

Knowledge, Attitudes, and Practices of Cardiopulmonary Resuscitation (CPR) Among Fourth-Year Nursing Students at Pham Ngoc Thach University of Medicine and Associated

Hoang Hai Dinh¹, Tran Ngoc Thanh Dang¹

¹Faculty of Nursing and Medical Technology, Pham Ngoc Thach University of Medicine, Ho Chi Minh City

Abstract

Background: Nurses are in frequent contact with patients, making them often the first to identify a cardiac arrest situation within a hospital setting. Timely cardiopulmonary resuscitation (CPR) can significantly double the survival chances of patients experiencing cardiac arrest. Numerous global studies have reported suboptimal results when assessing CPR competence among nursing students, leading to recommendations for adjustments in nursing education.

Objective: To assess the levels of knowledge, attitudes, and practices regarding cardiopulmonary resuscitation (CPR) among 4th year nursing students; To determine the relationship between various factors and the success rate of CPR practice in this population.

Methods: A cross-sectional descriptive study with analysis was conducted on 102 4th year nursing students from 2018 - 2022 at Pham Ngoc Thach University of Medicine. Data were entered using Excel 2010 software and analyzed using SPSS version 20.

Results: There are 10.8% of nursing students have good CPR knowledge, 61.8% of nursing students have a positive attitude about CPR and only 8.8% of nursing students achieved adequate CPR practice. In addition, the study found a correlation between the factors "CPR knowledge", "CPR attitude", "Received CPR updates", "Had prior CPR experience", "Nursing specialty" and "CPR practice".

Conclusions: The level of CPR practice of 4th year nursing students at Pham Ngoc Thach University of Medicine is low and should be improved before graduation. However, the students' attitude towards CPR is generally positive.

Keywords: Cardiopulmonary resuscitation, nursing students, knowledge, attitude, practice.

Received: 21/11/2024

Revised: 19/6/2025

Accepted: 20/7/2025

Author contact:

Hoang Hai Dinh

Email:

haidh@pnt.edu.vn

Phone: +84934136961

1. INTRODUCTION

Nurses are healthcare professionals who are in constant contact with patients and, therefore, are often the first to detect in-hospital cardiac arrest situations [1] and timely cardiopulmonary resuscitation

(CPR) can double the chance of survival for cardiac arrest patients [2]. Thus, the survival rate of such patients depends greatly on the nurses' CPR competency. Most healthcare providers, including nurses, receive CPR training before

graduation [3]. However, mastering CPR is complex as it involves both theoretical knowledge and the ability to translate it into technical skills [4]. Studies worldwide have shown that nurses' CPR competence significantly declines just months after training [5]. Similarly, many studies have found poor CPR proficiency among nursing students [4, 6, 7] and recommended updates and improvements to CPR training and refresher interventions during their education. This study was conducted with the following two specific objectives:

1. To assess the level of knowledge, attitudes, and practices (KAP) regarding CPR among fourth-year nursing students.
2. To examine the relationship between certain factors and the success rate of CPR practice among these students.

2. METHODS

2.1. Study Design

This is a cross-sectional descriptive and analytical study.

2.2. Participants

Participants were fourth-year undergraduate nursing students (cohort 2018–2022) from Pham Ngoc Thach University of Medicine, surveyed from May to August 2022.

$$n \geq \frac{N}{1+Nd^2}$$

2.3. Sample Size

Applying sample size calculation formulas:

Population size (N): 114

Margin of error (d): 0.05

Minimum sample size (n): 89

Using a population size of 114 and a margin of error of 0.05, the minimum sample size calculated was 89. A total of 102 students consented to participate.

Inclusion Criteria:

- Fourth-year regular nursing students across all specialties.
- Consent to participate.

Exclusion Criteria:

- Students experiencing illness during data collection.

2.4. Instruments

The study utilized a toolkit consisting of a three-part questionnaire and a checklist for CPR skills.

Part A of the questionnaire collected demographic and background characteristics of the participants.

Part B assessed CPR knowledge using the instrument developed by Veronese J.P (2018) [8]. The questionnaire includes 20 multiple-choice questions, each with four options and only one correct answer. Each correct response is awarded one point, for a maximum total score of 20. Students scoring over 80% (16 points) are categorized as having "good CPR knowledge."

