

Article

Digital Object Identifier:
Received 30 March 2026
Accepted 7 May 2026
Available online 1 September 2026

Assessment of Critical Care Nurses' Knowledge and Practice in the Management of Cardiogenic Shock: A Cross-Sectional Study in Al-Mukalla hospitals, Yemen

Abdulla Saeed Abdulla Alhanshi*, Saba Saeed Salim Bahabara, Yehia Khamis Al Molem

Department of Nursing, Faculty of Nursing, Hadhramout University, Mukalla, Yemen.

Corresponding author: a.alhanahi@hu.edu.ye.

This is an open-access article under production of [Hadhramout University Journal of Natural & Applied Science](#) with eISSN 2790-7201

Abstract: Cardiogenic shock (CS) is a life-threatening complication of acute myocardial infarction that requires rapid recognition and coordinated critical care nursing. The study evaluates intensive care unit (ICU) nurses' knowledge and observed clinical practice in the management of CS in hospitals in Al Mukalla, Yemen. A descriptive cross-sectional study was conducted from February to June 2023 across six hospitals, involving a convenience sample of 200 ICU nurses who completed a 24-item knowledge questionnaire and were observed using a seven-step practice checklist. Data were analyzed using SPSS version 20, with Chi-square and ANOVA tests applied at a significance level of $\alpha = 0.05$. The results showed that 60% of nurses achieved a satisfactory knowledge score, while 84% demonstrated adequate observed practice. Knowledge was significantly associated with education level ($p = 0.007$), whereas practice was associated with education level ($p = 0.009$), years of experience ($p = 0.001$), and prior training ($p = 0.036$). The linear association between total knowledge and practice scores was weak ($R^2 = 0.016$). Overall, ICU nurses demonstrated strong practical competencies; however, gaps in theoretical knowledge, particularly regarding CS management, were identified. These findings highlight the need for targeted continuing education programs and standardized clinical protocols to enhance evidence-based care for patients with cardiogenic shock.

Keywords: Cardiogenic Shock; Clinical Practice; Intensive Care Units; Nursing Care; Yemen

1. Introduction

Cardiogenic shock (CS) results from severe cardiac dysfunction leading to inadequate tissue perfusion and remains a major cause of in-hospital mortality following acute myocardial infarction [1]. Early recognition and timely management—hemodynamic support, oxygenation, and definitive cardiac interventions—are essential to improve outcomes. Despite advancements in revascularization, hospital mortality remains high, ranging between 40–60% [2]. The incidence of CS originating from acute coronary syndrome (ACS) complications is about 4–12%, which is divided into 30–40% at the time of admission and 60–70% during hospitalization [3]. Current clinical criteria for CS diagnosis include: Systolic Blood Pressure (SBP) <90 mm Hg for >30 minutes. Cardiac Index (CI)

<2.2 L/min/m². Pulmonary Capillary Wedge Pressure (PCWP) >15 mmHg. Signs of hypo perfusion: oliguria (<30 mL/hr), altered mental status, and elevated lactate (>2 mmol/L) [4].

Nurses in ICUs are central to early dehnicaltion, hemodynamic monitoring, and initiation of supportive measures, they must have a good scientific background about the profession and details related to coronary artery disease and critical care in order to identify patients problems and to which make the proper decision for intervention [5]. Gaps in theoretical knowledge and variability in clinical practice have been reported in multiple settings. This study assesses ICU nurses' knowledge and observed practice related to CS care in Al-Mukalla, Yemen,

and examines associations with demographic and professional factors.

2. Methodology

2.1 Design and setting

Descriptive cross-sectional study conducted in ICUs of six hospitals in Al-Mukalla (Ibn Sina, Al-Mukalla Hospital, University Teaching Hospital, Al-Arab Hospital, Nabd Al Hayah, Hadhramout Hospital) between February and June 2023.

2.2 Participants

Convenience sample of **200** ICU nurses. Inclusion criteria: currently employed in an ICU and consenting to participate. Exclusion: administrative refusal at one hospital (Al-Borj).

2.3. Instruments

(A) Knowledge questionnaire: 24 items covering definition, causes, signs/symptoms, risk factors, and management. Investigator cut-offs: >70% = satisfactory; 60–70% = good; <60% = poor.

(B) Practice checklist: Seven observed procedures: oxygen administration, IV cannulation, distal pulse monitoring, blood pressure measurement, preparation for endotracheal intubation, central venous pressure (CVP) measurement, and ECG monitoring.

