Knowledge, attitude, and practice of Palestinian critical care nurses about hemodynamic instability in patients with cardiovascular diseases

Hamza Abu Farah[1] and Mohamad Khleif[1*]

Abstract

Background Managing hemodynamic instability in critically ill patients due to cardiovascular disease or, in particular, coronary artery disease requires an integrated and responsive approach. The complexity lies in simultaneously addressing the underlying cardiovascular pathology and managing its systemic effects. The complexity described above involves a careful balance of interventions, including fluid and electrolyte management, pharmacological support, and, in some cases, mechanical circulatory support. The dynamic nature of hemodynamic instability necessitates constant vigilance and rapid adaptation of treatment strategies to align with the evolving clinical picture. So, this study aims to investigate the knowledge, attitude, and practice of Palestinian critical care nurses about hemodynamic instability in patients with cardiovascular diseases.

Method A cross-sectional design was conducted on 300 nurses in 30 hospitals in the West Bank and East Jerusalem of Palestine. Data were collected using a self-administered questionnaire composed of four sections covering the socio-demographics, knowledge, attitudes, and practices of the sample. Quantitative statistical analysis was done using Statistical Package for Social Sciences (SPSS) software.

Results The nurses demonstrated an almost low overall level of knowledge about hemodynamic instability, with a mean score of 2.7 on a 7-points scale. Additionally, nurses generally expressed a high positive attitude toward their practice, with a mean score of 3.8 on a 5-point scale. Although; Palestinian nurses showed a low level of knowledge about hemodynamic instability but expressed positive attitudes toward their practice. The practice level was also moderate with a mean score of 2.3 on a 5-point scale. Significant differences were found with a higher attitude of male nurses and higher knowledge with bachelor or higher educational levels. Other variables showed non-significant differences.

Conclusions Several challenges were identified, including lack of training and resources, within this study context. Educational interventions and improved access to resources could improve nurses' knowledge and practice in managing hemodynamic instability.

*Correspondence:
Mohamad Khleif
m.khleif@paluniv.edu.ps
Full list of author information is available at the end of the article

Background

Coronary artery disease is particularly significant among the various conditions under the umbrella of cardiovascular diseases (CVDs). It is primarily caused by plaque buildup in the coronary arteries, leading to heart attacks and chronic heart conditions [1]. Coronary artery disease is a significant contributor to cardiovascular mortality and can result in long-term health complications. Another critical condition is heart failure, where the heart loses its ability to pump blood effectively. Often a result of cumulative damage from CVDs or hypertension, heart failure leads to debilitating symptoms and a high rate of mortality [2]. Arrhythmias, or irregular heartbeats, represent another facet of CVDs. Conditions like atrial fibrillation can lead to severe complications, including stroke or sudden cardiac death.

The relationship between CVDs and stroke is particularly noteworthy, as strokes often result from problems in the blood vessels supplying the brain and can cause significant disability [3], So a combination of lifestyle factors, demographic changes, and increasing prevalence of risk factors further exacerbates the global burden of CVDs. Hypertension, diabetes, and obesity are among the most significant risk factors contributing to the development and progression of cardiovascular diseases [4]. These conditions are often influenced by lifestyle choices such as diet, physical activity, and smoking habits. Additionally, the ageing population contributes to the rising prevalence of CVDs, as the risk of developing these conditions increases with age [5].

Critically ill patients with cardiovascular diseases are notably prone to developing hemodynamic instability, a state characterized by the heart and vasculature's inability to maintain adequate blood flow and oxygen delivery. This instability often manifests as acute and significant changes in blood pressure, heart rate, and cardiac output [6]. The ramifications of such instability are severe, as they can precipitate a cascade of organ dysfunctions, potentially leading to organ failure. For instance, a decrease in cardiac output may result in renal hypoperfusion and subsequent acute kidney injury. At the same time, insufficient cerebral perfusion can lead to altered mental states or even ischemic events [7].

