

ASSESSMENT OF KNOWLEDGE AMONG NURSES ABOUT WOUND INFECTION IN CARDIOTHORACIC SURGERY PATIENTS

NAWAZ R*, BIBI S

Department of Nursing, Sharif College of Nursing Lahore, Pakistan

*Correspondence author email address: Nawaz.rozeena@gmail.com

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Abstract: *Cardiothoracic 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, despite the high incidence of wound infections observed in previous studies. Therefore, this study aimed to assess the knowledge and competency of staff nurses regarding wound management while also investigating potential differences in knowledge between nurses working in private and public hospitals. The study utilized a descriptive design and employed a self-reported questionnaire to evaluate the knowledge of staff nurses in cardiac wound management. A sample of 156 nurses from private and public hospitals was selected, and the questionnaire was distributed among them. Total knowledge scores were calculated, and the data were analyzed using descriptive and inferential statistical methods. The response rate for the study was 55.05%, with a total of 87 nurses participating. The findings of the study revealed several knowledge deficits among cardiothoracic nurses. These deficits were primarily related to wound healing, recognizing the signs and symptoms of surgical site infections, and understanding the specific aspects of cardiac wounds. Many nurses demonstrated uncertainty regarding the appropriate cleaning agents for washing cardiac wounds and lacked awareness of when the initial post-operative dressing should be changed. Based on these results, it is evident that measures need to be taken to improve the knowledge and competency of nurses in wound management. Seminars and workshops should be organized to keep nurses updated with the latest advancements and guidelines in wound care. Additionally, further training opportunities should be provided to enhance their understanding and proficiency in managing wounds specific to cardiothoracic surgeries. In conclusion, the study highlights the importance of addressing the knowledge gaps among cardiothoracic nurses regarding wound management. By equipping nurses with comprehensive knowledge and skills in this area, we can improve patient outcomes, reduce the incidence of surgical site infections, and alleviate the burden on healthcare systems.*

Keywords: Nurses, Wound Infection, Cardiothoracic Surgery, Surgical Site Infection, Surveillance, Wound Healing

Introduction

Surgical site infections (SSIs) pose a significant challenge for healthcare providers, contributing to patient readmissions following surgical procedures (Adeyemi and Trueman, 2019). In the case of open-heart surgery, SSIs can have devastating consequences, leading to increased morbidity and mortality rates (Al-Ebrahim et al., 2023; Garner and Anderson, 2016). Specifically, harvesting saphenous vein grafts during these procedures can result in compromised venous drainage, creating a conducive environment for developing complex wounds and skin infections (Siddiqi, 2016). Moreover, mediastinitis, a severe form of SSI affecting the surgical site after cardiac surgery, further exacerbates patient outcomes (Stryja et al., 2020). The burden of SSIs extends beyond patient health, straining hospital resources and imposing substantial financial costs (Nelson et al., 2015). However, it is possible to

mitigate the occurrence of SSIs by equipping healthcare providers, particularly nurses who play a pivotal role in post-cardiac surgery care, with comprehensive knowledge of wound management (Pearse et al., 2021). Potential complications can be promptly addressed by ensuring that nurses possess the necessary expertise to assess surgical wounds and identify warning signs such as fever, chills, increased wound size and depth, drainage, cellulitis, or malodor (Templeton, 2014). Implementing proper post-operative dressing protocols, such as adhering to guidelines recommending a 48-hour dressing duration, can decrease the incidence of SSIs. This becomes especially crucial in resource-limited settings like Pakistan, where the prevalence of SSIs and healthcare resources are constrained. By enhancing knowledge and understanding of wound care among cardiothoracic nurses, we can alleviate



healthcare systems' burden, shorten hospital stays, and ultimately improve patient outcomes.

Methodology

This prospective study was conducted in Lahore, Pakistan, involving two hospitals, one private and one public, over a period of six months, from September 2022 to March 2023. The study population consisted of cardiothoracic nurses working in these hospitals, estimated to be 156 nurses. Out of the targeted participants, a complete set of questionnaires was obtained from 87 nurses, yielding a response rate of 55.77%. The study protocol was approved by the ethical committee of both hospitals, ensuring compliance with ethical standards.

To assess the knowledge and competency of cardiothoracic nurses in wound management, a validated questionnaire comprising 15 questions was utilized. The questionnaire underwent validation by cardiothoracic surgeons working in the same hospitals, ensuring their reliability and appropriateness for the study objectives.