Table 1. Participant demographics (n = 200)

Variable	n	%
Age 20–30 years	123	61.5
Age 31–40 years	77	38.5
Male	134	67.0
Female	66	33.0
Single	90	45.0
Married	103	51.5
Divorced	7	3.5
Bachelor of Nursing	144	72.0
Nursing diploma	50	25.0
Technical Nursing Institute	6	3.0
<2 years experience	42	21.0
2–4 years experience	62	31.0
5–9 years experience	50	25.0
≥10 years experience	46	23.0
Attended cardiac training (Yes)	97	48.5
Attended cardiac training (No)	103	51.5

2.4 Data collection

Self-administered questionnaire followed by direct observation using the checklist. Observers used a standardized form and recorded “Done,” “Incomplete,” or “Not done.”

2.5 Statistical analysis

Data were entered into SPSS version 20. Descriptive statistics summarized sample characteristics and item responses. Associations between categorical variables and knowledge/practice levels were tested with Chi-square; ANOVA was used where appropriate. Significance threshold set at $p < 0.05$. The relationship between total

knowledge and total practice scores was assessed using linear regression (reported R^2).

2.6. Ethical considerations

The research proposal was approved by the Ethical Committee in the Faculty of Nursing. There is no risk to nurses during the application of the study. The study followed common ethical principles in clinical research. Confidentiality and anonymity were assured. Nurses and patients have the right to refuse to participate and or withdraw from the study without any reason at any time. Nurses' privacy was considered during the collection of data.

3. Results

3.1 Participant characteristics

Table (1) summarizes demographic and professional characteristics. The majority were aged 20–30 years (61.5%), male (67%), and held a Bachelor of Nursing (72%). 48.5% reported prior cardiac-specific training.

3.2 Knowledge assessment

Overall, 60% of nurses scored in the satisfactory range on the knowledge instrument. Table 2 shows item-level responses: the highest correct response rate was for the definition of CS (96.5%), while the lowest was for management of CS (66.3%).

Table 2. Knowledge item responses (n = 200)

Item	Yes n (%)	No n (%)	Incomplete n (%)
Definition of cardiogenic shock	193 (96.5)	4 (2.0)	6 (3.0)
Causes of cardiogenic shock	140 (70.0)	25 (12.5)	35 (17.5)
Signs and symptoms	165 (82.5)	21 (10.5)	14 (7.0)
Risk factors	146 (73.0)	28 (14.0)	26 (13.0)
CS more common with MI	171 (85.5)	17 (8.5)	12 (6.0)
Arrhythmia involvement	161 (80.5)	13 (6.5)	26 (13.0)
Management of CS	133 (66.5)	33 (16.5)	34 (17.0)

3.3. Observed practice

Observed practice was adequate in 84% of nurses. High adherence was observed for distal pulse monitoring (91%) and CVP measurement (89%); the lowest adherence was for ECG monitoring (69.5%) (Table 3).

3.4 Associations

Knowledge level was significantly associated with education level ($\chi^2 = 7.292$; $p = 0.007$). Practice level was significantly associated with education ($p = 0.009$), years of experience ($p = 0.001$), and prior training ($p = 0.036$). No significant associations were observed for gender or age. The linear regression between total knowledge and total practice scores yielded $R^2 = 0.016$, indicating a weak positive relationship, as shown in Figure 1.

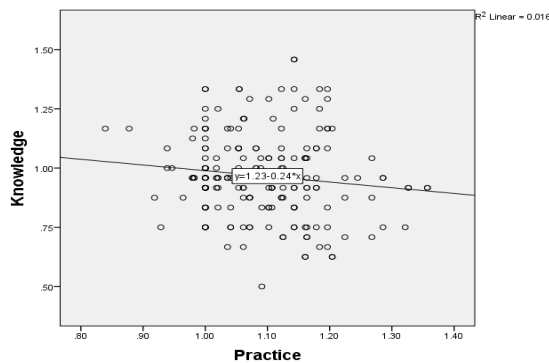


Figure1. The linear regression between total knowledge and total practice scores

Table 3. Observed practice items (n = 200)

Practice step	Done n (%)	Incomplete n (%)	Not done n (%)
Monitor distal pulse	182 (91.0)	14 (7.0)	4 (2.0)
Administer nasal oxygen	167 (83.5)	26 (13.0)	7 (3.5)
Hemodynamic monitoring	166 (83.0)	29 (14.5)	5 (2.5)
IV cannulation	175 (87.5)	19 (9.5)	6 (3.0)
Prepare for endotracheal intubation	178 (89.0)	12 (6.0)	10 (5.0)
Measure CVP	179 (89.5)	16 (8.0)	5 (2.5)
ECG monitoring	139 (69.5)	17 (8.5)	44 (22.0)

4. Discussion

Cardiogenic shock is the most common cause of death in patients hospitalized with acute myocardial infarction and is associated with a poor prognosis. More than 75% of cases are due to extensive left ventricular infarction and ventricular failure. To improve outcomes, cardiogenic shock needs to be recognized early in its course and its cause needs to be diagnosed rapidly. [6]. . Demographics: The dominance of male nurses (67%) and younger age groups (20–30 years) reflects the local workforce composition in high-stress ICU environments, consistent with regional studies [7]. This study identified a discrepancy between theoretical knowledge and observed clinical practice among ICU nurses in Al-Mukalla: while practical skills were generally strong, knowledge—particularly regarding CS management—was only moderate. High performance on basic recognition items (definition, signs) suggests that nurses can identify CS, but lower scores on management items indicate gaps in understanding of therapeutic priorities and advanced interventions.