Managing hemodynamic instability in critically ill patients due to CVDs or coronary artery disease requires an integrated and responsive approach. The complexity lies in simultaneously addressing the underlying cardiovascular pathology and managing its systemic effects [8]. The complexity described above involves a careful balance of interventions, including fluid and electrolyte management, pharmacological support, and, in some cases, mechanical circulatory support. The dynamic nature of hemodynamic instability necessitates constant vigilance and rapid adaptation of treatment strategies to align with the evolving clinical picture [9].

Moreover, the management strategy is influenced by the patient's overall health status, pre-existing comorbidities, and the specific etiology of the instability. This complexity underscores the importance of a multidisciplinary approach in critical care settings, where cardiology, critical care medicine, nursing, and pharmacy expertise converge to optimize patient outcomes [10]. Healthcare research, especially in the field of cardiovascular diseases (CVDs) and hemodynamic instability, has historically concentrated on medical and pharmacological interventions. This focus is likely due to the critical nature of CVDs, where timely medical interventions, such as the use of medications to stabilize heart function or surgical procedures to correct underlying issues, are often vital to patient survival [11].

These studies provide invaluable insights into the efficacy of various treatments and drugs. However, a noticeable scarcity of research delves into the critical role of nursing in this domain, especially in regions like Palestine [12]. This gap is significant because nurses are often the primary caregivers in critical care settings, where they play a pivotal role in monitoring and managing patients with hemodynamic instability, in addition to nursing care extends beyond medication administration and routine patient management. It involves a holistic approach encompassing continuous monitoring, early identification of complications, patient education, and emotional support. Nurses are also responsible for implementing care plans tailored to individual patient needs, considering their unique medical histories and the challenges their cardiovascular condition poses. This comprehensive approach is vital in managing hemodynamic instability but is often underrepresented in the current literature.

Aim of the study

The study aims to investigate the knowledge, attitude, and practice of Palestinian critical care nurses about hemodynamic instability among critically ill patients with cardiovascular diseases.

Significance of the study

This study is pivotal in enhancing the quality of nursing care for critically ill patients with cardiovascular diseases in Palestine. Focusing on managing hemodynamic instability, a crucial aspect of CVDs patient care aims

to identify effective nursing practices that could lead to improved patient outcomes. On the other hand, the outcomes of this research can potentially directly inform healthcare policies and practices in Palestine, specifically and more generally on the region, by shedding light on the current approaches and challenges in nursing care for hemodynamically unstable CVDs patients. These steps would ultimately lead to a more efficient healthcare system equipped to provide high-quality care to critically ill patients [13]. However, given the lack of extensive research in nursing management for hemodynamic instability among CVDs patients, particularly in the Palestinian context [14]. This study is set to bridge a significant gap in nursing research and enrich the existing body of knowledge in nursing and critical care.

This study emphasizes the importance of patient-centered care by trying to understand the effectiveness of different nursing approaches and perspectives in dealing with hemodynamic instability. Tailored care strategies that address the specific needs of CVDs patients can significantly improve their engagement, satisfaction, and overall health outcomes, marking a shift towards more personalized healthcare [15]. In addition, while centered on the Palestinian healthcare system, the findings of this study will be valuable to the global healthcare community. The insights regarding nursing care in a challenging and resource-limited setting can offer lessons and strategies applicable in similar contexts worldwide, particularly in regions facing comparable healthcare challenges. Additionally, it aligns with global efforts towards sustainable healthcare development, emphasizing the need for quality care, informed policy-making, and adequate training in the health sector [16].

Methods

Design
The research design for this study is a descriptive analytical cross-sectional survey. This design was chosen to provide a comprehensive understanding of the nursing perspectives toward hemodynamic instability in critically ill patients with cardiovascular diseases. It is also less time-consuming and less expensive.

Study settings
The study was conducted in 30 governmental and private hospitals across the whole West Bank and East Jerusalem of Palestine, to ensure a comprehensive representation of the nursing body in different healthcare settings and geographical areas. The study aimed to capture diverse perspectives and practices by including both types of hospitals.