Descriptive statistics were employed to analyze the collected data, utilizing the statistical software SPSS version 25. The total knowledge score was computed

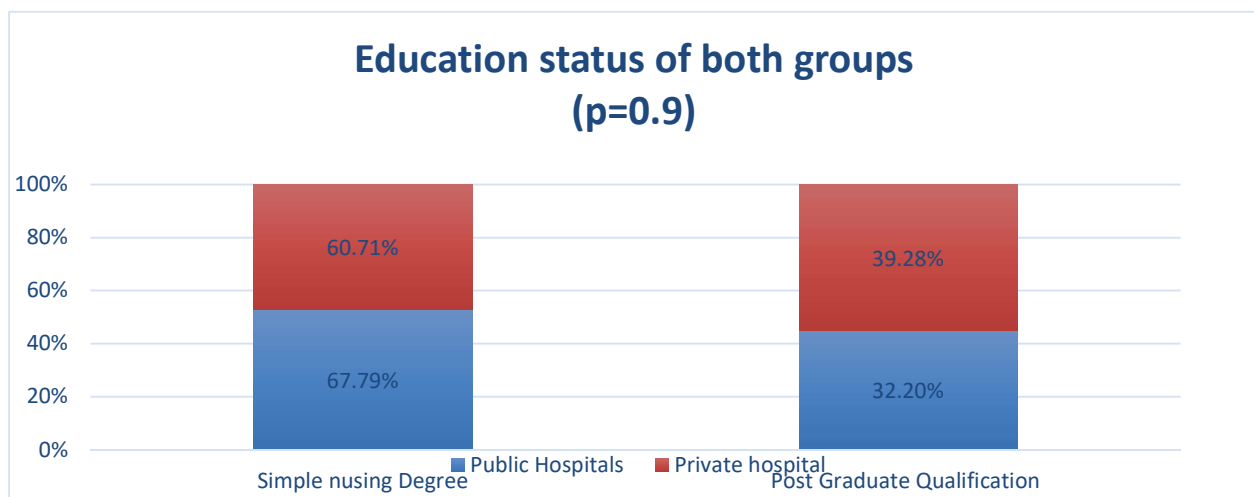
by assigning a value of 1 for each correct answer provided by the participants. Furthermore, the sample was divided accordingly to explore potential differences in knowledge between the two groups of nurses (public hospital vs. private hospital). This comparison was motivated by the scarcity of available data on surgical site infections (SSIs) in patients who underwent cardiothoracic surgery in public hospitals, in contrast to the existing data from private hospitals. Pearson's correlation coefficient, Pearson's chi-square (χ^2), and independent sample t-tests were used to assess the groups' differences. Statistical significance was determined at a p-value less than 0.05.

Results

Among the targeted sample of 156 cardiothoracic nurses, 87 completed the survey, resulting in a response rate of 55.76%. The majority of these nurses held simple nursing degrees (58.76%), while a significant proportion had post-graduate qualifications (30.92%) (Figure 1). Interestingly, there were no notable differences in educational qualifications, clinical experience, or current positions between nurses working in public and private hospitals.

Table 1 Demographic variables in both groups

Variables	Constructs	Nurses In Public Hospitals	Nurses In Private Hospitals	P-Value
		N=59	N= 28	
Educational Qualification	<i>Degree</i>	67.79% (40)	60.71% (17)	0.9
	<i>Post Graduate Qualification</i>	32.20% (19)	39.28% (11)	
Years Of RN Experience	<i>0-5 Yrs.</i>	16.94% (10)	21.42% (6)	0.6
	<i>5-10 Yrs.</i>	13.55% (8)	17.85% (5)	
	<i>10-15 Yrs.</i>	25.42% (15)	25% (7)	
	<i>15 -20 Yrs.</i>	23.72% (14)	17.85% (5)	
	<i>>20 Yrs.</i>	20.33% (12)	17.85% (5)	
Current Position	<i>Staff Nurse</i>	91.52% (54)	75% (21)	0.92
	<i>Nurse Manager/Clinical Staff Nurse</i>	8.48% (5)	25% (7)	



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Picture used as part of the research questionnaire.

Analyzing the responses, it was found that only a small percentage of nurses (27.58%) correctly identified whether a displayed wound image indicated infection. Similarly, a modest proportion (34.48%) knew the recommended minimum duration of 48

hours for the initial post-operative dressing removal. However, a higher percentage (75.86%) were aware that normal saline is the recommended cleansing agent for cardiothoracic wounds, and an equal percentage recognized the association between sternal wound infections and high mortality rates.

Regarding the early signs and symptoms of cardiac surgery wound infection, only 31.03% of nurses answered correctly, while a mere 22.98% could identify the correct phase of wound healing. Notably, a low percentage (21.83%) of nurses recognized the pre-operative conditions that could lead to surgical site infection, while 64.36% identified factors that hinder wound healing. However, most nurses (60.91%) provided accurate advice to patients regarding managing sternal clicking complications following cardiac surgery.

