had the highest mean score, evident from the positive mean differences with significant levels compared to other groups.

6- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and Nursing experience in this surgical CCU

The following (Table 4.21) shows the distribution of nursing awareness and level of knowledge according to nursing experience in this surgical CCU

The following ANOVA test in (Table 4.22) shows that the level of knowledge had a significance level of .011, which shows a statistically significant difference between groups. This suggests that the variation in knowledge levels is significantly different among the groups. For Nursing Awareness, the F-value is much higher at 13.041 with a significance level of .000, indicating a highly significant difference between groups. This result underscores a strong variation in nursing awareness across the groups.

The post-test in (Table 4.23) shows that for Level of Knowledge: The group with the highest level of knowledge is the 4-6 years group, which shows significantly higher knowledge levels compared to the 1-3 years and 7-10 years groups.

For Nursing Awareness: The group with the highest nursing awareness is the > 10-year group. It shows significantly higher awareness compared to the 1-3 years and 4-6 years groups and also has the highest awareness compared to the 7-10 years group.

7- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open-heart surgery patients in North West Bank hospitals and completion of training in post-operative wound care for open-heart surgery patients

The following (Table 4.24) shows a T-test of the level of knowledge and awareness with training programs the test indicates that nurses who were involved in a training program had a significantly higher level of knowledge, with a mean difference of 2.24916. The statistical significance ($p < .001$) and confidence intervals suggest that this difference is not due to chance.

Regarding nursing awareness, the test shows a negative mean difference of -1.47811, indicating one group has lower nursing awareness than the other, meaning that nurses who were involved in a training program also had a significantly higher awareness with a P-value less than 0.05.

8- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open-heart surgery patients in North West Bank hospitals and overall confidence in providing post-operative wound care to open-heart surgery patients

The following (Table 4.26) shows the distribution of nursing awareness and level of knowledge according to overall confidence in providing post-operative wound care

The ANOVA results in (Table 4.27) show significant differences in both "Level of Knowledge" and "Nursing Awareness" among different groups with a p-value of less than 0.05 in both, rejecting the previous hypothesis, meaning that there is a statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care.

The post-test in (Table 4.28) showed that Level of Knowledge: The "Very Confident" group had significantly higher mean scores compared to both the "Neutral" and "Confident" groups, with a mean difference of 4.58333 from the "Neutral" group and 2.59804 from the "Confident" group.

Nursing Awareness: The "Very Confident" group also had the highest mean scores, significantly higher than the "Neutral" group, with a mean difference of 4.66667.

9- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and working hours per week in surgical CCU

The following (Table 4.29) shows the distribution of nursing awareness and level of knowledge according to working hours per week in surgical CCU

According to (Table 4.30) below showing ANOVA between Level of Knowledge and working hours we conclude that there is a significant difference between groups, with a between-groups sum of squares of 147.664 and a mean square of 73.832. The F-value is 29.338, with a significance level (p-value) of .000, indicating that the differences observed are statistically significant and reject the previous hypothesis.

As for Nursing Awareness, we conclude that there is no significant difference between groups, with a between-groups sum of squares of 12.164 and a mean square of 6.082. The F-value is .493, with a p-value of .612, indicating that the differences observed are not statistically significant.

Based on the multiple comparisons in the Tukey posttest as shown in (Table 4.31):

Level of Knowledge: The group working "Less than 40 hours" per week had the highest level of knowledge. This group showed significantly higher mean scores compared to those working "40 hours" per week.

10- There is no statistical difference at ($\alpha \leq 0.05$) between nurses' knowledge and awareness of post-operative wound care for open heart surgery patients in North West Bank hospitals and having a clear protocol for dealing with a open heart wound in work place.

Table (4.32) shows an independent sample t-test of the Level of Knowledge and nursing awareness which showed that nurses having a clear protocol had a higher mean score, as indicated by a p-value less than alpha rejecting the previous hypothesis, meaning that nurses with a clear protocol had a significantly higher level of knowledge

Nursing Awareness: There was no statistically significant difference in nursing awareness between the groups (p-values of .097 and .087), so it's not possible to identify which group had the highest level of nursing awareness based on this test. The results suggest that both groups had similar levels of nursing awareness.

As for the last research questions:

5. To what extent is there a correlation between the level of knowledge and the level of awareness among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, in Palestine?

We will put the following hypothesis for testing, there is no statistically significant correlation at the level of $\alpha \leq 0.05$ between the level of knowledge and the level of awareness among nurses regarding post-operative wound care for open heart surgery patients in North West Bank hospitals, Palestine.

As shown in (Table 4.34) below there is a significant positive correlation between Level of Knowledge and Nursing Awareness (Pearson Correlation = 0.275, p = .010). This suggests that as nursing awareness increases the level of knowledge regarding open heart wound care increases, indicating a moderate positive relationship.

4.5 Summary

The majority of nurses were found to be between the ages of 26 and 35, to have a B.Sc. in nursing, and to have worked for one to five years. Only 35.6% of nurses said their workplace had a defined protocol for open heart wound care, even though they had high confidence levels in wound care. Although nurses demonstrated a high level of understanding in areas including the use of antiseptics and surgical handwashing, only 42.5% of them could properly identify the handwashing processes, and only 59.8% could identify symptoms of wound infection. Despite the high level of awareness of recommended techniques, only 44.8% of respondents utilized face masks when cleaning wounds. Knowledge and awareness levels were highly influenced by age, gender, marital status, training, service experience, and educational level.

The study concluded that although nurses have a strong base of information and awareness, there are still gaps in the areas of infection recognition, protocol availability, and the regular use of preventive measures. These results imply that to improve nursing practices in post-operative wound care for patients undergoing open heart surgery, specific training and educational initiatives are required.

Chapter Five :Discussion

5.1 Introduction

The findings of this study offer valuable insights into the knowledge and awareness of nurses in the North West Bank, Palestine, regarding post-operative wound care for open-heart surgery patients. The study revealed that while nurses possess a generally high level of knowledge (83.39%), their awareness (70.48%) is moderate, indicating room for improvement in both areas, particularly in awareness.

5.2 Knowledge Level

Regarding the nursing knowledge about wound care for patients post open heart surgery in our study is 83.39% which revealed a high level of knowledge, this result disagrees with a study by AbouZaid et al., 2020 (Unsatisfactory 56.4%); Mohamed et al., 2018 (Unsatisfactory 100%) and Faria et al., 2018 (92.7% had inadequate knowledge on the subject).

Regarding the application of antiseptic solutions, surgical handwashing, and the advantages of wound dressing, high levels of understanding were noted. Only 42.5% of respondents were able to accurately identify the handwashing stages, while 59.8% were able to identify indicators of wound infection. Additionally, every nurse was aware of the need for surgical hand washing and the appropriate lab testing for surgery site infections.

Strong educational backgrounds, training programs, and perhaps continual professional growth are the reasons for the high percentage. Theoretical knowledge is frequently emphasized in formal schooling, which these nurses most certainly acquired. Although antiseptic solutions and surgical handwashing may have been covered in theory throughout nursing school, nurses may not have received regular reinforcement in the practical use and recall of specific actions (such as the stages of handwashing). It's possible that typical training places less emphasis on learning about signs of wound infection.

5.3 Awareness Level

Regarding nursing awareness was 70.48%, which is classified as moderate, and similar to EL-Azab, Mostafa, and Abdelraouf, 2023 (41.6% of them had an expert total score level of awareness).

The majority of nurses concurred on fundamental procedures like aseptic methods and handwashing. But just 44.8% of participants cleaned their wounds with face masks. There was a high level of awareness of evidence-based guidelines, but only 37.9% of respondents regularly got updates or training. Strong confidence was shown in managing wounds, and all nurses stressed the importance of cultural awareness when providing care.