Part C assessed CPR attitudes using the scale developed by Mersha A.T (2020) [9]. This section includes 13 items, each rated on a 5-point Likert scale (1–Strongly disagree; 2–Disagree; 3–Neutral; 4–Agree; 5–Strongly agree). The maximum score is 65. Students scoring above 80% (52 points) are categorized as having a "positive CPR attitude".

The CPR skills checklist, included in the Fundamentals of Nursing textbook vol.2 [10] is currently used for teaching students at Pham Ngoc Thach University of Medicine. This checklist is periodically updated according to guidelines from the American Heart Association (AHA). It consists of 21 steps, with each correctly performed step scoring one point. The maximum score is 21. Students scoring

over 80% (17 points) are classified as having “adequate CPR practice.”

The CPR knowledge and attitude questionnaires were translated using a forward–backward translation process [11] and reviewed by six experts for content validity. Pilot testing was conducted on 30 third-year nursing students, resulting in a Kuder–Richardson 20 (KR-20) reliability coefficient of 0.76 for the knowledge scale, and a Cronbach’s alpha of 0.92 for the attitude scale.

2.5. Data Collection Procedure

Data were collected class-by-class. Students first completed the knowledge and attitude questionnaires, followed by CPR skills evaluation using a Little Anne manikin. Performance was scored

independently by two assessors, with the final score being the average.

2.6. Data Analysis

Data were entered using Excel 2010 and analyzed with SPSS v20.

Descriptive statistics were reported as frequencies, percentages, means, or medians. Spearman’s correlation and Fisher’s exact tests were used to assess relationships, with statistical significance set at $p < 0.05$.

2.7. Ethical Consideration

Approved by the Ethics Committee of the University of Medicine and Pharmacy at Ho Chi Minh City (Decision No. 122/HĐĐĐ-ĐHYD, dated January 25, 2022).

3. RESULTS

3.1. Demographic Characteristics of Fourth-Year Nursing Students

Table 1. Demographic Characteristics of Fourth-Year Nursing Students

Characteristics	Frequency (n)	Percentage (%)		
Gender				
Male	21	21%		
Female	81	79%		
Received CPR updates				
Yes	69	68%		
No	33	32%		
Had prior CPR experience				
Yes	23	23%		
No	79	77%		
Nursing specialty				
General nursing	44	42%		
Anesthesia nursing	21	21%		
Paramedic nursing	6	6%		
Rehabilitation nursing	15	15%		
Midwifery	16	16%		
Location				
Ho Chi Minh City	57	56%		
Others	44	44%		
Age	Min 22	Max 25	Mean 22.11	SD 0.40

A total of 102 students participated. The majority were female (79%) and 68% reported having received updated CPR training. Only 23% had ever performed CPR on a cardiac arrest patient. The most common nursing specialty was General nursing (42%), and 56% of students had permanent residence in Ho Chi Minh City.

3.2. CPR knowledge of 4th year nursing students

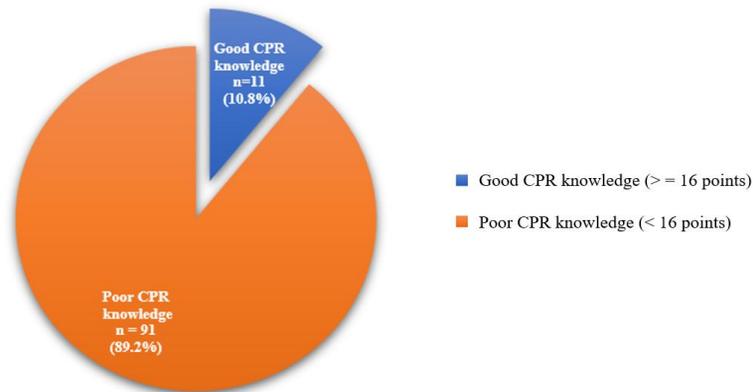


Figure 1. Classification of knowledge of nursing students about CPR (N = 102)

Mean score \pm Standard deviation: 11.96 ± 2.77 / total 20 points

Min - Max: 6 -18

Figure 1 shows that the proportion of 4th year nursing students have “Good CPR knowledge” are 10.8%. The mean score is 11.96 ± 2.77 (out of 20).