Sample and sampling procedure
The study was done using a convenient sample of 300 critical care nurses out of all those who work in the thirty hospital settings included in the study, who are estimated to be around 800 nurses (based on personal communication of researcher with those settings). The target sample inclusion criteria were nurses who are on full-time work in critical care departments in the selected settings, and who provide direct care to CVDs patients.

Data collection and tool
The data collection period for this study was between the 1st of January to the 31st of March 2024. The structured questionnaires, specifically designed for this research by the research team based on thorough literature review and experts' validation, served as the primary tool for data collection (an English version of the questionnaire is available as supplementary file with this manuscript). The questionnaire validation process included thorough literature review of related researches and designs to study the professionals' knowledge, attitude and practice, then the designed questions were sent to 4 experts in the fields of critical care nursing, critical care medicine, critical care nursing research and research methodology, respectively. Those experts were selected based on their specialty and expertise in the field of critical care and research in health. This validation process conducted by the research team and the experts review ensured validity of the tool. Even though, this is still a limitation of the study tool as more psychometric analysis will be needed for more validity and wider use of such tool.

The study tool comprised of the following sections; first, demographic information of participants including age, gender, educational level, years of experience in nursing, years of experience in critical care units and reception of training in managing hemodynamic instability. Second, knowledge of nurses of hemodynamic instability including 8 multiple choice questions such as "Which symptom is least likely associated with hemodynamic instability in cardiovascular patients?" and "What is a common cause of hemodynamic instability in heart failure patients?". Third, attitude of nurses including five items with a 5-point Likert scale (from strongly disagree to strongly agree), inquiring attitude for items such as "perceived confidence in skills" and "Value of Evidence-Based Practice". Forth, practice of nurses including a 5-point Likert scale (from never to always used), asking about actual practices by nurses, which asked about 8 different practices such as "adherence to established protocols" and "timely identification and assessment".

The reliability of the questionnaire was assessed using Cronbach's alpha coefficient. This coefficient is a measure of internal consistency, indicating how closely related the items in the questionnaire are to each other. A value of

0.85 was obtained, which suggests good reliability. This indicates that the items in the questionnaire are consistent in measuring the intended constructs.

The questionnaires were distributed to nurses working in the Intensive Care Units (ICUs) in the selected hospitals. Contacts with department heads were done in order to enhance reachability to each participant, either by direct distribution of questionnaires to critical care nurses or by reaching out for them over their phones and sending them a copy to fill back. Completed questionnaires were subjected to thorough review to ensure completeness and accuracy of the data. Following the collection of responses, the data was meticulously reviewed and compiled. Any discrepancies or missing information were addressed through follow-up communication with participants on spot.

Statistical analysis

The data analysis for this study was conducted using SPSS (version 23). The significance of differences in percentages was tested. Statistical significance was considered when the p-value was equal to or less than 0.05. These inferential statistics allowed for exploring potential relationships and differences in nursing perspectives based on specific variables of interest. Distribution means and standard deviations were exhibited in the analysis. To confirm the existence of any statistically significant differences, variance tests (F- test and t-test) were used. Normality was substituted by the large sample size.

Table 1 Distribution of sociodemographic characteristics for study participants

N = 300		Frequency	Percentage
Gender	Male	184	61.3%
	Female	116	38.7%
	Total	300	100%
Education Level	Bachelor's Degree	254	84.7%
	Diploma (2 years)	6	2.0%
	Master's Degree	40	13.3%
	Total	300	100%
Age group	31 years and less	185	61.7%
	more than 31 years	115	38.3%
	Total	300	100%
Years of Professional Experience in Nursing	7 years and less	173	58.4%
	more than 7 years	127	41.6%
	Total	300	100%
Years worked in intensive care units	7 years and less	233	79.0%
	more than 7 years	67	21.0%
	Total	300	100%
Reception of specific training in managing hemodynamic instability	No	221	73.7%
	Yes	79	26.3%
	Total	300	100%

N = sample size

Ethical consideration

All required ethical approvals were met. IRB approval was taken for this study from the ethical committee at the Palestine Ahliya University. Further permissions to access included settings were taken from each corresponding hospital in the study. Consent of participants to participate was approved by them prior to start. All data collection reserved anonymity. Samples can terminate their involvement in the study at any time.