This study identifies deficiencies in several areas such as face mask use during wound care, infection recognition, handwashing processes, protocol availability, and nurses' strong base of knowledge and awareness. Filling in these gaps could enhance post-operative wound care nursing practices for patients after open cardiac surgery.

The study found that only 37.9% of nurses received regular updates or training, which likely contributed to the moderate awareness level. High confidence may lead to complacency, where nurses feel confident in their abilities but may overlook critical updates or evidence-based practices, resulting in gaps between what they know and what they do. Low face mask usage (44.8%) could be caused by cultural or habitual factors, where practices may not align with evidence-based guidelines unless emphasized in regular training or protocols.

5.4 Nursing Demographic Data

The majority of the nurse in our study were 26-35 years old (81.6%) which is not similar to EL-Azab, Mostafa, and Abdelraouf, 2023 (59.7 were 25 – 35 Years); AbouZaid et al., 2020 (27.3% were 30 < 35) and Surme et al., 2016 (39.5 were 24-30 years). Age has a significant effect on awareness and knowledge levels. When compared to earlier age groups, the 36–40 age group demonstrated the highest levels of both knowledge and awareness, with notable improvements. Older and more experienced nurses (36–40 years old) have probably dealt with a wider range of complicated cases, which has enhanced their awareness and given them a deeper understanding of the subject.

On the other hand, 87.4% of the participants were male, which is not similar to AbouZaid et al., 2020 (92.7% female); EL-Azab, Mostafa, and Abdelraouf, 2023 (74% woman) and Surme et al., 2016 (83% female). Knowledge levels were significantly affected by gender, with female nurses having better knowledge than male nurses. However, there was no discernible variation in awareness levels according to gender. It's possible that greater educational options or social support for women in healthcare roles contributed to their increased understanding. Nonetheless, workplace rules and protocols may also have an equal impact on awareness, which calls for consistent application, hence diminishing gender-based disparities.

Marital status in our study was single (51.7%) and married (48.3%) which is consistent with AbouZaid et al., 2020 (47.2% married). A significant element was marital status. It was shown that married nurses knew more than single nurses, while single nurses were more aware than married nurses. While single nurses may have more time or energy to be up-to-date and watchful in practice, married nurses may choose stable professions and continual study (greater knowledge).

B.Sc. in nursing held by 80, 4% of the participants, which is consistent with Sadaf et al., 2018 (88.8%); AbouZaid et al., 2020 (76.4%), but not consistent with EL-Azab, Mostafa, and Abdelraouf, 2023 (48.1%) and GIZAW et al., 2022 (47.4% married). Knowledge and awareness were significantly affected by educational attainment. Nurses possessing a Master's degree or above demonstrated the highest levels of awareness and knowledge. A master's degree or above exposes nurses to advanced coursework, research, and critical thinking abilities that improve knowledge and the capacity to use it in a variety of contexts, increasing awareness.

According to experience years in our study, there are 39.1% have 1-5 years of service, which consistent with Sadaf et al., 2018 (49.95% 1-5 years) and AbouZaid et al., 2020 (36.4% 1-5 years) but not consistent with Moran, 2018 (26.9% 6-10 years); EL-Azab, Mostafa, and Abdelraouf, 2023 (64.9% less than 5 years) and NAWAZ & BIBI, 2023 (25% 10-15 years). The impact of service experience was also noteworthy. Experienced nurses (16–20 years) showed the highest levels of awareness and understanding. As nurses work in a variety of clinical settings, they develop experience and expertise. The higher levels of

knowledge and awareness according to experience years can be explained by the fact that individuals with 16–20 years of experience, for instance, have likely experienced a wider range of cases and update their methods frequently.

5.5 Working Environment

39.1% of nurses had 1-3 years of experience in the surgical CCU, which is consistent with Surme et al., 2016 (47.2% had 1-5 years of experience in SCCU) and not consistent with EL-Azab, Mostafa, and Abdelraouf, 2023 (64.9% less than 5 years). Based on the nurses' years of experience in the surgical Critical Management Unit (CCU), there is a statistically significant difference in their knowledge and awareness of post-operative wound management for patients after open heart surgery. The groups with four to six years of experience are the most knowledgeable, while the groups with ten or more years of experience are the most aware. Having mastered their function and continued to develop, nurses with four to six years of experience in the surgical critical care unit may be at the highest level of their specialization. After more than ten years, one may not actively seek out new information in favor of depending more on acquired experience for awareness.

Most of the participants were senior nurse (51.7%) which agree with Moran, 2018 (73.5%) and NAWAZ & BIBI, 2023 (75%). Senior nurses are more knowledgeable and aware since they frequently hold leadership positions that call for current knowledge and a thorough grasp of best practices.

Regarding the participant receiving training on post-operative wound care for open heart surgery patients it results (37.9%) in our study, it is not similar to Surme et al., 2016 (62%) and Sickder, 2010 (54.2%). Compared to nurses who have not participated in post-operative wound care training programs, those who have demonstrated a marked increase in knowledge and awareness. There is a 2.25 mean difference in knowledge ($p < 0.001$) and a 1.48 mean difference in awareness ($p < 0.05$). By offering tailored information and reiterating best practices, post-operative wound care-specific training directly improves knowledge and awareness.

Though 52.9% had training regarding surgical wound care in general, which is similar to Dung et al 2020 (67.4%) but is not similar to EL-Azab, Mostafa, and Abdelraouf, 2023 (26%) and Mohamed et al., 2018 (2.5%).

Only 35.6% had a clear protocol for dealing with open heart wounds in their workplace in our study which is consistent with GIZAW et al., 2022 (52%). The knowledge levels of nurses who follow a well-defined procedure for the care of open heart wounds at work are much greater, whereas there is no discernible difference in their awareness levels. Well-defined procedures standardize procedures and enhance knowledge by offering a point of reference. But raising awareness necessitates purposeful action, which may not be sufficiently achieved by merely adhering to procedures.

Despite overall confidence in providing post-operative wound care to open-heart surgery patients 78.2% were confident, based on the nurses' self-reported confidence in their ability to provide post-operative wound care, there are notable disparities in both knowledge and awareness. When it comes to knowledge and awareness, those who are "Very Confident" exhibit noticeably higher levels than those who are "Neutral" or "Confident." "Very Confident" nurses are more likely to keep up to date and actively apply their information, which raises awareness. "Confident" nurses, on the other hand, might not pursue more education, which leaves gaps in their knowledge.

On the other hand, about hours per week you typically work in the surgical CCU is 40 hours 52.9%, this variable is not discussed in other research studies related to the topic. Weekly working hours greatly affect knowledge levels; those who work fewer than 40 hours a week tend to have the highest levels of knowledge. On the other hand, there is no discernible variation in nurse awareness according to working hours. Less than 40-hour work weeks may give nurses more time for relaxation, introspection, and lifelong learning, which would increase their expertise. But experience and habit have a greater influence on awareness than hours worked.

5.6 Conclusion

This study provides important new insights into the understanding of post-operative wound management for patients undergoing open heart surgery among nurses in the North West

Bank, Palestine. The results show a discrepancy between knowledge and consistent application, with nurses demonstrating a high degree of knowledge (83.39%) but a moderate awareness (70.48%). Based on demographic characteristics, differences in knowledge and awareness were noted, with older, more seasoned, and higher educated nurses performing better. Knowledge was greatly increased by training and well-defined protocols; however, awareness was less consistently affected. Practical difficulties still exist, such as uneven face mask use and a dearth of frequent updates, despite general confidence. The study emphasizes how crucial it is to have a supportive workplace culture and reasonable workloads to uphold excellent standards of care.

