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Nurses' knowledge and attitudes regarding nursing care for patients following open-heart surgery

Znanje in odnos medicinskih sester do zdravstvene nege pacientov po operaciji na odprtem srcu

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Key words: nurses'; knowledge; attitude; open-heart surgery; postoperative care

Ključne besede: medicinske sestre; znanje; stališča; operacija na odprtem srcu; pooperativna oskrba

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ABSTRACT

Introduction: Open-heart surgery requires complex postoperative monitoring and prompt nursing interventions to prevent complications, reduce morbidity, and support recovery. However, in some settings, nurses' knowledge of evidence-based perioperative cardiac care may be insufficient. This study aims to assess nurses' knowledge and attitudes regarding postoperative open-heart surgery care and examine their associations with nurses' demographic characteristics.

Methods: A descriptive cross-sectional study was conducted among 50 intensive care unit nurses at AL-Nasiriyah Heart Centre in Iraq. Participants were recruited using purposive sampling. Data were collected from 25 June to 21 August 2023 using a self-administered questionnaire covering participants' demographic characteristics, knowledge, and attitudes regarding postoperative open-heart surgery nursing care. Content validity was assessed by seven experts. Internal consistency was satisfactory, with Cronbach's alpha coefficients of 0.78 for knowledge and 0.82 for attitude. Data were analysed using descriptive statistics and ordinal regression with SPSS version 23 and Excel 2010.

Results: The mean knowledge score was 3.01 ± 1.18 , indicating generally poor knowledge, with 58.0% of nurses classified as having poor knowledge. The mean attitude score was 24.03 ± 16.62 , indicating a moderate attitude. No statistically significant associations were found between nurses' demographic characteristics and knowledge or attitude scores.

Discussion and conclusion: Nurses demonstrated limited knowledge and a moderate attitude towards postoperative open-heart surgery nursing care. Ongoing education is recommended to improve evidence-based postoperative cardiac nursing care.

IZVLEČEK

Uvod: Operacija na odprtem srcu zahteva kompleksno pooperativno spremljanje in pravočasne zdravstveno-negovalne intervencije za preprečevanje zapletov, zmanjšanje obolenosti ter podporo okrevanju. Vendar pa je v nekaterih okoljih znanje medicinskih sester o na dokazih temelječi perioperativni zdravstveni negi lahko nezadostno. Namen te raziskave je bil oceniti znanje in stališča medicinskih sester glede pooperativne zdravstvene nege po operaciji na odprtem srcu ter preučiti povezave med njimi in demografskimi značilnostmi medicinskih sester.

Metode: Izvedena je bila opisna presečna raziskava med 50 medicinskimi sestrami na oddelku intenzivne terapije v Kardiološkem centru AL-Nasiriyah v Iraku. Udeleženci so bili vključeni z namenskim vzorčenjem. Podatki so bili zbrani med 25. junijem in 21. avgustom 2023 s pomočjo vprašalnika, ki je zajemal demografske značilnosti udeležencev ter njihovo znanje in stališča glede zdravstvene nege po operaciji na odprtem srcu. Vsebinsko veljavnost je ocenilo sedem strokovnjakov. Notranja konsistentnost je bila zadovoljiva, saj je Cronbachov alfa koeficient znašal 0,78 za znanje in 0,82 za stališča. Podatki so bili analizirani z opisno statistiko in ordinalno regresijo z uporabo programov SPSS ver. 23 in Excel 2010.

Rezultati: Povprečna ocena znanja je znašala $3,01 \pm 1,18$, kar kaže na splošno slabo znanje; 58,0 % medicinskih sester je bilo razvrščenih v skupino s slabim znanjem. Povprečna ocena stališč je znašala $24,03 \pm 16,62$, kar kaže na zmerno izražena stališča. Statistično značilnih povezav med demografskimi značilnostmi medicinskih sester ter ocenami znanja ali stališč ni bilo ugotovljenih.

