ORIGINAL ARTICLE

Self-Efficacy in Performing Cardiopulmonary Resuscitation (CPR) among Nurses in Acute Care Settings

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ABSTRACT

Introduction: Nurses are primary responders in cardiac emergencies, initiating timely interventions to improve patient survival rates and reduce cardiovascular mortality. The effectiveness of cardiopulmonary resuscitation as life-saving measure is closely intertwined with nurses' self-efficacy and knowledge levels. **Methods:** This study assesses nurses' self-efficacy in CPR performance through a quantitative, cross-sectional survey involving 145 nurses from acute care settings, including emergency and trauma units and critical care units in a public hospital. Nurses currently working in these areas were selected through stratified random sampling. A self-administered questionnaire employing validated instruments was utilized to gauge nurses' CPR knowledge and self-efficacy (alpha>0.7). SPSS version 27 was used, employing descriptive and inferential analysis to achieve the study's objectives. **Results:** Findings indicate that most participants (91%) reported high self-efficacy in CPR performance. However, a significant proportion of respondents exhibited inadequate CPR knowledge, with 91.7% (n=133) indicating insufficient knowledge. Despite this knowledge gap, most participants displayed a high level of self-efficacy. Nevertheless, the study did not find a significant relationship between knowledge and self-efficacy (p>0.05). **Conclusion:** These results shed light on the CPR proficiency status among nurses in this healthcare setting, revealing a disparity between nurses' perceived confidence and actual knowledge, with knowledge levels falling short of expectations. This discrepancy raises critical concerns, suggesting that nurses may overestimate their CPR skills compared to their real preparedness, potentially compromising intervention effectiveness and patient outcomes. Consequently, there is an urgent need for educational interventions aimed at enhancing nurses' CPR knowledge.
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INTRODUCTION

A critical situation can arise in any healthcare setting, with sudden cardiac arrest representing a global leading cause of death, resulting in a mortality rate exceeding 8% (1). According to the Department of Statistics Malaysia report in 2019, cardiac arrest cases increased from 13.9% in 2017 to 15.6% in 2018 (2). However, swift interventions such as cardiopulmonary resuscitation (CPR) and defibrillation, often administered promptly by nurses as initial responders in hospital settings, can significantly improve survival rates among cardiac arrest patients. Cardiopulmonary resuscitation, or CPR, is one of the life-saving techniques that combine chest compressions and rescue breathing to reverse cardiac arrest (3).

Administering CPR and employing automated external defibrillation (AED) at the onset of cardiac arrest or irregular heartbeats can substantially increase the likelihood of patient survival (4). CPR primarily aims to restore blood circulation to the brain and heart, effectively reviving the patient (5). In addition, death or any possible damage to the tissue could be minimized by early implementation of CPR and defibrillation (CPR-D). It may increase the survival rate in cardiac arrest patients (6).

The efficacy of resuscitation efforts is closely tied to the promptness of nurses' response, with quicker initiation of CPR correlating with higher survival rates among patients in cardiac arrest (4). Consequently, nurses are pivotal in mitigating cardiovascular mortality and improving survival rates (5). Adequate knowledge is a

fundamental component that shapes nurses' readiness before undertaking life-saving procedures, potentially influencing patient health outcomes with early recognition and prompt intervention patient outcomes (7). Self-efficacy among nurses is a key determinant of successful resuscitation efforts, enabling them to make decisive actions during emergencies. Conversely, a lack of self-efficacy may result in adverse patient outcomes (6).