5.7 Recommendation

1. Put in place initiatives for ongoing education that emphasize both knowledge and real-world application. To keep nurses informed and aware, regular training and updates on the newest evidence-based practices are crucial.
2. Create and implement standardized, unambiguous protocols for wound care, especially in surgical wards. Make sure these policies are easily available and updated regularly.
3. Promote a culture of ongoing learning and development so that nurses are inspired to look for new knowledge, attend training sessions regularly, and regularly use best practices in their work.
4. Provide age-appropriate training courses. While experienced nurses should be encouraged to contribute their ideas through workshops and peer-led training sessions, younger nurses could benefit from mentorship and focused education to close knowledge and awareness gaps.
5. Make sure that male and female nurses have equal access to opportunities for professional development and continuing education to address gender-related inequities. Encourage training programs male -sensitive and that foster knowledge sharing and collaborative learning among all nurses.
6. Programs for training should be adjusted to take married and single nurses' differing schedules and responsibilities into account. It is a good idea to provide flexible

learning opportunities, like online courses, to single nurse to increase their knowledge and awareness.

7. Nurses should be encouraged and assisted in obtaining further education or qualifications. To increase general knowledge and awareness, put in place accessible continuing education programs that encourage higher education, particularly for individuals with lesser educational backgrounds.
8. Keep updated on how working hours affect the effectiveness of nurses. To prevent burnout and preserve high knowledge and awareness levels, think about introducing flexible shifts or cutting back on excessive hours.

5.8 Study Limitation

1. The study was limited to the North West Bank of Palestine, which limited its applicability to other areas or nations.
2. The external validity of the study may be compromised if the sample size is insufficient to accurately reflect all nurses in the area.
3. Using only self-reported data may result in response bias, which could affect how accurate the results are.
4. Because the study only provides a single point in time (Cross-Sectional), it is challenging to evaluate changes or long-term effects.
5. The study's conclusions are limited since it did not look at how nurses' knowledge and awareness directly affect patient outcomes.

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Appendices

Appendix One: List of Tables

Table 3.1 Number of nurses in the hospitals

#	Hospital Name	Number of Nurses
1.	Nablus Specialized Hospital	14 Nurse
2.	Specialized Arab Hospital (SAH)	14 Nurse
3.	An-Najah National University Hospital	31 Nurse
4.	Al-Razi Hospital	14 Nurse
5.	Ibn Sina Specialized Hospital	14 Nurse

Table 4.2: Kolmogorov-Smirnov normality test results

Variables	Level of Knowledge	Nursing Awareness
	sig	sig
Age	0.001	0.001
Sex	0.001	0.001
Marital status	0.001	0.001
Educational level	0.001	0.001
Service experience	0.001	0.001
Working experience in this surgical CCU/ years?	0.001	0.001
Job title in surgical CCU	0.001	0.001
Any training regarding Post-operative Wound Care for Open Heart Surgery Patients	0.001	0.001
Any training regarding Surgical Wound Care in general	0.001	0.001
Overall confidence in providing post-operative wound care to open-heart surgery patients	0.001	0.001
Typical weekly working hours in the surgical CCU	0.001	0.001
Presence of a clear protocol for open heart wound management in the workplace.	0.001	0.001

Table 4.5: Nursing Knowledge of Post-operative Wound Care for Open Heart Surgery Patients

Variable	Answer	N	N %
1. What is the best antiseptic solution to disinfect the surface of the dressing trolley?	Incorrect	9	10.3%
	Correct	78	89.7%
2. What is the correct purpose for surgical hand washing?	Incorrect	0	0.0%
	Correct	87	100.0%
3. What are the correct steps of hand washing?	Incorrect	50	57.5%
	Correct	37	42.5%
4. Which one is the correct answer for the benefit of wound dressing?	Incorrect	0	0.0%
	Correct	87	100.0%
5. When do you change the surgical wound dressing for open heart surgery patients?	Incorrect	48	55.2%
	Correct	39	44.8%
6. How do you select a dressing solution?	Incorrect	0	0.0%
	Correct	87	100.0%
7. What is the purpose of maintenance of normal nutritional status for open heart surgical patients?	Incorrect	5	5.7%
	Correct	82	94.3%
8. What kinds of diet should be provided for post-operative open-heart patients?	Incorrect	5	5.7%
	Correct	82	94.3%

9. Which answer is correct for open-heart surgical patients with compromised immune systems?	Incorrect	5	5.7%
	Correct	82	94.3%
10. How do you prevent infection in open heart patients with immunodeficiency disorder?	Incorrect	16	18.4%
	Correct	71	81.6%
11. Which statement is correct for the diagnosis of surgical site infection among open heart patients?	Incorrect	4	4.6%
	Correct	83	95.4%
12. Which answer is a good sign of no surgical site infection among open heart patients?	Incorrect	5	5.7%
	Correct	82	94.3%
13. Which laboratory is used to ensure surgical site infection among open heart patients?	Incorrect	0	0.0%
	Correct	87	100.0%
14. Which laboratories are used to assess open heart patient’s nutritional status"	Incorrect	4	4.6%
	Correct	83	95.4%
15. What is the correct level of blood sugar that enhances the function of white blood cells adequate to prevent site infection in open heart patients?	Incorrect	0	0.0%
	Correct	87	100.0%
16. Which of the following signs may indicate a wound infection in an open-heart surgery patient?	Incorrect	35	40.2%
	Correct	52	59.8%
17. What is the most appropriate nursing intervention for managing wound pain in post-operative open-heart surgery patients?	Incorrect	5	5.7%
	Correct	82	94.3%

18. What information should be included in patient education regarding wound care for open-heart surgery patients?	Incorrect	15	17.2%
	Correct	72	82.8%
19. Which surgical technique is commonly used for wound closure in open-heart surgery?	Incorrect	16	18.4%
	Correct	71	81.6%
20. What is a significant risk factor for surgical site infections in open-heart surgery patients?	Incorrect	8	9.2%
	Correct	79	90.8%
21. Which member of the healthcare team should be notified first if there are concerns regarding a wound in an open-heart surgery patient?	Incorrect	4	4.6%
	Correct	83	95.4%
22. What is the initial nursing action for a post-operative open-heart surgery patient experiencing wound dehiscence?	Incorrect	11	12.6%
	Correct	76	87.4%

Table 4.6: Nursing Awareness of Post-operative Wound Care for Open Heart Surgery Patients

	Categories	Count	N %
1. Wash my hands before and after changing the open heart wound dressing and touching the surgical site	Strongly Disagree	0	0.0%
	Disagree	13	14.9 %
	Neutrally	11	12.6 %
	Agree	54	62.1 %
	Strongly Agree	9	10.3 %
2. I wash my hands before wearing the surgical glove	Strongly Disagree	0	0.0%
	Disagree	18	20.7 %
	Neutrally	6	6.9%
	Agree	59	67.8 %
	Strongly Agree	4	4.6%
3. I use sterilized dressing material for cleaning open heart surgical wound dressing	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	0	0.0%
	Agree	71	81.6 %
	Strongly Agree	16	18.4 %

4. I use an aseptic technique during open-heart surgical wound dressing	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	0	0.0%
	Agree	66	75.9 %
	Strongly Agree	21	24.1 %
5. I assess and monitor surgical site conditions among open-heart patients.	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	0	0.0%
	Agree	71	81.6 %
	Strongly Agree	16	18.4 %
6. I separate infected dressing from non-infected dressing	Strongly Disagree	0	0.0%
	Disagree	4	4.6%
	Neutrally	5	5.7%
	Agree	71	81.6 %
	Strongly Agree	7	8.0%
7. I use a face mask during cleaning open heart surgical wound dressing	Strongly Disagree	0	0.0%
	Disagree	43	49.4 %
	Neutrally	5	5.7%