Results

General characteristics of participants

The mean- age for the participants is 29.1 years, and 185 participants (61.7%) aged less than 31 years old. Females in the sample were 116 (38.7%), and large number of it (254) has a bachelor's degree (84.7%), while 40 nurses (13.3%) have a master's degree. The sample distribution concerning clinical background shows that the mean of the years of professional experience in nursing is 7.9 years, while years worked in intensive care units have a mean of 5 years. A large number of the sample, 173 (58.4%), has seven years or less of overall experience. This trend is even more pronounced in the ICU-specific experience, where 79% of participants have seven years or less of experience. Most participants (73.7%) did not receive training on managing hemodynamic instability, as seen in Table 1.

Nurses' knowledge, attitude and practice

The study revealed that the nurses' knowledge was low concerning the management of hemodynamic instability, with a mean score of 2.7 on a 7-point scale. The attitude of nurses towards their practice was positive, and they understood the importance of evidence-based practice and the need to enhance their knowledge and skills. Nurses generally expressed positive attitudes toward their practice, with a mean score of 3.8 on a 5-point scale.

The nurses reported on the practices they used to care for hemodynamically unstable patients; this included monitoring equipment, consultation with cardiologists, and administering prescribed medications and the frequent use of ECG monitors and regular consultations with cardiologists reflect good practice. Furthermore, the study revealed that nurses encounter several obstacles and barriers to practice development, including insufficient training, lack of personnel and equipment, and language barriers, with a mean score of 2.3 on a 5-points scale. See Table 2.

Relationship between study variables with nurses' knowledge, attitudes, and practice toward hemodynamic instability

Overall, nurses have similar levels of knowledge regardless of gender, age group, experience in nursing,

Table 2 Mean and SD of knowledge, attitude and practice scores of nurses

N = 300	Mean	SD
Knowledge	2.66	1.08
Attitude	3.82	0.59
Practice	2.34	0.56

SD = Standard Deviation, N = sample size, Knowledge scale = 7 points, Attitude scale = 5 points, Practice scale = 5 points

experience in ICU, or having training in hemodynamic instability management ($p > 0.05$). Educational level, on the other hand, showed statistically significant differences in nurses' knowledge ($p = 0.02$), with those with bachelor or master degree having more mean knowledge scores than those with diploma level education.

Regarding attitude, there was a significant relationship ($p = 0.02$) with being a male nurse to have better or higher attitude mean score. Education level did not significantly impact mean scores ($p > 0.05$), showing no variance among nurses with bachelor's, diploma, or master's degrees with attitude. Likewise, age (31 years and below versus older) and years of experience in nursing (7 years or less versus more than seven years) and years of experience in the ICU did not significantly affect attitude mean scores ($p > 0.05$). Regarding specific training on managing

hemodynamic instability, while nurses who received such training showed a slightly higher attitude mean score compared to those who did not, the difference was not statistically significant ($p = 0.8$).

For the nurses' practices, none of the categories of the study demographic and clinical variables have any statistically significant ($p > 0.05$) differences with Knowledge, attitudes, or practice of critical care nurses included in this study. See Table 3.

The predictors of knowledge, attitude and practice of ICU nurses toward hemodynamic instability

Table 4 shows the results of a multiple regression analysis examining the effect of various sociodemographic variables on nurses' knowledge, attitude and practice. None of those variables significantly affect knowledge, as evidenced by their p-values being above the typical significance level of 0.05. The overall model also does not explain much of the variance in knowledge, as the R-square value is only 0.029. on the other hand, results indicate that gender, years of professional experience in nursing, and the number of years worked in intensive care units significantly affect nurses' attitudes. Specifically, being male ($p = 0.024$) and having more years of professional experience in nursing ($p = 0.002$) are