Detailed information on wound infection knowledge can be found in Table 2. Notably, no statistically significant differences were observed in the knowledge of wound infection between nurses working in private and public hospitals. Furthermore, educational qualifications and length of experience in the cardiothoracic unit did not exhibit any association with differences in wound care knowledge, as measured by the questionnaire.

Table 2 Knowledge of nurses about wound infection after cardiothoracic surgery:

Questions	Percentage of nurses who correctly answered the questions n=87		P value
	Public n=59	Private n=28	
Accurately determined whether or whether the wound was not infected	29.85% (17)	25% (7)	0.5
correctly recognized the tissue type in the wound's photos	11.86% (7)	7.14% (2)	0.65
correctly recognized the wound-healing phase	25.42% (15)	17.85% (5)	0.7
correctly determined whether or not vacuum-assisted closure is the best course of action	62.71% (37)	54% (16)	0.23
Treatment of choice for necrotic wound	49.15% (29)	39.28% (11)	0.21
The recommended cleaning solution for wounds in the heart (normal saline)	76.27% (45)	75% (21)	0.65
The timing of the initial post-operative dressing removal is corrected.	37.28% (22)	28.57% (8)	0.25
Mentioned the factors that inhibit wound healing	67.79% (40)	53.57% (15)	0.54
The pre-operative risk factors for wound infection after heart surgery are identified	22.03% (13)	17.85% (5)	0.65
Finding the pre-operative and perioperative risk factors for wound infection after heart surgery	8.47% (5)	7.14% (2)	0.25
whether or not sternal injuries have a high MORTALITY RATE	77.96% (46)	71.42% (20)	0.23
On the fourth post-operative day, your patient has moderate wound leakage. How should this wound be treated according to the right procedure?	28.81% (17)	21.42% (6)	0.54
recognizing the symptoms and signs of surgical wound infection	32.20% (19)	28.57 (8)	0.32
Identified the cleansing agent as depicted in the picture.	74.5% (44)	67.85% (19)	0.51
A post-operative patient reports that he can feel and hear clicking and grating sounds on his sternum whenever he gets out of bed. What nursing intervention do you think is best?	64.44% (38)	53.57% (15)	0.32

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Discussion

The results of this study show that nurses have a considerable knowledge gap in the field of wound management, consistent with findings from earlier studies on nurses' understanding of leg ulcers and a survey of Canadian doctors (Edwards et al., 2005; Woo and Sears, 2016). Interestingly, there were no major knowledge gaps regarding wound infection between nurses working in public and private hospitals. Nurses must participate in continuing professional education (CPE) to fill this knowledge gap to advance and maintain their professional practice. The healthcare system should aid nurses in professional development by setting up seminars and workshops. However, nurses frequently encounter difficulties pursuing CPE due to the conflicting demands of personal, professional, and educational duties (Burrow et al., 2016). Another obstacle to nurses participating in educational activities is the shortage of study leaves.

A noteworthy finding from this study was that many participants did not adhere to the guidelines regarding removing the initial post-operative dressing (McHugh, 2011). However, recent research has indicated no significant difference in patients with clean surgical wounds whose dressings were removed before 48 hours compared to those whose dressings were removed after 48 hours (Hsieh et al., 2016). Another concerning issue was many nurses' incorrect choice of cleansing agent for cardiothoracic wounds. Pyodine, chlorhexidine, or alcohol-based antiseptics are commonly used for skin antisepsis before invasive procedures but should not be used for wound cleaning, as they can impede healing and affect normal tissue growth (Kotb and Sayed, 2015). The recent NICE (2017) guidelines recommend dressing and cleaning the surgical wound with normal saline within 48 hours after surgery (Ding et al., 2017). However, specific guidelines regarding the timing for dressing removal are lacking, leaving nurses uncertain about the appropriate time for removal. Further research is warranted to address this knowledge gap. It is important to acknowledge some limitations of this study. These include a small sample size of 87 participants, a relatively low response rate of 55.05%, and a descriptive study design. Additionally, the sample was self-selected, potentially introducing self-selection bias as those interested in wound care management were more likely to complete the questionnaire.

Conclusion

In conclusion, this study sheds light on the significant knowledge deficit among nurses regarding wound management. It emphasizes the need for ongoing education and professional development

opportunities to enhance nurses' knowledge. Healthcare organizations should provide support and resources to facilitate nurses' participation in educational activities. Addressing these knowledge gaps can improve patient outcomes and enhance the overall quality of care.

Conflict of interest

The authors declared absence of conflict of interest.

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