Studies have highlighted variations in knowledge, attitudes, and confidence levels among healthcare professionals (5,8,9). Barriers to successful resuscitation include insufficient knowledge, low self-confidence in CPR performance, and a lack of motivation or confidence during emergencies (9,10). Nurses have expressed inadequate confidence in handling defibrillators, leading to decreased self-efficacy in CPR (10). Conversely, factors such as insufficient training, high workload among nurses, equipment shortages in hospital settings, fear, and inadequate knowledge contribute to low self-confidence among nurses during emergencies or CPR (11,12,13). Inadequate CPR knowledge among nurses potentially hinders effective CPR performance (14). Therefore, some suggestions for establishing regular, ongoing CPR and simulation-based CPR training programs were identified in a few studies (8,14,15). Simulation, providing a safe and non-threatening environment, facilitated the application of leadership, critical thinking, decision-making, problem-solving and prioritizing skills. It may contribute to the development of self-efficacy or confidence in participants (16).

Self-efficacy is a pivotal factor in determining a nurse's ability to perform CPR effectively and significantly to the successful performance of CPR and outcomes (9,16). It is considered the best measure of a nurse's preparedness and confidence in executing life-saving procedures. High self-efficacy in CPR indicates a positive and proactive approach among nurses, contributing to the chain of survival (6). Some studies highlighted that nurses working in specialized units demonstrated a relatively high sense of self-efficacy in CPR with higher confidence levels in resuscitation compared to those in non-specialized units (6,17). The findings suggested that nurses exposed to high-acuity clinical environments and complex equipment tended to have enhanced confidence levels, mitigating negative emotions such as nervousness, fear and worry.

To date, relatively limited studies have been conducted on the self-efficacy of cardiopulmonary resuscitation among nurses in Malaysia. Therefore, this study addresses the critical issue of sudden cardiac arrest among nurses, often being the first responders in such situations, especially in acute care settings, filling the gap in existing research. The study aims to evaluate nurses' knowledge and self-efficacy in a public hospital with the following objectives:

- To determine the knowledge of cardiopulmonary resuscitation (CPR) among nurses working in acute care settings in a public hospital.
- To determine the self-efficacy in cardiopulmonary resuscitation (CPR) among nurses working in acute care settings in a public hospital.
- To investigate the relationship between knowledge and self-efficacy in cardiopulmonary resuscitation (CPR) with the demographic attributes of nurses working in acute care settings in a public hospital.

MATERIAL AND METHOD

This study adopts a quantitative approach utilizing a cross-sectional survey design, which is pertinent for evaluating knowledge and self-efficacy in CPR and exploring the relationships between these variables. A public hospital located in Klang, Selangor, Malaysia,was chosen for the setting due to its status as the primary referral centre for surrounding districts, rendering it the busiest hospital in Selangor. Given the increasing number of hospital visits and emergency admissions (ER) and intensive care units (ICU), which primarily cater to critically ill patients at high risk of cardiac arrest, it is crucial for nurses, as first responders, to promptly recognize early signs of deterioration, possess a comprehensive understanding of cardiac arrest management, and initiate CPR and defibrillation promptly during in-hospital cardiac arrest (IHCA) to improve the likelihood of survival.

Population and sampling

The study focused on a population of nurses employed in emergency and intensive care units, with 120 nurses from the ICU and 80 from the ER (N=200). A stratified random sampling method was employed to ensure representative sampling from these subpopulations, allowing for an equal proportion of nurses from each acute care setting. The sample size was determined using Raosoft calculation software, with parameters set at a 5% margin of error, 95% confidence level, and an assumed response distribution of 50%, adding a 10% attrition rate (n=145). Inclusion criteria comprised nurses currently employed in both acute care settings, possessing at least one year of work experience, and having completed either Basic Life Support (BLS) or Advanced Cardiovascular Life Support (ACLS) training courses with a valid certification for nursing practice. Nurse administrators not actively involved in CPR were excluded.

Measures

This study utilizes a self-administered questionnaire. Recognizing the demanding and stressful nature of ICU and ER work, where nurses contend with numerous critical patient states, data were collected electronically via a Google Form link. This approach allowed participants to complete the survey at their convenience, selecting a time suitable for questionnaire completion. The data collection extended over about three months.