Diskusija in zaključek: Medicinske sestre so pokazale omejeno znanje in zmerno izražena stališča glede zdravstvene nege po operaciji na odprtem srcu. Za izboljšanje na dokazih temelječe pooperativne zdravstvene nege se priporoča stalno izobraževanje.



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Introduction

Coronary heart disease (CHD) is a common cardiovascular disorder characterised by the accumulation of atherosclerotic plaques within the arterial lumen. The resulting obstruction of blood flow leads to reduced oxygen supply to the myocardium. CHD is the primary aetiology of significant morbidity and mortality in the United States and worldwide (Shahjehan et al., 2024). It is estimated that by 2030, CHD will remain the most common cause of global mortality (Mousa & Mansour, 2020). Worldwide, about 63% of deaths resulting from chronic illness are related to cardiovascular disease (Rad et al., 2021). Cardiovascular disease can be treated surgically, pharmacologically, and through lifestyle changes such as not smoking, following a healthy diet, and engaging in regular exercise. Surgical treatment has increased in popularity despite being the most challenging treatment modality and showing a higher mortality rate in 2016, along with a greater prevalence of comorbidities (Lisboa Cordeiro et al., 2020).

One of the most important therapeutic strategies for cardiac disorders is open-heart surgery. Interventions such as heart transplantation, correction of congenital or acquired structural defects, myocardial revascularisation, and the use of implantable medical devices often require open-heart surgery. However, it is important to note that not every clinical scenario necessitates such surgical intervention; for example, certain valve repairs or replacements may now be performed using fewer invasive methods, including transcatheter procedures (Senst et al., 2022). Open-heart surgery involves opening the chest, and operating on the heart's muscles, valves, arteries, and other structures. This is a major procedure that requires hospitalisation, generally with a minimum postoperative hospital stay of one week (El-Gafour et al., 2021). Open-heart surgery includes cardiac valve procedures, aortic procedures, and coronary artery bypass graft (CABG) surgery (Abdel Sabour Gad et al., 2019). In high-income countries, an average overall cardiac surgical volume of 123.2 procedures per 100,000 individuals annually has been observed (36.7 CABG, 30.8 valvular surgeries, 7.9 congenital interventions). The unadjusted annual volume benchmarks per 100,000 individuals for low- and middle-income countries are as follows: 61.6 cardiac surgical procedures, 18.3 CABG, 15.4 valvular surgical interventions, and 4.0 congenital heart surgeries (Vervoort et al., 2024).

A nurse's role is to support continuity of care so that patients can focus on achieving better outcomes at lower cost, while maintaining patient safety and adhering to the highest standards of care (Ljungholm et al., 2022). Postoperative management of cardiac surgery patients can be challenging, as haemodynamic instability, arrhythmias, bleeding, infection, and respiratory dysfunction can develop or change rapidly (Battinji, 2019).

Postoperative nursing care following open-heart surgery requires continuous monitoring to prevent complications. This includes regular assessment of vital signs, particularly arterial blood pressure and peripheral pulses, continuous ECG monitoring, and evaluation of cardiac enzymes. Urine output, chest drainage, and body temperature must be closely monitored. Mechanical ventilation is maintained until independent breathing is achieved, and fluid and electrolyte balance is carefully managed. Pain control is essential during the first 24 to 72 hours, with monitoring for side effects. Daily weight and signs of haemorrhage are also important indicators during recovery (Dressler, 2022).

The primary purpose of this study was to address regional gaps in the scientific literature. According to Elateif (2017), nurses caring for cardiac patients require a solid theoretical foundation in the principles of cardiac patient care. This study is important both regionally and globally, as it addresses a significant gap in the literature on nurses' knowledge and attitudes towards postoperative care following open-heart surgery — an area critical to improving patient outcomes and enhancing the quality of cardiovascular care. Therefore, the main objective of this study was to evaluate nurses' knowledge and attitudes regarding postoperative open-heart surgery nursing care.