	Agree	39	44.8 %
	Strongly Agree	0	0.0%
8. I am aware of the current evidence-based guidelines for post-operative wound care in open-heart surgery patients	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	12	13.8 %
	Agree	71	81.6 %
	Strongly Agree	4	4.6%
9. I frequently receive updates or training on post-operative wound care protocols for open-heart surgery patients	Strongly Disagree	4	4.6%
	Disagree	30	34.5 %
	Neutrally	20	23.0 %
	Agree	28	32.2 %
	Strongly Agree	5	5.7%
10. I feel confident in my ability to assess and manage post-operative wounds in open-heart surgery patients	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	5	5.7%
	Agree	73	83.9 %

	Strongly Agree	9	10.3 %
11. I am aware of the importance of using pain assessment tools to evaluate post-operative wound pain in open-heart surgery patients.	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	5	5.7%
	Agree	78	89.7 %
	Strongly Agree	4	4.6%
12. I recognize the signs that may indicate wound complications in open-heart surgery patients during post-operative care.	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	7	8.0%
	Agree	76	87.4 %
	Strongly Agree	4	4.6%
13. I prioritize accurate and comprehensive documentation of wound assessments, interventions, and patient responses in post-operative wound care.	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	5	5.7%
	Agree	82	94.3 %
	Strongly Agree	0	0.0%
14. I understand the importance of effective communication with other healthcare team members regarding wound assessments,	Strongly Disagree	0	0.0%
	Disagree	5	5.7%
	Neutrally	0	0.0%

interventions, and patient progress in post-operative care.	Agree	82	94.3 %
	Strongly Agree	0	0.0%
15. I prioritize providing patient and family education regarding post-operative wound care instructions, signs of complications, and self-care techniques.	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	5	5.7%
	Agree	82	94.3 %
	Strongly Agree	0	0.0%
16. I demonstrate cultural sensitivity and respect when providing post-operative wound care to patients from diverse backgrounds.	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	0	0.0%
	Agree	87	100.0 %
	Strongly Agree	0	0.0%
17. I utilize technology and digital health tools to enhance wound assessment, documentation, and communication in post-operative care for open-heart surgery patients.	Strongly Disagree	0	0.0%
	Disagree	0	0.0%
	Neutrally	42	48.3 %
	Agree	45	51.7 %
	Strongly Agree	0	0.0%

Table 4.8: distribution of nursing awareness and level of knowledge

		Level of Knowledge		Nursing Awareness	
		Mean	S.D	Mean	S.D
Age	20-25	17.83	1.03	49.33	2.06
	26- 30	16.65	1.42	47.46	3.69
	31-35	14.85	1.10	47.35	3.33
	36-40	19.00	.00	53.00	.00
	41-45	.	.	.	.
	> 45	.	.	.	.

Table 4.9: ANOVA test of nurses' knowledge and awareness with age

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Level of Knowledge	Between Groups	234.694	3	78.231	52.211	.000
	Within Groups	124.364	83	1.498		
	Total	359.057	86			
Nursing Awareness	Between Groups	145.966	3	48.655	4.479	.006
	Within Groups	901.621	83	10.863		
	Total	1047.586	86			

Table 4.10, Tukey post-test of nurses' knowledge and awareness with age.

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Level of Knowledge	20-25	26-30	-.81532	.40664	.194	-1.8815	.2508
		31-35	-3.01961*	.41101	.000	-4.0972	-1.9420
		36-40	3.83333*	.70672	.000	1.9804	5.6862
	26-30	20-25	.81532	.40664	.194	-.2508	1.8815
		31-35	-2.20429*	.29080	.000	-2.9667	-1.4419
		36-40	4.64865*	.64427	.000	2.9595	6.3378
	31-35	20-25	3.01961*	.41101	.000	1.9420	4.0972
		26-30	2.20429*	.29080	.000	1.4419	2.9667
		36-40	6.85294*	.64704	.000	5.1565	8.5494
	36-40	20-25	-3.83333*	.70672	.000	-5.6862	-1.9804
		26-30	-4.64865*	.64427	.000	-6.3378	-2.9595

		31-35	-6.85294*	.64704	.000	-8.5494	-5.1565
Nursing Awareness	20-25	26-30	1.87387	1.09491	.324	-.9968	4.7446
		31-35	1.98039	1.10668	.286	-.9212	4.8819
		36-40	-3.66667	1.90288	.225	-8.6557	1.3224
	26-30	20-25	-1.87387	1.09491	.324	-4.7446	.9968
		31-35	.10652	.78300	.999	-1.9464	2.1594
		36-40	-5.54054*	1.73474	.010	-10.0888	-.9923
	31-35	20-25	-1.98039	1.10668	.286	-4.8819	.9212
		26-30	-.10652	.78300	.999	-2.1594	1.9464
		36-40	-5.64706*	1.74219	.009	-10.2148	-1.0793
	36-40	20-25	3.66667	1.90288	.225	-1.3224	8.6557
		26-30	5.54054*	1.73474	.010	.9923	10.0888
		31-35	5.64706*	1.74219	.009	1.0793	10.2148
*. The mean difference is significant at the 0.05 level.							

Table 4.11: nursing awareness and level of knowledge according to gender

		Level of Knowledge		Nursing Awareness	
		Mean	S.D	Mean	S.D
Sex	Male	19.20	1.62	47.66	3.54
	Female	22.09	2.04	49.82	2.52

Table 4.12: Independent sample T-test of nurses' knowledge and awareness of gender

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Level of Knowledge	Equal variances assumed	64.217	.000	.161	85	.873	.10646	.66292	-1.21161	1.42453
	Equal variances not assumed			.086	10.469	.933	.10646	1.23101	-2.61983	2.83275
Nursing Awareness	Equal variances assumed	2.423	.123	-1.950	85	.055	-2.16029	1.10800	-4.36330	.04272
	Equal variances not assumed			-2.506	16.330	.023	-2.16029	.86213	-3.98492	-.33565

Table 4.13: nursing awareness and level of knowledge according to marital status

		Level of Knowledge		Nursing Awareness	
		Mean	S.D	Mean	S.D
Marital status	Single	18.53	2.15	49.13	3.29
	Married	19.88	1.68	46.64	3.27
	Divorced	.	.	.	.
	Widoe	.	.	.	.

Table 4.14: ANOVA of nurses' knowledge and awareness of marital status

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Level of Knowledge	Between Groups	43.042	3	14.347	3.768	.014
	Within Groups	316.016	83	3.807		
	Total	359.057	86			
Nursing Awareness	Between Groups	134.834	3	44.945	4.087	.009
	Within Groups	912.753	83	10.997		
	Total	1047.586	86			

Table 4.15: Tukey post-test of nurses' knowledge and awareness of marital status

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) Marital status	(J) Marital status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Level of Knowledge	Single	Married	-1.25614*	.42989	.023	-2.3832	-.1290
		Divorced	-1.96667	1.41008	.506	-5.6637	1.7303
		Widow	-2.46667	1.41008	.305	-6.1637	1.2303
	Married	Single	1.25614*	.42989	.023	.1290	2.3832
		Divorced	-.71053	1.41559	.958	-4.4220	3.0010
		Widow	-1.21053	1.41559	.828	-4.9220	2.5010
	Divorced	Single	1.96667	1.41008	.506	-1.7303	5.6637
		Married	.71053	1.41559	.958	-3.0010	4.4220
		Widow	-.50000	1.95126	.994	-5.6159	4.6159
	Widow	Single	2.46667	1.41008	.305	-1.2303	6.1637
		Married	1.21053	1.41559	.828	-2.5010	4.9220

		Divorced	.50000	1.95126	.994	-4.6159	5.6159
Nursing Awareness	Single	Married	2.47544*	.73060	.006	.5599	4.3910
		Divorced	2.63333	2.39643	.691	-3.6498	8.9164
		Widow	2.63333	2.39643	.691	-3.6498	8.9164
	Married	Single	-2.47544*	.73060	.006	-4.3910	-.5599
		Divorced	.15789	2.40581	1.000	-6.1498	6.4656
		Widow	.15789	2.40581	1.000	-6.1498	6.4656
	Divorced	Single	-2.63333	2.39643	.691	-8.9164	3.6498
		Married	-.15789	2.40581	1.000	-6.4656	6.1498
		Widow	.00000	3.31618	1.000	-8.6945	8.6945
	Widow	Single	-2.63333	2.39643	.691	-8.9164	3.6498
		Married	-.15789	2.40581	1.000	-6.4656	6.1498
		Divorced	.00000	3.31618	1.000	-8.6945	8.6945

*. The mean difference is significant at the 0.05 level.