The questionnaire link was distributed to potential participants, adhering to ethical principles, ensuring consensus, anonymity, and confidentiality. The online form comprised three sections:

Part A: Demographic details
This part entails the information of sample characteristics including gender, age, ward/unit, years of experience, level of education, BLS and ACLS training and certification, and experience with CPR cases.

Part B: Knowledge on Cardiopulmonary Resuscitation (CPR)
This section consists of 20 multiple choice items to measure CPR knowledge adopted from Chandrasekaran et al. (17) (α=0.81). The correct response entitled for a score of '1' and '0' for the incorrect response. The highest for total knowledge score was 20. Knowledge scores 15 and above (>75%) were considered adequate knowledge and scores less than 75% were considered inadequate knowledge.

Part C: Self-efficacy in Performing CPR
This part measures the nurses' self-efficacy in performing CPR with 12 items on a 10-point scale ranging from 0 (not at all) to 10 (fully) adopted from Seol and Lee (18) (α= 0.80). The higher the score ranging from 0 to 120 points, indicating the higher confidence in CPR.

Reliability and validity
A small-scale study was conducted to re-test the reliability and validity of the instrument with the current population and setting, using 15 samples. An alpha value of more than 0.7 was obtained, indicating that the instrument accurately measures self-efficacy and is consistent with the current population of nurses working in the chosen hospital.

Statistical Analysis
The collected data underwent cleaning, organization, and analysis using Statistical Package for Social Sciences (SPSS) software version 28. Descriptive statistics were calculated to assess knowledge and self-efficacy in cardiopulmonary resuscitation (CPR), including percentages, means, and standard deviations. Given the non-normal distribution of the data, non-parametric tests were employed to examine the relationship between CPR knowledge and self-efficacy and the demographic attributes of the nurses. The significance level was established at $p<0.05$.

Ethical concerns
This study was approved by the UiTM Research Ethics Committee (500-FSK (PT.23/4)) and the Medical Research Ethics Committee (MREC) (23-01350-PCS). All participants were given the information on the study, consented with fully autonomous, and being kept anonymous. Hence, any conflict of interest within all parties involved has been avoided.

RESULTS

The study achieved a 100% response rate (n = 145). Table I displays the demographic profile of the participants. Most participating nurses are female (89.7%), while males represent a smaller proportion (10.3%). The largest age bracket comprises participants aged 30 and above (n = 98, 6.6%), whereas the smallest is those under 25 (n = 5, 3.4%). There is a balanced distribution of nurses across various acute care settings, with 72 nurses (49.7%) from Emergency and Trauma and 73 (50.3%) from the Intensive Care Unit. Most participants hold a Diploma in Nursing (n = 143, 97.9%), while only 3 (2.1%) possess a bachelor's degree in nursing. Notably, a considerable number of participants (77.2%) have a Post-basic Certificate/Advanced Diploma, with 21 specializing in Emergency Care (14.5%) and 12 in Intensive Care (14.5%). Most participants (n = 78, 53.8%) have six to ten years of work experience, followed by 29.0% with 1 to 5 years and 17.2% with 11 years and above. All nurses (100%) have undergone previous training in Basic Life Support (BLS). However, not all participants have received training in Advanced Cardiovascular Life Support (ACLS), with 42.8% accredited and 57.2%

Table I: The demographic background of participants. The descriptive analysis of the demographic data presents the characteristics of the studied population. Data are presented as frequency and percentage.

Demographic Information		n (%)
Gender	Male	15 (10.3)
	Female	130 (89.7)
Age	< 25 years old	5 (3.4)
	26 – 29 years old	42 (29.0)
	> 30 years old	98 (67.6)
Acute care setting	Emergency and Trauma unit	72 (49.7)
	Intensive Care unit	73 (50.3)
Educational background	Diploma in Nursing	142 (97.9)
	Bachelor in nursing	3 (2.1)
Postbasic / Advance Diploma	Emergency Care	21 (14.5)
	Intensive Care Nursing	12 (8.3)
	None	112 (77.2)
Working experience	1 to 5 years	42 (29.0)
	6 to 10 years	78 (53.8)
	11 years and above	25 (17.2)
Previous training in BLS with accredited certification	Yes	145 (100.0)
Previous training in ACLS with accredited certification	Yes	62 (42.8)
	No	83 (57.2)
Experience attending CPR cases	Yes	144 (99.3)
	No	1 (0.7)

Note: N=145.

without accreditation. Moreover, most (99.3%) have experience attending CPR cases, while only a small percentage (0.7%) lack such expertise.