Table 3 Differences between study demographic and clinical variables with knowledge, attitudes, and practice of nurses

		knowledge			Practice			Attitudes		
		Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Gender	Female	2.6	1.0	0.20	2.3	0.4	0.79	3.8	0.4	0.02*
	Male	2.7	1.1		2.3	0.5		3.9	0.4	
Education Level	Bachelor	2.7	1.1	0.02*	2.3	0.4	0.08	3.8	0.4	0.39
	Diploma (2 years)	1.5	1.2		2.7	1.1		3.8	1.1	
	Master	2.6	0.9		2.3	0.5		3.9	0.3	
Age	≤ 31 years	2.7	1.1	0.20	2.3	0.5	0.06	3.8	0.4	0.35
	> 31	2.7	1.0		2.4	0.4		3.8	0.5	
Experience in nursing	≤ 7 years	2.6	1.1	0.25	2.4	0.5	0.18	3.8	0.4	0.43
	> 7 years	2.8	1.0		2.3	0.4		3.8	0.4	
Experience in ICU	≤ 7 years	2.6	1.1	0.79	2.3	0.5	0.43	3.8	0.4	0.74
	> 7 years	2.8	0.9		2.3	0.4		3.8	0.5	
Training in hemo-dynamic instability	No	2.6	1.1	0.21	2.4	0.5	0.78	3.8	0.4	0.83
	Yes	2.8	1.1		2.3	0.4		3.8	0.5	

*statistically significant at Alpha < 0.05

Table 4 Multiple regression of knowledge, attitude and practice of ICU nurses toward hemodynamic instability

	knowledge		Attitude		Practice	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
Gender	0.076	0.205	0.133	0.024*	0.015	0.809
Age	0.140	0.413	0.284	0.090	0.336	0.050*
Education Level	0.070	0.260	0.085	0.161	0.017	0.784
Experience in nursing	0.344	0.125	0.679	0.002*	0.308	0.169
Experience in ICU	0.217	0.139	0.526	< 0.001*	0.170	0.245
Training in hemodynamic instability	0.099	0.146	0.035	0.595	0.074	0.275

*Dependent Variable: knowledge R-square = 0.029 F = 1.452 p-value = 0.195; attitude $R = 0.276$ R-square = 0.079 F = 4.014 p-value = <0.001; practice $R = 0.184$ R-square = 0.034 F = 1.696 p-value = 0.122

associated with more positive attitudes. Conversely, more years worked in intensive care units is associated with less positive attitudes ($p < 0.001$). Overall, the model explains a moderate amount of the variance in attitudes (R-square = 0.079), and the F-test for the overall significance of the model is highly significant ($p < 0.001$). Furthermore, results indicate that age significantly positively affects perceived practice, as evidenced by its low p-value of 0.05. Older nurses tend to perceive more challenges in managing hemodynamic instability. However, the other variables do not significantly affect practice. Overall, the model explains a small amount of the variance in practice (R-square = 0.034), and the F-test for the overall significance of the model is not statistically significant (p-value = 0.122).

Discussion

Gender, age, educational level, and training did not significantly affect knowledge scores or perceived challenges. While other studies have found that these variables affect nurses' knowledge, the study by Smith et al. [17] found that age and education level significantly influenced nurses' knowledge and confidence in managing hemodynamic instability. In contrast, while other studies found that these variables do not affect the nurses' knowledge, Giovanni et al. [18] found no significant difference in knowledge scores based on gender. However, the general trend suggests that higher levels of education and more years of experience tend to be associated with better knowledge and clinical competence.

The knowledge assessment demonstrated that nurses had a low level of knowledge regarding hemodynamic instability, nurses showed a good understanding of reduced cardiac output as a cause of hemodynamic instability but had varying levels of awareness about other critical aspects. There was a statistically significant relationship between education level and knowledge scores, with bachelor and master degree holders scoring higher than diploma holders. The low knowledge scores suggest that while nurses are generally aware of critical concepts related to hemodynamic instability, there is room for improvement, especially in less-understood areas. The significant relationship between education level and knowledge scores underscores the importance of higher education in enhancing clinical knowledge. This is still valid in the national healthcare system and context, even though there is no clear job description of different level nurses on ground in the actual practice, which was clearer in its effect on the practice measures later.