Aims and objectives

The purpose of the study was to evaluate nurses' knowledge and attitudes regarding patient care after open-heart surgery. Its specific aims were to: (1) assess the level of nurses' knowledge; (2) assess the level of nurses' attitudes; and (3) explore the relationship between knowledge and attitude scores and relevant demographic characteristics.

What are nurses' knowledge levels and attitudes regarding nursing care for patients following open-heart surgery, and how are these associated with their demographic characteristics?

Method

A quantitative descriptive cross-sectional design was used. The study was conducted at AL-Nasiriyah Heart Centre, Iraq, a specialised heart centre providing care for adult patients requiring cardiac surgery and intensive postoperative management. This design was selected as it enabled the description of nurses' attitudes and current levels of knowledge, and allowed examination of associations with demographic variables at a single point in time.

Description of the research instrument

Data were collected using a researcher-developed questionnaire, with items constructed on the basis

of a comprehensive review of clinical guidelines and the existing literature on post-cardiac surgery nursing care (e.g. Dressler, 2022). This self-administered questionnaire comprised two parts. The first part included demographic questions on age, gender, education level, years of nursing experience, and years of experience at the heart centre. The second part was divided into two domains. The knowledge domain consisted of 10 multiple-choice questions related to postoperative nursing care following open-heart surgery. Correct answers were assigned 1 point, and incorrect answers 0 points, yielding total scores ranging from 0 to 10. The authors classified scores of 1–3 as poor knowledge, 4–6 as moderate knowledge, and 7–10 as good knowledge. The attitude domain comprised 14 items covering key aspects of postoperative nursing care, such as electrocardiographic monitoring, airway maintenance, and other routine postoperative interventions. A three-point response format was used, and total attitude scores were classified as poor (1–14), moderate (15–28), or good (29–42). A panel of seven experts evaluated content validity. Reliability testing showed acceptable internal consistency, with Cronbach's alpha values of 0.78 for the knowledge domain and 0.82 for the attitude domain.

Description of the research sample

The target population consisted of nurses working in the AL-Nasiriyah Heart Centre intensive care unit. A non-probability purposive sampling method was used to select nurses directly involved in postoperative care following open-heart surgery. A total of 50 nurses participated in the study. Inclusion criteria were employment in the ICU, willingness to participate

in the study, and possession of one of the following educational qualifications: nursing middle school, nursing institute, college of nursing, or postgraduate nursing education. Nurses working outside the ICU and those who declined to participate were excluded. All questionnaires distributed were returned and analysed, resulting in a 100% response rate.

Description of the research procedure and data analysis

Data collection was conducted from 25 June to 21 August 2023. Eligible nurses were informed of the purpose of the study and invited to participate voluntarily. After informed consent was obtained, the questionnaire was administered at the study site. Data were analysed using SPSS version 23 and Excel 2010. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarise the variables. Ordinal regression analysis was performed to examine the association between demographic characteristics and the knowledge and attitude outcomes. Statistical significance was set at $p < 0.05$.

Results

All 50 participants completed the questionnaire, resulting in a 100% response rate. The mean age of participants was 26.82 ± 3.02 years, with the majority (39 participants, 78.0%) aged 25–30 years. In terms of gender distribution, 39 participants (78.0%) were female and 11 (22.0%) were male. Educational levels varied, with 22 participants (44.0%) holding a degree from the College of Nursing. Most participants had 4–6

Table 1: Nurses' demographic characteristics

Variables	Categories (n = 50)	n	%
Age (year)	< 25	7	14.0
	25–30	39	78.0
	31–35	2	4.0
	> 35	2	4.0
	Mean $\pm$ SD	26.82 $\pm$ 3.02	
Gender	Male	11	22.0
	Female	39	78.0
Level of education	Nursing middle school	5	10.0
	Nursing institute	18	36.0
	College of nursing	22	44.0
	Postgraduate	5	10.0
Years of experience in nursing	1–3 years	2	4.0
	4–6 years	26	52.0
	7–10 years	22	44.0
Years of experience at the heart centre	1–3 years	1	2.0
	4–6 years	32	64.0
	7–10 years	17	34.0

Legend: n - sample size; % - percentage; SD - standard deviation

years of nursing experience (26 participants, 52.0%) and experience at the Heart Centre (32 participants, 64.0%). These characteristics are presented in Table 1.