Knowledge of cardiopulmonary resuscitation among nurses in acute care settings

Table II presents an insight into the level of knowledge of CPR among nurses in the study, utilizing a descriptive analysis. The knowledge is classified into inadequate and adequate levels, determined by the knowledge scores. The scores of 15 and above (>75%) were considered adequate, and scores less than 75% were deemed inadequate. The participants' overall knowledge was inadequate (M=57.14, SD=11.68) and signified a comparatively lower level of CPR knowledge with the extent of variability in individual scores. The majority (n=131, 90.3%) of the participants had inadequate knowledge of CPR, while the remaining 14 (9.7%) had adequate knowledge. Further analysis of the knowledge items was conducted to identify specific areas of deficiency. Four items were answered correctly by over 90% of participants, namely item 1 (n=141, 99.3%), item 2 (n=131, 90.3%), item 12 (n=133, 91.7%), and item 15 (n=139, 95.9%). Conversely, eight items were answered correctly by less than half of the participants, including item 3 (n=69, 47.6%), item 5 (n=62, 42.8%), item 9 (n=50, 34.5%), item 10 (n=61, 42.1%), item 11 (n=57, 39.3%), item 13 (n=31, 21.4%), item 16 (n=41, 28.3%), and item 18 (n=64, 44.1%). Moreover, item 8 emerged with the lowest correct response rate, answered accurately by less than 10% of the participants (n=7, 4.8%).

Self-efficacy in CPR among nurses in acute care settings

Table III provides the descriptive results of self-efficacy in CPR among nurses in the study setting. The self-efficacy score was determined by two categories, which include a low level of self-efficacy (score <50%) and a high level of self-efficacy (score >50%). Overall, this study found self-efficacy was high among nurses (M=73.10, SD=15.77) yet implies some variability in self-efficacy scores. The majority (n=132, 91.0%) of the participants had a high level of self-efficacy in CPR, while the remaining 13 (9.0%) had a low level. The analysis of self-efficacy offers valuable insights into nurses' perceptions of their ability to execute CPR in emergencies. Nurses participating in the study demonstrated confidence in their capacity to assess a

Table II: Knowledge of cardiopulmonary resuscitation among nurses in acute care settings. Descriptive analysis on knowledge of CPR among nurses. Data are presented in frequencies, percentage and mean+SD.