3.3. CPR attitude of 4th year nursing students

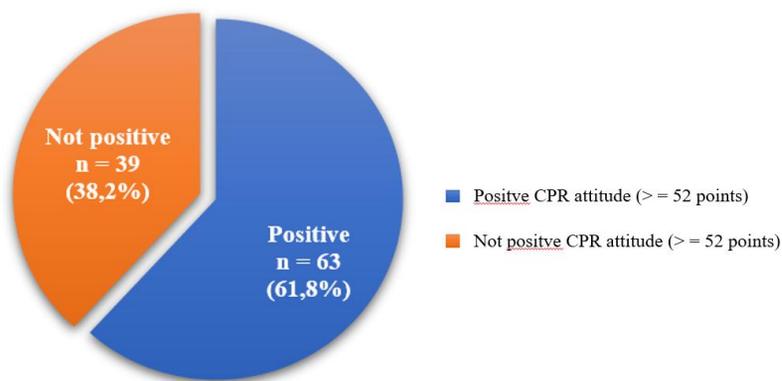


Figure 2. Classification of attitudes about CPR of nursing students (N=102)

Mean score \pm SD: 52.78 ± 5.09 / Total 65 points

Min - Max: 42 - 63

Figure 2 shows that the proportion of 4th year nursing students have "Positive CPR attitude" are 61.8%. The mean score is 52.78 ± 5.09 (out of 65)

3.4. CPR practice of 4th year nursing students

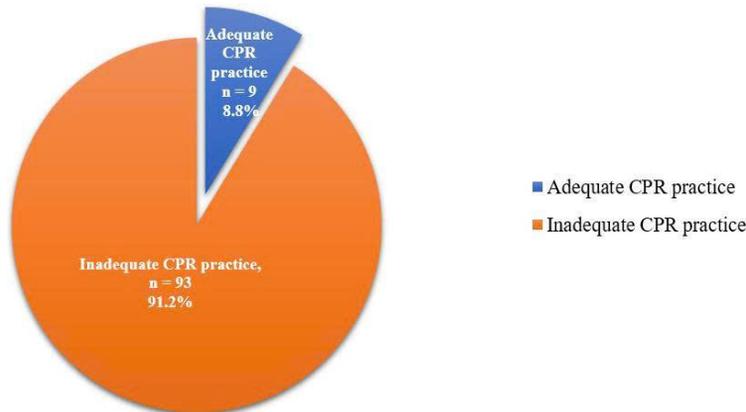


Figure 3. Classification of CPR practice of nursing students (N=102)

Median score (IQR): 7.5 (7) /total 21 points
Min - Max: 2 - 18

Figure 3 shows that the proportion of 4th year nursing students have adequate CPR practice are 8.8%. The median score is 7.5 (7) out of 21.

3.5. Factors affecting CPR practice of 4th year nursing students

Table 2. Correlation between knowledge, attitude and practice score of CPR of 4th year nursing students (N=102)

	Correlation coefficients	p value
Knowledge - Practice	0.63*	p < 0.001
Attitude - Practice	0.46*	p < 0.001

* Spearman correlation coefficient (rho)

Table 2 shows that between the knowledge and practice of CPR of nursing students there is a statistically significant average positive correlation, with the coefficient rho = 0.63; p < 0.001. Besides, the results also recorded that there was a weak positive correlation between the attitude and practice of CPR of students, with statistical significance, with rho = 0.46; p < 0.001.

Table 3. Factors affecting CPR practice of 4th year nursing students

Factors	CPR practice		Fisher's exact (p)*
	Adequate (%)	Inadequate (%)	
Received CPR updates			p = 0.03
Yes	9 (8.8%)	60 (58.8%)	
No	0 (0%)	33 (32.4%)	
Had prior CPR experience			p = 0.004
Yes	6 (5.9%)	17 (16.7%)	
No	3 (2.9%)	76 (74.5%)	

Nursing specialty		
General nursing	5 (4.9%)	39 (38.3%)
Anesthesia nursing	0 (0%)	21 (20.6%)
Paramedic nursing	4 (3.9%)	2 (1.9%)
Rehabilitation nursing	0 (0%)	15 (14.7%)
Midwifery	0 (0%)	16 (15.7%)

p < 0.001

** The correlation between the two variables was initially analyzed by Chi-square test, however, the number of cells in the table with expected value < 5 accounted for 50%, so Fisher' exact test was used*

Table 3 indicate that CPR practice is statistically associated with received CPR updates, Had prior CPR experience, and Nursing specialty.