This aligns with previous research, such as Ahmed et al. [19] in Egypt, which also found a correlation between higher education levels and better clinical knowledge, which suggests continuous professional development and advanced training programs are necessary to keep

nursing staff updated with the latest evidence-based practices. The nurses demonstrated a low overall level of knowledge about hemodynamic instability.

Nurses generally had a positive attitude towards their skills and the value of evidence-based practice, with mean scores indicating confidence and recognition of the need for continuous learning. This study showed that the majority of nurses expressed high confidence in their skills related to the management of hemodynamically stable cases, with broad consensus on the importance of evidence-based practice. In addition, most nurses felt that their training was adequate, with a significant percentage remaining who believed there was a need to improve training programs.

Other studies found varying confidence levels among nurses regarding their skills in managing hemodynamic instability. For instance, a study by smith et al. [20] indicated that only 56% of nurses felt highly confident in their abilities, reflecting a disparity compared to the findings in Palestine. In contrast, Minja et al. [21] noted a higher emphasis on continuous learning among nurses, with 85% acknowledging the need for ongoing professional development in critical care contexts. These findings underscore the importance of tailored training programs and ongoing support to enhance nursing proficiency and ensure optimal patient care outcomes. Nurses generally expressed positive attitudes toward their practice, with a mean score of 3.82 on a 5-point scale. They reported confidence in their skills (mean = 3.88) and recognized the value of evidence-based practice (mean = 3.85).

ECG monitors were the most frequently used equipment. A majority of nurses frequently consulted with cardiologists. Adherence to established protocols was inconsistent, with of nurses not strictly following them. The primary response to sudden cardiac events was to call for a cardiologist or medical staff. The findings regarding the inconsistent adherence to protocols indicate a need for better implementation and monitoring of standard procedures. The frequent use of ECG monitors and regular consultations with cardiologists reflect good practice. However, the variability in responses to hemodynamic instability suggests a need for more standardized training and protocols, which aligns with Giovanni et al. [18] in the USA, which also emphasized the need for standardized protocols to improve patient outcomes. By ensuring consistent adherence to evidence-based protocols, hospitals can improve the management of hemodynamic instability and reduce variability in patient care.

In the Palestinian healthcare system context, this may be related to the nature of work environment and local policies and regulations, as there are no fixed or binding national regulations or distinctive job description for different levels of nurses; either upon their educational level or their years of experience or training. It worth

mentioning that nursing profession in Palestine is composed of two types of professionals; registered nurses, holding a bachelor degree of 4 years of studying at a university, and practical nurses who hold a diploma of 2 years studying at a college. These differences in education are not reflected actually in practice, as there is no clear or official job description of nurses nationally, so all nurses do the same job based on the department they are working in and the need at hand.

Even though, several limitations were encountered in this study. Those limitations include the use of self-reported data collection tool were reliance on self-reported data could introduce response bias, where participants might provide answers they perceive as socially desirable or expected. Also, use of cross-sectional design in this study captured a snapshot in time, limiting the ability to establish causal relationships or track changes over time. Furthermore, response rate and non-response bias were considered a limitation in this study. The actual response rate and any potential non-response bias are not specified, which could impact the sample's representativeness.

Conclusion
This study provides a comprehensive view of the current landscape of ICU nurses' knowledge, practices, and attitudes regarding managing hemodynamic instability in critically ill cardiovascular patients in Palestine. The findings reveal a concerning cognitive level among nurses indicating a significant gap in understanding symptoms and guidelines related to hemodynamic instability. This underscores a critical need for enhanced education and training programs tailored to the unique challenges faced in Palestinian healthcare settings.

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12912-024-02549-w.

Supplementary Material 1

Declarations

Author details
[1]Faculty of Allied Medical Sciences, Palestine Ahliya University, Bethlehem, Palestine

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