Table 4.16: nursing awareness and level of knowledge according to educational level.

		Level of Knowledge		Nursing Awareness	
		Mean	S.D	Mean	S.D
Educational level	Diploma in Nursing	19.40	.89	47.20	3.90
	B.Sc. in Nursing	18.83	2.04	47.60	3.62
	Masters and above	21.17	1.03	50.17	1.03

Table 4.17: ANOVA testing level of knowledge and awareness with educational level

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Level of Knowledge	Between Groups	54.724	1	54.724	15.284	.000
	Within Groups	304.333	85	3.580		
	Total	359.057	86			
Nursing Awareness	Between Groups	69.573	1	69.573	6.047	.016
	Within Groups	978.013	85	11.506		
	Total	1047.586	86			

Table 4.18: nursing awareness and level of knowledge according to Service experience

		Level of Knowledge		Nursing Awareness	
		Mean	S.	Mean	S.D
Service experience	0-5 years	18.35	1.04	48.91	3.50
	6-10 years	19.34	1.65	46.55	2.50
	11-15 years	21.40	.94	47.25	3.75
	16 -20 years	24.00	.00	53.00	.00
	Above 20 years	.	.	.	.

Table 4.19: ANOVA test of nurses' knowledge and awareness of service experience

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Level of Knowledge	Between Groups	229.941	3	76.647	49.271	.000
	Within Groups	129.116	83	1.556		
	Total	359.057	86			
Nursing Awareness	Between Groups	199.928	3	66.643	6.525	.001
	Within Groups	847.658	83	10.213		
	Total	1047.586	86			

Table 4.20: Tukey post-test of nurses' knowledge and awareness of service experience

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) Service experience	(J) Service experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Level of Knowledge	0-5 years	6-10 years	-.99189*	.31527	.012	-1.8185	-.1653
		11-15 years	-3.04706*	.35147	.000	-3.9686	-2.1255
		16 -20 years	4.35294*	.65929	.000	2.6244	6.0815
	6-10 years	0-5 years	.99189*	.31527	.012	.1653	1.8185
		11-15 years	-2.05517*	.36252	.000	-3.0057	-1.1047
		16 -20 years	5.34483*	.66524	.000	3.6007	7.0890
	11-15 years	0-5 years	3.04706*	.35147	.000	2.1255	3.9686
		6-10 years	2.05517*	.36252	.000	1.1047	3.0057
		16 -20 years	7.40000*	.68314	.000	5.6089	9.1911
	16 -20 years	0-5 years	-4.35294*	.65929	.000	-6.0815	-2.6244
		6-10 years	-5.34483*	.66524	.000	-7.0890	-3.6007

		11-15 years	-7.40000*	.68314	.000	-9.1911	-5.6089
Nursing Awareness	0-5 years	6-10 years	2.36004*	.80780	.023	.2421	4.4780
		11-15 years	1.66176	.90056	.260	-.6994	4.0229
		16 -20 years	-4.08824	1.6892	.081	-8.5172	.3407
	6-10 years	0-5 years	-2.36004*	.80780	.023	-4.4780	-.2421
		11-15 years	-.69828	.92887	.876	-3.1336	1.7371
		16 -20 years	-6.44828*	1.7045	.002	-10.9172	-1.9793
	11-15 years	0-5 years	-1.66176	.90056	.260	-4.0229	.6994
		6-10 years	.69828	.92887	.876	-1.7371	3.1336
		16 -20 years	-5.75000*	1.7503	.008	-10.3392	-1.1608
	16 -20 years	0-5 years	4.08824	1.6892	.081	-.3407	8.5172
		6-10 years	6.44828*	1.7045	.002	1.9793	10.9172
		11-15 years	5.75000*	1.7503	.008	1.1608	10.3392

*. The mean difference is significant at the 0.05 level.

Table 4.21: nursing awareness and level of knowledge according to nursing experience in this surgical CCU

		Level of Knowledge		Nursing Awareness	
		Mean	S.D	Mean	S.D
Working experience in this surgical CCU/ years?	<1	.	.	.	.
	1-3	18.35	1.04	48.91	3.50
	4-6	20.07	.80	46.80	2.40
	7-10	19.78	2.03	45.78	2.89
	>10	19.09	4.04	51.73	1.01

Table 4. 22: ANOVA of nurses' knowledge and awareness of nursing experience in CCU

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Level of Knowledge	Between Groups	44.784	3	14.928	3.942	.011
	Within Groups	314.274	83	3.786		
	Total	359.057	86			
Nursing Awareness	Between Groups	335.602	3	111.867	13.041	.000
	Within Groups	711.984	83	8.578		
	Total	1047.586	86			

Table 4.23: Tukey post-test of nurses' knowledge and awareness of nursing experience in CCU

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) Working experience in this surgical CCU/ years?	(J) Working experience in this surgical CCU/ years?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Level of Knowledge	1-3	4-6	-1.71373*	.60315	.028	-3.2951	-.1323
		7-10	-1.42484*	.50160	.028	-2.7400	-.1097
		>10	-.73797	.67497	.695	-2.5076	1.0317
	4-6	1-3	1.71373*	.60315	.028	.1323	3.2951
		7-10	.28889	.62663	.967	-1.3540	1.9318
		>10	.97576	.77243	.589	-1.0494	3.0010
	7-10	1-3	1.42484*	.50160	.028	.1097	2.7400

		4-6	-.28889	.62663	.967	-1.9318	1.3540
		>10	.68687	.69603	.757	-1.1380	2.5118
	>10	1-3	.73797	.67497	.695	-1.0317	2.5076
		4-6	-.97576	.77243	.589	-3.0010	1.0494
		7-10	-.68687	.69603	.757	-2.5118	1.1380
Nursing Awareness	1-3	4-6	2.11176	.90784	.100	-.2685	4.4920
		7-10	3.13399*	.75499	.000	1.1545	5.1135
		>10	-2.81551*	1.01594	.034	-5.4791	-.1519
	4-6	1-3	-2.11176	.90784	.100	-4.4920	.2685
		7-10	1.02222	.94318	.700	-1.4506	3.4951
		>10	-4.92727*	1.16263	.000	-7.9755	-1.8790

	7-10	1-3	-3.13399*	.75499	.000	-5.1135	-1.1545
		4-6	-1.02222	.94318	.700	-3.4951	1.4506
		>10	-5.94949*	1.04763	.000	-8.6962	-3.2028
	>10	1-3	2.81551*	1.01594	.034	.1519	5.4791
		4-6	4.92727*	1.16263	.000	1.8790	7.9755
		7-10	5.94949*	1.04763	.000	3.2028	8.6962
*. The mean difference is significant at the 0.05 level.							