Measure		Mean (SD)	n (%)	Correct answer n (%)	Wrong answer n (%)
Overall knowledge		55.08 (9.87)			
Knowledge category					
Adequate			133 (91.7)		
Inadequate			12 (8.3)		
Knowledge items					
1.	What is the abbreviation of 'BLS'?			144 (99.3)	1 (0.7)
2.	When you find someone unresponsive in the middle of the road, what will your first response? (Note: you are alone there).			131 (90.3)	14 (9.7)
3.	If you confirm someone is not responding to you even after shaking and shouting at him, what will be your immediate action?			69 (47.6)	76 (52.4)
4.	What is the location for chest compression?			76 (52.4)	69 (47.6)
5.	What is the location for chest compression for infants?			62 (42.8)	83 (57.2)
6.	If you do not want to give mouth-to-mouth CPR, the following can be done EXCEPT:			110 (75.9)	35 (24.1)
7.	How do you give rescue breathing in infants?			76 (52.4)	69 (47.6)
8.	Depth of compression in adult during CPR.			7 (4.8)	138 (95.2)
9.	Depth of compression in children during CPR.			50 (34.5)	95 (65.5)
10.	Depth of compression in neonates during CPR.			61 (42.1)	84 (57.9)
11.	Rate of chest compression in adult and children during CPR.			57 (39.3)	88 (60.7)
12.	Ratio of CPR, single rescuer in adult is:			133 (91.7)	12 (8.3)
13.	In a newborn the chest compression and ventilation are?			31 (21.4)	114 (78.6)
14.	What does abbreviation AED stand for?			115 (79.3)	30 (20.7)
15.	What does abbreviation EMS stand for?			139 (95.9)	6 (4.1)
16.	If you and your friend are having food in a canteen and suddenly your friend starts expressing symptoms of choking, what will be your first response?			41 (28.3)	104 (71.7)
17.	You are witnessing an infant who suddenly started choking while he was playing with the toy, you have confirmed that he is unable to cry or cough, what will be your first response?			94 (64.8)	51 (35.2)
18.	You are witnessing an adult unresponsive victim who has been submerged in fresh water and just removed from it. He has spontaneous breathing, but he is unresponsive. What is the first step?			64 (44.1)	81 (55.9)
19.	You noticed that your colleague has suddenly developed slurring of speech and weakness of right upper limb. Which one of the following can be done?			82 (56.6)	63 (43.4)
20.	A 50-year-old gentleman with retrosternal chest discomfort, profuse sweating, and vomiting. What is next?			115 (79.3)	30 (20.7)

Note: N=145.

Table III: Self-efficacy in CPR among nurses in acute care settings
Descriptive analysis on self-efficacy in CPR among nurses. Data are presented in frequencies, percentage and mean+SD.

	Measure	n (%)	Mean (SD)
Overall self-efficacy			73.10 (15.77)
Self-efficacy category			
Low		13 (9.0)	
High		132 (91.0)	
Self-efficacy items			
1.	I am sure that I can perform CPR in emergency.		3.23 (0.79)
2.	I am too hard to learn because it is too difficult to perform CPR.		2.39 (1.09)
3.	I do not think that I will not do CPR in emergency situations well.		2.64 (1.11)
4.	I believe in my own ability to perform CPR.		3.25 (0.81)
5.	I can exactly identify a patient's condition when they are in emergency.		2.94 (0.76)
6.	I can respond rapidly when to a patient is in emergency.		3.17 (0.79)
7.	I can check whether the patient is conscious or not.		3.46 (0.75)
8.	I can ask for help when the patient is unconscious.		3.57 (0.68)
9.	I can check breath for an unconscious patient.		3.47 (0.70)
10.	I can do mouth-to-mouth resuscitation to a patient who has no breathing.		2.50 (1.04)
11.	I can check the carotid artery of an unconscious patient.		3.46 (0.73)
12.	I can do chest compressions and mouth-to-mouth resuscitation to a patient who is pulseless.		2.99 (0.94)

Note: N=145.

patient's condition, with the highest efficacy observed for Item 8 (M=3.57, SD=0.68), followed closely by Item 7 (M=3.46, SD=0.75) and Item 11 (M=3.46, SD=0.73). Conversely, Item 2 displayed the lowest level of self-efficacy (M=2.39, SD=0.79), while the remaining items generally depicted moderate confidence levels among nurses regarding their proficiency in executing specific CPR skills.

The relationship between knowledge and self-efficacy in CPR among nurses in acute care settings

Examining the relationship between CPR knowledge and self-efficacy was performed with the non-parametric Spearman rho test due to the non-normal distribution of the data. Findings from this study revealed no significant relationship between CPR knowledge and self-efficacy (r=0.08, p>0.05) (Table IV).

Table IV: The relationship between knowledge and self-efficacy in CPR among nurses. The correlational analysis between knowledge and self-efficacy in CPR was performed with Spearman rho and the significant value is set at p<.05.

Variable	Correlation Coefficient (*r*)	p-value
Knowledge Self-efficacy	0.08	0.33

Note: p<0.05.