The weak correlation observed between overall knowledge and practice scores in this study ($R^2 = 0.016$) suggests that while nurses may demonstrate strong practical competencies, these skills are not always underpinned by robust theoretical knowledge. This discrepancy has been noted in other regional studies, where practical exposure and teamwork in critical care units compensated for gaps in formal knowledge [5]. Such findings underscore the importance of structured continuing education programs and

standardized protocols to bridge the gap between theory and practice.

Table 4a. Correlation between Nurses' Knowledge and Socio-Demographic Data (Study Sample n=200)

Socio-demographic variable	Good Knowledge (n=120)	Poor Knowledge (n=80)	X ²	P-value
Gender	Male: 80 (66.7%) Female: 40 (33.3%)	Male: 54 (67.5%) Female: 26 (33.0%)	0.015	0.902
Age	20–30 years: 73 (60.8%) 31–40 years: 47 (39.2%)	20–30 years: 50 (62.5%) 31–40 years: 30 (37.5%)	0.056	0.812
Marital Status	Single: 52 (43.3%) Married: 63 (52.5%) Divorced: 5 (4.2%)	Single: 38 (47.5%) Married: 40 (50.0%) Divorced: 2 (2.5%)	0.624	0.732

The present study demonstrated that ICU nurses' knowledge of cardiogenic shock was significantly associated with their educational attainment, with bachelor's degree holders outperforming diploma graduates. This finding is consistent with prior studies conducted in Iraq, which reported that nurses with higher academic qualifications exhibited superior theoretical knowledge in managing cardiogenic shock (Table 4a and 4b), while demographic variables such as gender and age had minimal impact [7],[8]. Similarly, research from Mosul highlighted that both education level and years of employment positively influenced knowledge and practice, whereas training sessions alone did not yield significant improvements [5].

(A) Interpretation and implications.

The significant associations of practice with education, experience, and training underscore the value of formal education and targeted continuing professional development. The weak knowledge–practice correlation suggests that practical competence may be supported by on-the-job routines and supervision, but that deeper theoretical understanding is necessary for complex decision-making and for adapting care when protocols are absent or when patients present atypically.

(B) Comparison with prior studies.

Findings align with regional reports that document variable knowledge and stronger procedural skills among ICU nurses. Differences across studies may reflect variations in curricula, availability of in-service training, and exposure to high-acuity cases [8–10].

(C) Limitations

Convenience sampling limits generalizability beyond Al-Mukalla. The knowledge instrument used investigator-defined cutoffs and lacked formal psychometric validation. Observational

assessments may be subject to the Hawthorne effect. The cross-sectional design precludes

causal inference and the study did not link nurse competency to patient outcomes.

Table 4b. Correlation between Nurses' Knowledge and Educational/Occupational Characteristics (Study Sample n=200)

Educational/Occupational variable	Good Knowledge (n=120)	Poor Knowledge (n=80)	X ²	P-value
Education Level	Bachelor: 78 (65.0%) Diploma: 42 (35.0%)	Bachelor: 68 (82.5%) Diploma: 14 (17.5%)	7.292	0.007*
Occupational Experience	<2 years: 22 (18.3%) 2–4 years: 38 (31.7%) 5–9 years: 28 (23.3%) >10 years: 32 (26.7%)	<2 years: 20 (25.0%) 2–4 years: 24 (30.0%) 5–9 years: 22 (27.5%) >10 years: 14 (17.5%)	3.146	0.370
Training	Yes: 53 (44.2%) No: 59 (49.2%) Don't remember: 8 (6.7%)	Yes: 30 (37.5%) No: 44 (55.0%) Don't remember: 6 (7.5%)	0.879	0.644

5. Conclusion

ICU nurses in Al-Mukalla demonstrate generally adequate observed practice in CS care but have moderate theoretical knowledge, particularly regarding management strategies. Strengthening theoretical training and implementing standardized CS protocols are recommended to align knowledge with practice and to support high-quality patient care.

6. Recommendations

1. Implement structured, mandatory in-service training focused on CS pathophysiology, hemodynamic management, and advanced monitoring.
2. Develop and disseminate standardized clinical protocols for CS care across hospitals to reduce practice variability.
3. Promote advanced education and ICU certification for nurses to enhance theoretical foundations and clinical decision-making.
4. Conduct multicenter, longitudinal research linking nurse competency to patient outcomes and using validated assessment instruments.