Table 4.24: group statistics of nurses' knowledge and awareness of training programs

Group Statistics					
	Have you ever taken any training regarding Post-operative Wound Care for Open Heart Surgery Patients	N	Mean	Std. Deviation	Std. Error Mean
Level of Knowledge	No	54	19.0370	1.64790	.22425
	Yes	33	21.7879	1.86677	.32496
Nursing Awareness	No	54	47.3704	3.66161	.49828
	Yes	33	48.8485	3.02202	.52607

Table (4.25): Independent Samples Test of nurses' knowledge and awareness with training

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Level of Knowledge	Equal variances assumed	1.124	.292	5.87	85	.000	2.24916	.38304	1.48758	3.01074
	Equal variances not assumed			5.69	61.336	.000	2.24916	.39483	1.4597	3.038
Nursing Awareness	Equal variances assumed	3.221	.076	-1.94	85	.055	-1.478	.75895	-2.9871	.0308
	Equal variances not assumed			-2.04	77.508	.045	-1.478	.72459	-2.9208	-.0354

Table 4.26: nursing awareness and level of knowledge according to overall confidence in providing post-operative wound care

		Level of Knowledge		Nursing Awareness	
		Mean	S.D	Mean	S.D
How do you rate your overall confidence in providing post-operative wound care to open-heart surgery patients?	Not at all confident	.	.	.	.
	Not confident	.	.	.	.
	Neutral	17.00	.00	51.00	.00
	Confident	18.99	1.94	47.90	3.67
	Very confident	21.58	.51	46.33	2.06

Table (4.27): ANOVA test of nurses' knowledge and awareness with over all confidence in open heart wound care

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Level of Knowledge	Between Groups	105.156	2	52.578	17.395	.000
	Within Groups	253.902	84	3.023		
	Total	359.057	86			
Nursing Awareness	Between Groups	96.640	2	48.320	4.268	.017
	Within Groups	950.946	84	11.321		
	Total	1047.586	86			

Table 4.28: Tukey post-test of nurses' knowledge and awareness with overall confidence in open heart wound care

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) How do you rate your overall confidence in providing post-operative wound care to open-heart surgery patients	(J) How do you rate your overall confidence in providing post-operative wound care to open-heart surgery patients	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Level of Knowledge	Neutral	Confident	-1.98529*	.69011	.014	-3.6319	-.3387
		Very confident	-4.58333*	.82686	.000	-6.5562	-2.6105
	Confident	Neutral	1.98529*	.69011	.014	.3387	3.6319
		Very confident	-2.59804*	.54437	.000	-3.8969	-1.2992
	Very confident	Neutral	4.58333*	.82686	.000	2.6105	6.5562
		Confident	2.59804*	.54437	.000	1.2992	3.8969
Nursing Awareness	Neutral	Confident	3.10294	1.33557	.058	-.0837	6.2895

		Very confident	4.66667*	1.60020	.012	.8486	8.4847
	Confident	Neutral	-3.10294	1.33557	.058	-6.2895	.0837
		Very confident	1.56373	1.05351	.304	-.9499	4.0774
	Very confident	Neutral	-4.66667*	1.60020	.012	-8.4847	-.8486
		Confident	-1.56373	1.05351	.304	-4.0774	.9499
*. The mean difference is significant at the 0.05 level.							

Table 4.29: nursing awareness and level of knowledge according to working hours per week in surgical CCU

		Level of Knowledge		Nursing Awareness	
		Mean	S.D	Mean	S.D
How many hours per week do you typically work in the surgical CCU	Less than 40 hours	20.56	1.30	47.54	3.33
	40 hours	17.96	1.79	48.28	3.62
	More than 40 hours	.	.	.	.

Table 4.30**:** ANOVA test of nurses' knowledge and awareness with working hours per week

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Level of Knowledge	Between Groups	147.664	2	73.832	29.338	.000
	Within Groups	211.393	84	2.517		
	Total	359.057	86			
Nursing Awareness	Between Groups	12.164	2	6.082	.493	.612
	Within Groups	1035.422	84	12.326		
	Total	1047.586	86			

Table 4.31**:** Tukey post-test of working hours and nurses' knowledge and awareness

Multiple Comparisons							
Tukey HSD							
Dependent Variable	(I) How many hours per week do you typically work in the surgical CCU	(J) How many hours per week do you typically work in the surgical CCU	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Level of Knowledge	Less than 40 hours	40 hours	2.62916*	.34435	.000	1.8076	3.4508
		More than 40 hours	2.06098	1.14877	.178	-.6799	4.8019
	40 hours	Less than 40 hours	-2.62916*	.34435	.000	-3.4508	-1.8076
		More than 40 hours	-.56818	1.14695	.874	-3.3047	2.1684
	More than 40 hours	Less than 40 hours	-2.06098	1.14877	.178	-4.8019	.6799
		40 hours	.56818	1.14695	.874	-2.1684	3.3047
*. The mean difference is significant at the 0.05 level.							

Table 4.32: Group Statistics of having protocol with Level of Knowledge and Nursing Awareness

Group Statistics					
	Do you have a clear protocol for dealing with open heart wounds in your workplace?	N	Mean	Std. Deviation	Std. Error Mean
Level of Knowledge	No	56	18.1607	1.74540	.23324
	Yes	31	21.0323	.94812	.17029
Nursing Awareness	No	56	48.3929	3.59635	.48058
	Yes	31	47.0968	3.17653	.57052

Table 4.33: Independent Samples Test of Having Protocol with Level of Knowledge and Nursing Awareness

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Level of Knowledge	Equal variances assumed	5.823	.018	-8.479	85	.000	-2.87154	.33866	-3.54488	-2.19820
	Equal variances not assumed			-9.943	84.990	.000	-2.87154	.28879	-3.44573	-2.29736
Nursing Awareness	Equal variances assumed	1.569	.214	1.676	85	.097	1.29608	.77323	-.24131	2.83347
	Equal variances not assumed			1.737	68.788	.087	1.29608	.74596	-.19215	2.78431

Table 4.34: the correlation between the level of knowledge and the level of awareness

Correlations			
		Level of Knowledge	Nursing Awareness
Level of Knowledge	Pearson Correlation	1	.275**
	Sig. (2-tailed)		.010
	N	87	87
Nursing Awareness	Pearson Correlation	.275**	1
	Sig. (2-tailed)	.010	
	N	87	87
**. Correlation is significant at the 0.01 level (2-tailed).			

Appendix Two: Study Tools

Subject No: ……. Date: …….

The questionnaire comprises three parts: parts A, B, and C.

Part A: Demographic Data Profile

Please answer the following questions, give the mark (x) on the parenthesis, and fill in the blank area.

1. Age: ( ) 20-25 ( ) 26- 30 ( ) 31-35 ( ) 36-40 ( ) 41-45 ( ) > 45

2. Sex: Male ( ) Female ( )

3. Marital status: Single ( ) Married ( )

4. Educational level: Diploma in Nursing ( ) B.Sc. in Nursing ( )
Masters and above ( )

5. Service experience: 0-5 years ( ) 6-10 years ( ) 11-15 years ( )
16 -20 years ( ) above 20 years ( )

6. Working experience in this surgical CCU/ years ( ) <1 ( ) 1-3 ( ) 4-6 ( ) 7-10 ( ) >10

7. Your job title in surgical CCU ( ) junior nurse ( ) senior nurse ( ) Assistant head nurse ( ) Head nurse

8. Have you ever taken any training regarding Post-operative Wound Care for Open Heart Surgery Patients? No ( ) Yes ( )

9. Have you ever taken any training regarding Surgical Wound Care in general? No ( ) Yes ()

10. How do you rate your overall confidence in providing post-operative wound care to open-heart surgery patients?

Very confident ( )

Confident ( )

Neutral ( )

Not confident ( )

Not at all confident ( )

11. How many hours per week do you typically work in the surgical CCU?

Less than 40 hours ( )

40 hours ( )

More than 40 hours ( )