The mean knowledge score was 3.01 ± 1.18 , indicating a poor overall level of knowledge, and the attitude was moderate, with a mean score of 24.03 ± 16.62 , as shown in Table 2.

All 50 respondents (100%) consistently placed the patient on the monitor, monitored vital signs, ensured cannula patency, administered prescribed medications, and used aseptic techniques when changing dressings. Additionally, 45 respondents (90%) monitored ECG for cardiac arrhythmias, and 46 respondents (92%) monitored arterial blood gases. A total of 31 respondents (62%) monitored heart enzymes, while 40 respondents (80%) monitored the colour of the lips, limbs, and nails for signs of bluishness. Mechanical ventilation was maintained by 44 respondents (88%) until the patient could breathe independently. Deep breathing and coughing exercises were encouraged by 31 respondents (62%), and fluid balance was maintained by all 50 respondents (100%). Pain levels were monitored by 22 respondents (44%), and signs of infection by 30 respondents (60%), as shown in Table 3.

Knowledge assessment revealed significant gaps: 29 respondents (58.0%) incorrectly answered how often blood pressure should be measured post-operatively, and 41 respondents (82.0%) did not know the correct frequency 24 hours after surgery. Only 8 respondents (16.0%) correctly identified the preferred peripheral artery for pulse measurement. A total of 41 respondents (82.0%) answered the urine output measurement frequency question incorrectly, and 36 respondents (72.0%) did not know the expected chest tube drainage amount. Notifying the doctor about weight increase was correctly answered by 11 respondents (22.0%). Overall, 24 respondents (48.0%) provided correct responses for temperature measurement, while only 8 respondents (16.0%) knew the proper head positioning post-surgery. ECG frequency was known by 12 respondents (24.0%), and 34 respondents (68.0%) correctly answered the frequency of monitoring body fluids, as shown in Table 4.

Ordinal regression analysis found no statistically significant associations between demographic variables and knowledge or attitude scores. For both outcomes, all reported p-values were greater than 0.05, as shown in Table 5.

Table 2: Distribution of nurses' knowledge and attitudes regarding nursing care for patients after open-heart surgery

Category	Level	n	%
Knowledge	Poor	29	58.0
	Moderate	20	40.0
	Good	1	2.0
	Mean $\pm$ SD	3.01 ± 1.18	

Legend: n – number; % – percentage; SD – standard deviation

Table 3: Frequency and percentage of nurses' responses to attitude questions on postoperative nursing care

Attitude questions	Yes		No		No answer	
	F	%	F	%	F	%
I place the patient on the monitor.	50	100.0	0	0.0	0	0.0
I monitor the patient's vital signs.	50	100.0	0	0.0	0	0.0
I ensure patency of the cannula.	50	100.0	0	0.0	0	0.0
I monitor the ECG to detect any cardiac arrhythmia.	45	90.0	2	4.0	3	6.0
I monitor heart enzyme levels.	31	62.0	16	32.0	3	6.0
I monitor the colour of the lips, limbs, and nails to ensure there is no bluish discolouration of the skin.	40	80.0	8	16.0	2	4.0
I maintain mechanical ventilation until the patient can breathe independently.	44	88.0	0	0.0	6	12.0
I monitor arterial blood gases.	46	92.0	4	8.0	0	0.0
I maintain the patient's airway health by teaching the patient deep-breathing and coughing exercises.	31	62.0	17	34.0	2	4.0
I maintain fluid balance by administering the prescribed fluids.	50	100.0	0	0.0	0	0.0
I administer the prescribed medications.	50	100.0	0	0.0	0	0.0
I monitor the patient's pain level.	22	44.0	26	52.0	2	4.0
I monitor for signs of infection.	30	60.0	18	36.0	2	4.0
I use aseptic technique when changing the dressing.	50	100.0	0	0.0	0	0.0