The difference between knowledge and self-efficacy in CPR across the demographic variables of nurses in acute care settings

Table V compares nurses' mean ranks and median for knowledge and self-efficacy, considering various demographic factors such as clinical care settings, advanced life support (ACLS) training, years of working experience, and experience attending CPR cases. The differences were analysed using the Mann-Whitney U-test and Kruskal-Wallis test due to the non-normal distribution of the data. While mean rank values varied across comparison groups, all results appear insignificant (p>0.05).

DISCUSSION

The present study investigates the levels of knowledge and self-efficacy in CPR among nurses working in acute care settings within a public hospital. Additionally, it examines potential relationships between these variables and explores variations in findings across demographic attributes.

Knowledge of cardiopulmonary resuscitation among nurses in acute care settings

The study's findings regarding CPR knowledge among nurses raise significant concerns, as most participants exhibited inadequate CPR knowledge, aligning with the conclusions of a study conducted in Saudi Arabia (6). This deficiency in CPR knowledge is particularly troubling, given CPR's crucial role in saving lives during emergencies. This indicate a widespread lack of CPR knowledge among the nurses under study. However, studies conducted in India and at Umm Al-Qura University have reported a moderate level of CPR knowledge among nurses (20,21). The similarities between these studies emphasize the importance of addressing knowledge gaps to enhance the proficiency of nurses in performing CPR.

An analysis of the knowledge responses has revealed a concerning trend regarding understanding specific aspects of infant CPR among the surveyed nurses, highlighting areas where knowledge gaps exist. Among these, the most notable deficits were observed in recognizing the correct location for chest compressions in infants (Item 5) and understanding the appropriate compression depth for children (Item 9) and neonates (Item 10). Furthermore, responses to scenarios such as choking in a newborn (Item 13) indicated suboptimal levels of knowledge. This pattern of insufficient knowledge suggests a potential gap in nurse education regarding infant CPR protocols and general resuscitation

Table V: The difference between knowledge and self-efficacy in CPR across the demographic variables of nurses in acute care settings
The analysis of difference between knowledge and self-efficacy in CPR across the demographic variables of nurses in acute care settings were performed with Mann Whitney U-test and Kruskal Wallis test and the significant value is set at p<.05.

Variables		Measures							
		Knowledge				Self-efficacy			
		Mean Rank	Median	U	p	Mean Rank	Median	U	p
Acute care area	ED (n=72)	74.13	55.0	2545.5	0.74	75.99	31.67	2410.0	0.39
	ICU (n=73)	71.85				69.97			
ACLS training	Yes (n=62)	72.50	55.0	2542.0	0.90	77.90	31.67	2269.0	0.22
	No (n=83)	73.37				69.34			
Experience attending CPR case	Yes (n=144)	72.88	55.0	54.0	0.76	73.46	31.67	5.50	0.83
	No (n=1)	91.00				6.50			
Working experience (years)	1 – 5 (n=42)	79.48			0.46	69.05			0.49
	6 – 10 (n=78)	69.50				72.41			
	> 11 (n=25)	73.04				81.48			

Note: p<0.05.

practices. The identified deficiencies may be attributed to emergency and intensive care nurses' lack of familiarity with infant treatment protocols during emergencies. This shortfall raises serious concerns, given the unique challenges and requirements associated with administering CPR to infants. In situations where time is of the essence, unfamiliarity with the specificities of infant treatment can lead to delayed or suboptimal responses, potentially compromising patient outcomes.

Low knowledge regarding infant CPR highlights a critical need for targeted educational interventions. Understanding the unique physiological and anatomical considerations involved in providing CPR to infants compared to adults or children is crucial, with specific attention given to aspects such as identifying the correct location for chest compressions, determining appropriate compression depth, and adopting nuanced approaches required for newborns.