12. Do you have a clear protocol for dealing with open heart wounds in your workplace?

( ) Yes ( ) No

Part B: Nursing Knowledge of Post-operative Wound Care for Open Heart Surgery Patients

1. What is the best antiseptic solution to disinfect the surface of the dressing trolley?

a.70% ethyl alcohol with 0.5% chlorohexidine solution (x)

b.0.5% chlorohexidine solution

c.70% ethyl alcohol

2. What is the correct purpose for surgical hand washing?

a. Reduce the risk of surgical site infection (x)

b. Increase the risk of surgical site infection

c. Reduce the risk of dryness in nurses' hands

3. What are the correct steps of hand washing?

a. Wet your hands, rinse, and dry

b. Wet your hands, apply an antiseptic agent, rinse, dry with a paper towel (x)

c. Wet your hands, apply soap, and rinse

4. Which one is the correct answer for the benefit of wound dressing?

a. Dressing absorbs exudates (x)

b. Dressing does not absorb exudatesc.

c. Dressing decreases wound pain

5. When do you change the surgical wound dressing for open heart surgery patients?

a. Within 24 hours after surgery

b. When a dressing material (gauze) presents with a lot of exudates (x)

c. When a surgeon orders

6. How do you select a dressing solution?

a. Based on wound-based characteristics (x)

b. Based on the size of the wound

c. Based on the depth of the wound

7. What is the purpose of maintenance of normal nutritional status for open heart surgical patients?

a. To prevent the risk of post-operative complication (x)

b. To reduce immune function

c. To reduce healing process

8. What kinds of diet should be provided for post-operative open heart patients?

a. Protein-rich diet and vitamin C-containing fruits (x)

b. Carbohydrate-rich diet and vitamin C-containing fruits

c. Fat-rich diet and vitamin C-containing fruits

9. Which answer is correct for open-heart surgical patients with compromised immune systems?

a. more vulnerable to the risk of surgical site infection (x)

b. Have normal immune function

c. Have no risk of developing surgical site infection

10. How do you prevent infection in open heart patients with immunodeficiency disorder?

a. Eat fresh fruits and fresh vegetables

b. Eat well-cooked food (x)

c. Drink tab water

11. Which statement is correct for the diagnosis of surgical site infection among open heart patients?

a. Surgical site infection occurs within 30 days after operation (x)

b. Incision culture is negative

c. A patient has a fever within the first 3 days after the operation

12. Which answer is a good sign of no surgical site infection among open heart patients?

a. No discharge, no fever (x)

b. No discharge, or edema of the skin around the wound

c. No discharge, open suture line

13. Which laboratory is used to ensure surgical site infection among open heart patients?

a. Swab culture investigation (x)

b. Blood culture investigation

c. Urine culture investigation

14. Which laboratories are used to assess open heart patient's nutritional status"

a. Serum albumin and CBC (complete blood count) (x)

b. Serum albumin and urine analysis

c. Serum albumin and stool examination

15. What is the correct level of blood sugar that enhances the function of white blood cells adequate to prevent surgical site infection among open heart patients?

a. Lower than or equal to 110 mg/dl (x)

b. Lower or equal to 200 mg/dl

c. Higher than 200 mg/dl

16. Which of the following signs may indicate a wound infection in an open-heart surgery patient?

a. Increased redness and warmth around the wound

b. Purulent drainage from the wound site

c. Presence of foul odor from the wound

d. All of the above(x)

17. What is the most appropriate nursing intervention for managing wound pain in post-operative open-heart surgery patients?

a. Administering opioid analgesics as needed (x)

b. Encouraging frequent ambulation to distract from pain

c. Applying ice packs to the wound site

d. Providing relaxation techniques and distraction methods

18. What information should be included in patient education regarding wound care for open-heart surgery patients?

a. Importance of maintaining proper nutrition for wound healing

b. Signs and symptoms of wound infection

c. Instructions for changing wound dressings and monitoring for complications

d. All of the above (x)

19. Which surgical technique is commonly used for wound closure in open-heart surgery?

a. Continuous subcuticular sutures

b. Sterile adhesive strips (Steri-Strips)

c. Interrupted skin sutures

d. Staples (x)

20. What is a significant risk factor for surgical site infections in open-heart surgery patients?

a. Advanced age

b. History of diabetes mellitus

c. Prolonged duration of surgery

d. All of the above (x)

21. Which member of the healthcare team should be notified first if there are concerns regarding a post-operative wound in an open-heart surgery patient?

a. Charge nurse

b. Surgeon (x)

c. Respiratory therapist

d. Social worker

22. What is the initial nursing action for a post-operative open-heart surgery patient experiencing wound dehiscence?

a. Apply sterile dressings to the wound

b. Administer pain medication

c. Notify the healthcare provider immediately (x)

d. Encourage the patient to remain calm

Part C: Nursing Awareness of Post-operative Wound Care for Open Heart Surgery Patients

SD: Strongly Disagree D: Disagree NEU: Neutrally A: Agree SA: Strongly Agree

		SD	D	NEU	A	SA
1	I Wash my hands before and after changing open heart wound dressing and touching the surgical site					

2	I wash my hands before wearing the surgical glove					
3	I use sterilized dressing material for cleaning open heart surgical wound dressing					
4	I use an aseptic technique during open-heart surgical wound dressing					
5	I Assess and monitor surgical site conditions among open-heart patients.					
6	I separate infected dressing from non-infected dressing					
7	I use a face mask during cleaning open heart surgical wound dressing					
8	I am aware of the current evidence-based guidelines for post-operative wound care in open-heart surgery patients					
9	I frequently receive updates or training on post-operative wound care protocols for open-heart surgery patients					
10	I feel confident in my ability to assess and manage post-operative wounds in open-heart surgery patients					
11	I am aware of the importance of using pain assessment tools to evaluate post-operative wound pain in open-heart surgery patients.					
12	I recognize the signs that may indicate wound complications in open-heart surgery patients during post-operative care.					
13	I prioritize accurate and comprehensive documentation of wound assessments, interventions, and patient responses in post-operative wound care.					
14	I understand the importance of effective communication with other healthcare team members regarding wound assessments, interventions, and patient progress in postoperative care.					
15	I prioritize providing patient and family education regarding post-operative wound care instructions, signs of complications, and self-care techniques.					
16	I demonstrate cultural sensitivity and respect when providing post-operative wound care to patients from diverse backgrounds.					
17	I utilize technology and digital health tools to enhance wound assessment, documentation, and communication in post-operative care for open-heart surgery patients.					

Appendix Three: IRB Approval

Arab American University
Institutional Review Board - Ramallah

الجامعـــة العربيـــة الأمريكيـــة
مجلس اخلاقيات البحث العلمي – رام الله

IRB Approval Letter

Study Title: "Nurses' Knowledge and Awareness of Post-operative Wound Care for Open Heart Surgery Patients in North West-Bank Hospitals-Palestine; A Prospective Study".

Submitted by: Mona Sayel Yosef Fares

Date received: 20th May 2024

Date reviewed: 21th May 2024

Date approved: 21th May 2024

Your Study titled **"Nurses' Knowledge and Awareness of Post-operative Wound Care for Open Heart Surgery Patients in North West-Bank Hospitals-Palestine; A Prospective Study"** with the code number **"R-2024/A/83/N"** was reviewed by the Arab American University Institutional Review Board - Ramallah and it was approved on the 21th 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.