4. DISCUSSION

Among the 102 students in our study, 79% were female, consistent with findings from Katarzyna Kwiecien (2020) [6], reflecting the traditionally female-dominated nature of the nursing profession. Additionally, 23% of students reported having previously performed CPR on a cardiac arrest patient—similar to the 23.3% reported in Kwiecien's study [6].

Our study found that only 10.8% of fourth-year nursing students had good CPR knowledge, with a mean score of 11.96 ± 2.77 out of 20 (equivalent to 59.8%). This is slightly lower than the 65.4% average reported by Kwiecien-Jagus et al. (2020) [6]. However, our results are higher than the 40.4% reported by Umran Dal (2013) [12], whose study participants were third-year students with less clinical exposure.

In terms of attitude, 61.8% of students were found to have a positive attitude toward CPR, with a mean score of 52.78 ± 5.09 out of 65 (equivalent to 81.2%). This finding aligns with Gebremedhn et al. (2017), who found 57.1% of final-year nursing students had a positive attitude toward CPR [7]. Similarities in training level and specialty diversity may explain this consistency.

However, CPR practice competency remained critically low. Only 8.8% of students met the minimum threshold for adequate CPR skills, with a median score

of 7.5 out of 21 (35.7%). The lowest score is 2/21 and the highest is 18/21. This raises significant concerns regarding the preparedness of graduating nursing students to handle real-life cardiac emergencies. These findings are consistent with those of Gebremedhn (2017), likely due to similar study populations (final-year nursing students) [7].

We identified a moderate positive correlation between CPR knowledge and practice ($\rho = 0.63$; $p < 0.001$), indicating that while knowledge is foundational, it is not sufficient alone for competent CPR performance. A weak positive correlation was also found between attitude and practice ($\rho = 0.46$; $p < 0.001$). This supports the idea posited by Zeinab Mohammed (2020) that a positive perception of CPR may enhance knowledge retention and the motivation to improve CPR skills [13].

In our study, a statistically significant correlation was found between received CPR updates and CPR practice. This finding is consistent with the survey conducted by Kelkay (2016) among nurses working in provincial hospitals in Ethiopia [14]. Although 68% of students reported having received updates on CPR, the actual level of CPR practice observed in our study remained low. This highlights the need for extracurricular activities aimed at effectively enhancing CPR-related knowledge and skills among nursing students.

Our findings also revealed a statistically significant association between prior experience in performing resuscitation on cardiac arrest patients and CPR practice. Similar correlations were reported in the studies by Kelkay (2016) [14] and Guteta (2022) [15]. The experience of performing CPR may leave a lasting impression, enhancing memory retention of procedures and facilitating feedback from peers, thereby contributing to improved CPR practice among nursing students.

Additionally, the nursing specialty was found to be significantly associated with CPR practice among students. This suggests that the nature of clinical duties and the environment in which students practice can influence their proficiency in performing CPR techniques. Similar observations were noted in studies conducted by Guteta (2022) [15] and Ihunanya (2020) [16] among nurses.

A major strength of our study is the use of the American Heart Association (AHA) guidelines as the standard for assessing the knowledge, attitude, and practice of CPR among fourth-year nursing students. Knowledge and attitudes toward CPR were measured using an independently developed questionnaire, validated by a panel of six experts and tested for reliability prior to implementation. CPR practice was evaluated through direct observation of students' technical performance, assessed using a standardized skills checklist. However, the study has several limitations. The sample size was relatively small, and participants were limited to nursing students from the Pham Ngoc Thach University of Medicine, which may not fully represent the broader status of CPR competency among nursing students across different regions. Additionally, due to constraints in time and resources, we did not investigate factors related to CPR knowledge and attitudes among the participants.

5. CONCLUSION

The level of CPR practice among fourth-year nursing students at Pham Ngoc Thach University of Medicine is low and requires significant improvement before graduation. Only 10.8% had good CPR knowledge, 61.8% had a positive attitude, and just 8.8% demonstrated competent practice. Statistically significant correlations were found between CPR practice and factors such as knowledge, attitude, received CPR updates, had prior CPR experience, and nursing specialty.