Legend: % – percentage; F – frequency

Table 4: Frequency and percentage of correct and incorrect responses to knowledge questions on postoperative nursing care

Knowledge questions	Incorrect answer		Correct answer	
	F	%	F	%
How often should blood pressure be measured after the patient leaves the operating room until their condition stabilises?	29	58.0	21	42.0
How often should blood pressure be measured 24 hours after surgery?	41	82.0	9	18.0
Which peripheral artery is preferred for measuring the pulse after surgery?	42	84.0	8	16.0
How often should urine output be measured?	41	82.0	9	18.0
What is the expected amount of chest tube drainage 4–6 hours after surgery?	36	72.0	14	28.0
At what weight increase within one week post-surgery should the doctor be notified?	39	78.0	11	22.0
How often should temperature be measured after surgery?	26	52.0	24	48.0
At what angle should the nurse position the patient's head four hours after surgery?	42	84.0	8	16.0
How often should an ECG be performed after surgery?	38	76.0	12	24.0
How often should the nurse monitor body fluids after surgery?	16	32.0	34	68.0

Legend: % - percentage; F - frequency

Table 5: Ordinal regression of factors affecting nurses' knowledge and attitude scores regarding nursing care for patients after open-heart surgery

Variables	Knowledge				Attitude			
	Estimate	p-value	95% CI		Estimate	p-value	95% CI	
			LB	UB			LB	UB
Age								
<25	-0.43	0.81	-3.39	3.07	-3.33	0.15	-7.90	1.24
25–30	-0.17	0.92	-3.54	3.20	-2.77	0.22	-7.21	1.67
31–35	-2.22	0.60	-4.22	3.63	-3.22	0.64	-6.34	1.39
>35	0 ^a	–	–	–	0 ^a	–	–	–
Gender								
Male	-1.16	0.13	-3.39	1.08	-0.71	0.50	-2.79	1.37
Female	0 ^a	–	–	–	0 ^a	–	–	–
Level of education								
Nursing middle school	1.01	0.46	-1.69	3.71	-0.20	0.91	-3.71	3.30
Nursing institute	0.45	0.72	-2.02	2.29	-1.90	0.24	-5.07	1.27
College of Nursing	-0.84	0.42	-2.88	1.12	-0.69	0.63	-3.45	2.08
Postgraduate	0 ^a	–	–	–	0 ^a	–	–	–
Years of experience in nursing								
1–3 years	0.76	0.42	-2.22	4.23	-0.18	0.93	-3.85	3.50
4–6 years	0.70	0.59	-1.83	3.23	0.77	0.52	-1.58	3.50
7–10	0 ^a	–	–	–	0 ^a	–	–	–
Years of experience at the heart centre								
1–3 years	2.24	0.43	-3.33	7.81	1.21	0.71	-5.05	7.45
4–6 years	0.05	0.97	-2.69	2.78	-1.57	0.24	-4.17	1.04
7–10 years	0 ^a	–	–	–	0 ^a	–	–	–

Legend: LB - lower bound; UB - upper bound. Significance was set at $p < 0.05$.

Discussion

This study aimed to assess nurses' knowledge and attitudes regarding nursing care after open-heart surgery and to examine the relationships between these variables and nurses' demographic characteristics. The results showed that approximately 58.0% of participants

had poor knowledge of postoperative open-heart surgery, while 72.0% had a moderate attitude towards nursing care after open-heart surgery. This suggests that, although nurses are generally aware of the importance of postoperative care, they may need to strengthen areas where their confidence, motivation, or perceptions could be improved through further training or support.