رام الله – فلسطين

Tel: 02-294-1999 **E-Email:** IRB-R@aaup.edu **Website:** www.aaup.edu

Appendix Four: تسهيل المهمة

Arab American University
Faculty of Graduate Studies

الجامعة العربية الأمريكية
كلية الدراسات العليا

2024/5/30

إلى من يهمه الامر

تسهيل مهمة بحثية

تحية طيبة وبعد،

تُهديكم كلية الدراسات العليا في الجامعة العربية الأمريكية أطيب التحيات، وبالإشارة الى الموضوع أعلاه، تشهد كلية الدراسات العليا في الجامعة العليا أن الطالبة **منى صايل يوسف فارس** والتي تحمل الرقم الجامعي 202113200هي طالبة ماجستير في برنامج تمريض البالغين وتعمل على رسالة الماجستير الخاصة بها بعنوان:

"Nurses' Knowledge and Awareness of Post-operative Wound Care for Open Heart Surgery Patients in North West- Bank hospitals- Palestine, prospective study"

تحت إشراف الدكتور عبد الله الواوي، حيث سيكون الهدف من الدراسة :إجراء تقييم شامل لمستوى المعرفة والوعي بين الممرضات فيما يتعلق برعاية الجروح بعد العمليات الجراحية لمرضى جراحة القلب المفتوح في مستشفيات شمال الضفة الغربية في فلسطين، لتحديد مجالات التحسين وتعزيز رعاية المرضى وسيتم متابعة التمريض خلال فترة جمع البيانات ووضع التوصيات مع العلم بانه ستكون فترة جمع البيانات من وقت الحصول على الموافقة لغاية الوصول للعينة المطلوبة بواقع 100 ممرض في المجموع. 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.

كما أود التنويه بأن الطالبة منى صايل يوسف فارس سوف تقوم بمتابعة التمريض وذلك بعد الحصول على موافقة رسمية من حضرتكم وأيضا **تتعهد بعدم ذكر أسماء الممرضين المشاركين بالبحث وتطبيق اخلاقيات البحث العلمي في حال تم نشر البحث.**

وتفضلوا بقبول فائق الاحترام

عميد كلية الدراسات العليا

د. نوار قطب

كلية الدراسات العليا
FACULTY OF GRADUATE S

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Arab American University
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الجامعة العربية الأمريكية
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IBN SINA SPECIALIZED HOSPITAL
مستشفى ابن سينا التخصصي

For ISH – HR Department Use			
Receiving Date	14- 07 . 2024	Application completed	☒Yes ☐No
HR Department Note	تم استلام جميع الأوراق المطلوبة CV/ ID/ IRB/ تسهيل مهمة بحثية / Proposal / استبيان.		
Transfer Date	14. 07 . 2024	HR Department Stamp	R.H IBN SINA SPECIALIZED HOSPITAL دائرة الموارد البشرية

For ISH - Ethics Committee Use			
Receiving Date		Research Approval	☐Yes ☐No

Head of Ethics Committee Comment:

لا مانع مع تزويدنا بنسخة من النتائج
بالتوصيات

Head of Ethics Committee Signature: ____________ (IBN SINA SPECIALIZED HOSPITAL – Ethics Committee) **Date:** 15. 07. 2024

For ISH - CEO Use

CEO Comment:

لا مانع

CEO Signature: ____________ **Date:** 15. 07. 2024

مركز البحث العلمي السريري
Clinical Research Centre

CLINICAL RESEARCH CENTI

Approval date: 2024-09-30
Ref: CRC_2024_0374

Subject: Approval to conduct a research project at An-Najah National University Hospital

Dear Ms. Mona Fares,

I am writing this letter to grant you permission to conduct your research project titled "Nurses' Knowledge and Awareness of Post-Operative Wound Care for Open Heart Surgery Patients in North West- Bank hospitals-Palestine, prospective study". I hope your study will provide new insights and contribute the advancement of knowledge and evidence. Furthermore, I would like to emphasize the importance of adhering to the ethical guidelines set forth by the hospital throughout the research process.

On behalf of An-Najah National University Hospital, I extend my best wishes and support for your research endeavors.

Sincerely,

Sa'ed H. Zyoud, Ph.D.
Clinical Toxicology
Director of Clinical Research Center

CC:
Chief Medical Officer
Chief Nursing Officer

Note: this approval letter is not valid unless signed and stamped by the CRC and the Chief Medical Officer of An-Najah National University Hospital

معرفة ووعي الممرضات بالعناية بالجروح بعد العمليات الجراحية لمرضى جراحة القلب المفتوح في مستشفيات شمال الضفة الغربية – فلسطين، دراسة مقطعية

منى صايل يوسف فارس

د. عبدالله الواوي

د. عماد أبو خضر

د. ربحي بشارات

ملخص

عدوى موقع الجراحة في القلب المفتوح هي من المضاعفات المهددة للحياة بعد جراحة القلب والتي يمكن أن تؤدي إلى دخول المستشفى وزيادة نفقات الرعاية الصحية والمرض والوفيات. إن منع العدوى أثناء جراحة القلب المفتوح يحسن نتائج المرضى مع توفير ملايين الدولارات. يجب أن يكون الممرضون على دراية بالتهابات موقع الجراحة، بما في ذلك تصنيفاتها وعوامل الخطر ومجموعات المخاطر والعلامات والأعراض والوقاية بالمضادات الحيوية ومستحضرات الجلد قبل الجراحة والرعاية الجراحية الميدانية بعد الجراحة وإدارة العدوى والتدابير الوقائية. يجب على الممرضات الدفاع عن مرضاهم في جميع الظروف

الهدف من الدراسة هو تقييم معرفة الممرضات ووعيهن بالعناية بالجروح بعد الجراحة لمرضى جراحة القلب المفتوح في مستشفيات شمال غرب الضفة الغربية – فلسطين

أجريت دراسة مقطعية وصفية كمية ارتباطية في أقسام وحدة العناية المركزة الجراحية في خمسة مستشفيات في شمال غرب الضفة الغربية. شارك في الدراسة ما مجموعه 87 ممرضة وحدة العناية المركزة الجراحية. تم جمع البيانات باستخدام استبيان ذاتي الإدارة لتقييم معرفة الممرضات (22 سؤالاً) ووعيهن (17 نقطة) بالعناية بالجروح بعد الجراحة. تم إجراء التحليل الإحصائي باستخدام برنامج SPSSالإصدار 23، باستخدام الإحصاءات الوصفية، واختبار كولموجوروف–سميرنوف للطبيعية، واختباراتT ، وتحليل التباين، وارتباط بيرسون لتحليل البيانات.

وفقًا للنتائج، كان لدى الممرضات مستوى عالٍ من المعرفة (83.39٪)، ولكن مستوى متوسطًا فقط من الوعي (70.48٪). لوحظت فروق كبيرة في المعرفة والوعي وفقًا للعمر والجنس والحالة الاجتماعية ومستوى التعليم والخبرة، من بين المتغيرات الديموغرافية والمهنية الأخرى. في حين كان التأثر بالوعي أقل اتساقًا، ارتبط التدريب وتوافر البروتوكولات الصريحة بمستويات معرفة أفضل. تسلط النتائج الضوء على قيمة التعليم المتخصص والخبرة في العالم الحقيقي وتشجيع بيئات العمل في تحسين ممارسات التمريض.

تمتلك الممرضات في مستشفيات شمال الضفة الغربية معرفة أساسية قوية ولكنهن يظهرن مستويات متفاوتة من الوعي فيما يتعلق برعاية الجروح بعد الجراحة لمرضى جراحة القلب المفتوح. يعد التعليم المستمر والتدريب المتخصص وتطوير بروتوكولات واضحة قائمة على الأدلة أمرًا ضروريًا لتعزيز المعرفة والوعي، مما يؤدي في النهاية إلى تحسين نتائج المرضى والحد من حدوث التهابات موقع الجراحة في المنطقة.

الكلمات المفتاحية: رعاية الجروح بعد الجراحة، جراحة القلب المفتوح، التهابات موقع الجراحة، معرفة الممرضات، وعي الممرضات.