6. RECOMMENDATIONS

It is necessary to organize extracurricular workshops to provide high-quality updates on CPR knowledge and skills for nursing students prior to graduation. Integrating simulation-based, scenario-driven teaching methods into CPR training may further enhance students' practical competency.

REFERENCES

1. Nicol, P., et al., *Retention into internship of resuscitation skills learned in a medical student resuscitation program incorporating an Immediate Life Support course*. Resuscitation, 2011. **82**(1): p. 45-50.
2. Bjorshol, C.A., et al., *Hospital employees improve basic life support skills and confidence with a personal resuscitation manikin and a 24-min video instruction*. Resuscitation, 2009. **80**(8): p. 898-902.
3. Gebremedhn, E.G., G.B. Gebregergs, and B.B. Anderson, *The knowledge level of final year undergraduate health science students and medical interns about cardiopulmonary resuscitation at a university teaching hospital of Northwest Ethiopia*. World journal of emergency medicine, 2014. **5**(1): p. 29.
4. Mendez-Martinez, C., et al., *Acquisition of Knowledge and Practical Skills after a Brief Course of BLS-AED in First-Year Students in Nursing and Physiotherapy at a Spanish University*. Int J Environ Res Public Health, 2019. **16**(5).

5. Rajeswaran, L. and V.J. Ehlers, *Cardiopulmonary resuscitation knowledge and skills of registered nurses in Botswana*. *curationis*, 2014. **37**(1): p. 1-7.
6. Kwiecien-Jagus, K., et al., *A Cross-International Study to Evaluate Knowledge and Attitudes Related to Basic Life Support among Undergraduate Nursing Students-A Questionnaire Study*. *Int J Environ Res Public Health*, 2020. **17**(11).
7. Gebreegziabher Gebremedhn, E., et al., *Attitude and skill levels of graduate health professionals in performing cardiopulmonary resuscitation*. *Adv Med Educ Pract*, 2017. **8**: p. 43-50.
8. Veronese, J.P., et al., *Cardiopulmonary resuscitation by Emergency Medical Services in South Africa: Barriers to achieving high quality performance*. *Afr J Emerg Med*, 2018. **8**(1): p. 6-11.
9. Yusoff, M.S.B., *ABC of Content Validation and Content Validity Index Calculation*. *Education in Medicine Journal*, 2019. **11**(2): p. 49-54.
10. Think, C.V., *Fundamentals of Nursing textbook Vol. 2*. 2015, Ho Chi Minh City: MPH Co., LTD.
11. Yu, D.S., D.T. Lee, and J. Woo, *Issues and challenges of instrument translation*. *West J Nurs Res*, 2004. **26**(3): p. 307-20.
12. Dal, U. and D. Sarpkaya, *Knowledge and psychomotor skills of nursing students in North Cyprus in the area of cardiopulmonary resuscitation*. *Pak J Med Sci*, 2013. **29**(4): p. 966-71.
13. Mohammed, Z., et al., *Knowledge of and attitudes towards cardiopulmonary resuscitation among junior doctors and medical students in Upper Egypt: cross-sectional study*. *Int J Emerg Med*, 2020. **13**(1): p. 19.
14. Kelkay, M.M., et al., *A cross sectional study on knowledge, practice and associated factors towards basic life support among nurses working in amhara region referral hospitals, northwest Ethiopia, 2016*. *Hospice and Palliative Medicine International Journal*, 2018. **2**(2).
15. Guteta, M., *Factors Affecting Cardiopulmonary Resuscitation Practice Among Nurses in Mizan Tepi University Teaching Hospital, Tepi General Hospital, and Gebretsadik Shawo Hospital, Southwest Ethiopia*. *Open Access Emerg Med*, 2022. **14**: p. 165-175.
16. Ihunanya, O.M., *Knowledge, Attitude and Practice of Cardiopulmonary Resuscitation Among Nurses in Babcock University Teaching Hospital in Ilishan-Remo, Ogun State, Nigeria*. *International Journal of Caring Sciences*, 2020. **13**(3): p. 1773.