Acknowledgements

The authors thank the participating hospitals and nurses for their cooperation and the observers who assisted with data collection.

References

[1] McDonagh TA, Metra M, Adamo M, et al. (2021) ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). With the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur J Heart Fail.*;24:4–131.

- [2] Chioncel O, Parissis J, Mebazaa A, et al. (2020) Epidemiology, pathophysiology, and contemporary management of cardiogenic shock: a position statement from the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail.*;22:1315–1341.
- [3] Vahdatpour C, Collins D, Goldberg S. Cardiogenic shock. (2019) *J Am Heart Assoc.*;8(8):e011991.
- [4] Vallabhajosyula S, Ya'Qoub L, Singh M, et al. (2021) Response by Vallabhajosyula to letter regarding article, "Sex disparities in the management and outcomes of cardiogenic shock complicating acute myocardial infarction in the young." *Circ Heart Fail.*; 14:e007154.
- [5] Taib A, Mohamed J, Al-Samady A. (2018) Assessment of nurses knowledge and practices concerning cardiogenic shock. *Mosul J Nurs.*;6(2):87–97.
- [6] Topalian S, Ginsberg F, Parrillo JE. (2008) Cardiogenic shock. *Crit Care Med.*;36(suppl):S66–S74.
- [7] Al-Ganmi A. (2014) Assessment of nurses' knowledge concerning cardiogenic shock for patients in cardiac care unit at Baghdad hospitals. *Kufa J Nurs Sci.*;4(2):215–222.
- [8] Hussein A, Hassan H. (2016) Effectiveness of educational program on nurse's knowledge concerning management of cardiogenic shock at Al-Mosul Teaching Hospitals. *Kufa J Nurs Sci.*;6(1):154–162.
- [9] Sambu B. (2018). Effect of a training program on nurses' knowledge, attitudes and practice regarding nursing care of acute myocardial infarction in Medani Heart Center and Wad Medani Emergency Hospital, Gezira State, Sudan (2014–2017) [Doctoral dissertation]. University of Gezira;
- [10] Mohamed A, Abd-Alziz M, Ahmed A, Ahmed N. (2020) Assessment of nurses' knowledge and practices regarding care for patients with cardiogenic shock.;8(20):55–63.

تقييم مستوى المعرفة والممارسة لدى مرضي وحدات العناية الحرجة في إدارة الصدمة القلبية في مستشفيات مدينة المكلا - اليمن

المخلص: تُعدّ الصدمة القلبية من أخطر المضاعفات المرافقة للاحتشاء الحاد لعضلة القلب، إذ تستلزم سرعة التشخيص والتدخل التمريضي المنسق في وحدات العناية الحرجة. يستهدف هذه الدراسة تقييم مستوى المعرفة والممارسة السريرية الملاحظة لدى مرضي وحدات العناية المركزة في إدارة الصدمة القلبية في مستشفيات مدينة المكلا - اليمن. أُجريت دراسة وصفية مقطعية خلال المدة من فبراير حتى يونيو 2023 في ست مستشفيات. شملت الدراسة عينة ملائمة مكونة من (200) ممرض/ة في وحدات العناية المركزة، حيث استُخدم استبيان مكون من 24 بنداً لقياس المعرفة، إضافة إلى قائمة مراجعة مكونة من سبع خطوات لرصد الممارسة العملية. جرى تحليل البيانات باستخدام برنامج SPSS الإصدار 20، مع تطبيق اختبار مربع كاي (Chi-square) وتحليل التباين (ANOVA) عند مستوى دلالة إحصائية ($\alpha = 0.05$). أظهر 60% من الممرضين مستوى معرفة مرضي، فيما بلغت نسبة الممارسة العملية الكافية 84%. وُجد ارتباط دال إحصائياً بين المعرفة والمستوى التعليمي ($p = 0.007$) كما ارتبطت الممارسة بمستوى التعليم ($p = 0.009$)، سنوات الخبرة ($p = 0.001$)، والتدريب السابق ($p = 0.036$). أما العلاقة الخطية بين مجموع درجات المعرفة والممارسة فكانت ضعيفة). رغم قوة الكفايات العملية لدى مرضي وحدات العناية المركزة، إلا أنّ هناك فجوات ملحوظة في المعرفة النظرية، خصوصاً فيما يتعلق بإدارة الصدمة القلبية. توصي الدراسة بتعزيز برامج التعليم المستمر الموجهة، وتطبيق بروتوكولات معيارية موحدة لتحسين جودة الرعاية. الكلمات المفتاحية: الصدمة القلبية؛ الرعاية التمريضية؛ المعرفة؛ الممارسة السريرية؛ وحدات العناية المركزة؛ اليمن