The observed decline in knowledge levels may be partially attributed to limitations resulting from the aftermath of the pandemic (22). Disruptions or restrictions in conducting Basic Life Support (BLS) and Advanced Cardiovascular Life Support (ACLS) courses during the pandemic could have impeded healthcare professionals' participation in regular CPR training sessions (23). To tackle this challenge, it becomes essential to reevaluate and adapt the delivery of CPR training courses (24). Alternative formats like online modules or virtual training sessions could provide flexibility and accessibility (25). Additionally, healthcare institutions should prioritize resuming regular BLS and ACLS courses to ensure that healthcare professionals remain updated on the latest guidelines and practices (24). This proactive approach improves knowledge and contributes to maintaining a high standard of care, particularly in critical scenarios involving infant CPR.

Self-efficacy in CPR among nurses in acute care settings
The current findings underscore a high level of self-efficacy regarding CPR among most nurses working in acute care settings. These findings shed light on nurses' confidence levels in executing this vital life-saving procedure, pivotal in emergency response scenarios, with nurses often being the primary responders. Our research indicates that participants exhibited vital self-assurance, reflecting a solid belief in their CPR capabilities. Importantly, this observed self-confidence is deemed satisfactory, underscoring its significant role in empowering nurses to make sound decisions during cardiac arrest. Corresponding with prior research by Alaryani et al. (6), our study contrasts with reports of lower confidence levels in specific aspects of self-efficacy, as noted by Desiani et al. (7).

Similarly, other studies have highlighted nurses' primary concerns regarding their lack of self-efficacy or confidence, which poses a barrier to achieving optimal outcomes (26). Bolarinwa et al. (13) emphasized the detrimental impact of low self-efficacy in CPR among nurses, thus emphasizing the imperative for training initiatives to bolster nurses' confidence in CPR. However, a notable minority exhibiting lower self-efficacy underscores the necessity for targeted interventions and support mechanisms tailored to address specific needs, thereby enhancing nurses' confidence and competence in CPR skills.

The relationship between knowledge and self-efficacy in CPR among nurses
The present study explored the relationship between knowledge and self-efficacy in CPR. Contrary to expectations, no positive correlation was found between knowledge and self-efficacy in CPR among the nurses surveyed. The finding suggests that possessing a higher level of knowledge did not equate to increased self-efficacy in CPR. However, another study reported a positive correlation between knowledge and self-efficacy, particularly noting that many nurses demonstrated moderate knowledge and high self-efficacy in promptly initiating CPR and utilizing automated defibrillation (6).

Nurses must possess essential knowledge, a positive

attitude, and confidence to provide optimal nursing care to cardiac patients (9). Moon and Hyun (27) discovered a complex relationship between knowledge and self-efficacy in a study focusing on the impact of a blended learning CPR program on nurses' knowledge and self-efficacy. Although the intervention group exhibited higher knowledge scores, emotional attitudes, and self-efficacy, the difference in self-efficacy was not statistically significant ($p < 0.05$) (27). Bolarinwa et al. (13) suggested that healthcare professionals' self-efficacy is equally crucial as other factors, such as knowledge, skill, and attitude, in managing cardiac arrest cases. Their findings highlighted a significant challenge faced by participants: a need for more confidence in initiating CPR due to insufficient knowledge. This finding aligns with the present study's discovery of a non-significant correlation, indicating that specific training programs may only sporadically enhance the relationship between knowledge and self-efficacy.

While some studies underscore a significant link between knowledge and self-efficacy in CPR, the results of the current study indicate otherwise. Furthermore, the literature emphasizes the importance of knowledge for proficient CPR performance but acknowledges that various factors may influence its relationship with self-efficacy. The implications for nursing practice and education are evident. Instead of assuming a direct connection between knowledge and self-efficacy, training programs should adopt a comprehensive approach addressing both aspects separately. Moreover, tailored interventions may be necessary for nurses with lower self-efficacy, including additional training to bolster their knowledge base.