In Iraq, nursing care for patients after open-heart surgery is included in the undergraduate curriculum. Despite this, the overall mean knowledge score of 3.01 ± 1.18 indicates a generally poor level of knowledge among nurses, although a subset of participants demonstrated moderate knowledge. The discrepancy between nurses' positive attitudes and their limited knowledge suggests that, while nurses are willing to provide quality care, they may not have retained critical knowledge from their training or may lack opportunities for ongoing professional development in postoperative open-heart surgery care.

This variability highlights the need for targeted educational interventions that specifically address identified knowledge deficits while reinforcing nurses' existing competencies. It may also indicate a gap between the theoretical content delivered in the undergraduate curriculum and nurses' current retained knowledge, suggesting that the information was either insufficiently emphasised during training or inadequately reinforced in clinical practice. This result is consistent with a study conducted in Egypt (Mohamed et al., 2020), which found that nurses had a positive attitude towards postoperative nursing care. In contrast, El-Gafour et al. (2021) found that nurses had an unsatisfactory level of knowledge regarding postoperative nursing care. Similarly, Elateif (2017) reported that nurses had a low level of knowledge before the training programme. The findings indicate a potential gap in nursing education or professional development in Iraq, particularly in postoperative care for critically ill patients. Efforts should be made to strengthen nursing curricula or provide ongoing training to ensure nurses are equipped with the necessary knowledge to match their positive attitudes.

Regarding demographic characteristics, the majority of participants (78.0%) were aged 25–30 years, consistent with Elateif's (2017) findings. Due to the demanding nature of the work, many health agencies prefer to employ younger nurses in critical care units. The majority of the participants were female and held a Bachelor's degree in nursing, consistent with Omran's (2020) study. Most participants had 4–6 years of experience both in nursing and at the Heart Centre, in contrast to an Egyptian study where the majority had less than 2 years of experience (51.9%) (Sharaf Eldeen et al., 2022).

The results indicate no significant relationship between nurses' age, gender, educational level, or years of experience and their knowledge and attitude scores. The lack of significant relationships between demographic factors and nurses' knowledge or attitudes may indicate that factors such as age and experience do not play a major role in determining competency in this area, suggesting that specialised training programmes may be necessary to enhance knowledge across all groups. These findings align with Elateif (2017), who reported no significant relationship

between nurses' age and knowledge, but contrast with Sharaf Eldeen et al. (2022), who found significant associations between demographic characteristics and knowledge scores.

This study has several limitations. The small sample size limits the generalisability of the results. Additionally, the single-centre design limits the applicability of the findings to other settings or countries. The cross-sectional nature of the study prevents causal conclusions about the relationship between demographic factors and nurses' knowledge or attitudes. Furthermore, the use of a self-report questionnaire may introduce social desirability bias.

Despite these limitations, the findings suggest that healthcare institutions should implement structured, ongoing training programmes for ICU nurses to bridge the gap between theoretical knowledge and clinical practice in postoperative open-heart surgery care. Nurse educators should reassess how postoperative cardiac surgery content is delivered and reinforced within undergraduate nursing curricula. To fully understand the phenomenon under investigation, further research with larger, multi-centre, and multi-country samples is recommended.

Conclusion

This study revealed substantial knowledge gaps and moderate attitudes among ICU nurses regarding postoperative open-heart surgery nursing care. No statistically significant associations were found between nurses' knowledge scores and their sociodemographic characteristics. Undergraduate nursing curricula should emphasise care for patients undergoing open-heart surgery to improve nurses' knowledge and attitudes regarding their postoperative care. Continuing professional education is essential for maintaining and enhancing nurses' cardiac surgery care competencies throughout their careers.

Conflict of interest

None to declare.

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The study received no funding.

Ethical approval

The relevant institutional authorities, including the Thi-Qar Health Department and AL-Nasiriyah Heart Centre, granted permission to conduct the study. Participation was voluntary and anonymous. Participants were informed of their right to withdraw at any time without consequences. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Author contributions

Both authors contributed equally to the conception of the study, data collection and analysis, interpretation of the results, and preparation and revision of the manuscript.

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