The difference between knowledge and self-efficacy in CPR across the demographic variables of nurses in acute care settings

Variations in both knowledge and self-efficacy regarding CPR were investigated across various demographic variables among nurses working in acute care settings. These variables included the specific area of acute care, completion of ACLS training, years of working experience, and exposure to CPR cases. Analysis revealed discernible differences in both knowledge and self-efficacy across these demographic categories.

Nurses with limited experience exhibited lower levels of self-efficacy than their more seasoned counterparts, a finding consistent with Siew Eng and Siok Cheng (17) research, which highlighted a positive correlation between years of experience and self-efficacy. Moreover, nurses directly involved in CPR cases demonstrated notably higher confidence levels than those lacking such exposure, underscoring the crucial role of hands-on experience and real-life scenarios in shaping nurses' readiness and confidence during emergencies (17). Previous studies consistently indicate that nurses with more significant experience and direct exposure to CPR cases tend to possess higher levels of self-efficacy (15,17), echoing the current study's findings and emphasizing the significance of practical experience in bolstering nurses' confidence.

The implications of these findings are profound for nursing practice and education. The disparities in self-efficacy across varying experience levels underscore the necessity for tailored interventions. While novice nurses may benefit from comprehensive training programs, experienced counterparts may require targeted interventions addressing specific challenges to enhance their self-efficacy. The impact of exposure to CPR cases on nurses' self-efficacy accentuates the importance of creating opportunities for active participation in real-life scenarios. Hospitals and educational institutions should thus design and implement programs facilitating regular exposure to CPR cases, ensuring nurses are adequately prepared and confident in handling emergencies.

This study fails to reject the null hypothesis since the findings provide insufficient evidence to illustrate the significant difference or effect between the variables being studied. Several factors may have contributed to these findings, including the study's limited sample size, which diminishes its statistical power to detect actual effects. Additionally, data variability and potential confounding variables or extraneous factors may have obscured underlying effects, making it challenging to discern significant differences.

Limitations

One noteworthy limitation of this study is its relatively small sample size, which may limit the generalizability of findings to a broader population. Future research could benefit from more extensive and diverse samples to enhance the study's external validity. Additionally, this study was conducted in a single public hospital, which may restrict the generalizability of results to different healthcare settings. Furthermore, the reliance on self-reported data for knowledge and self-efficacy assessment introduces potential biases. Participants' recall of experiences and attitudes may lead to recall bias, as memories may not accurately reflect past events.

Directions for Future Research

A more comprehensive approach involving multiple healthcare institutions would provide a more robust understanding of CPR knowledge and self-efficacy. Additionally, incorporating observational study methods and objective data could provide a more accurate assessment of nurses' knowledge and self-efficacy in performing CPR.

CONCLUSION

The current study focused on evaluating the knowledge and self-assurance of nurses in CPR, specifically those working within acute care environments. Nurses in

such settings hold a crucial responsibility in managing critically ill patients, where timely and effective CPR can be a life-saving intervention. Given the urgency and critical nature of emergencies within these settings, nurses must possess theoretical understanding and practical proficiency in administering CPR. In instances of cardiac arrest or respiratory failure, the prompt and adept application of CPR can significantly enhance the likelihood of patient survival. CPR helps sustain blood circulation and oxygenation to vital organs when executed accurately, providing valuable time until advanced medical interventions are available.

This study uncovers a significant disparity between nurses' self-reported confidence levels and their actual knowledge, indicating lower levels of knowledge than initially expected. This inconsistency raises concerns as it suggests that nurses might feel more assured in their CPR abilities than their level of preparedness warrants. Such discordance between confidence and knowledge could potentially hinder the effectiveness of CPR interventions, leading to less-than-optimal outcomes for patients. There is a pressing need for intervention to address the identified knowledge gaps among nurses in CPR (25).

In-house training and educational initiatives, such as workshops, are indispensable tools for enhancing nurses' CPR knowledge (23). These programs should not solely focus on theoretical understanding but should also incorporate practical, hands-on experiences (28). A multifaceted approach is crucial for cultivating increased confidence and proficiency in CPR skills among nurses (29). Such interventions can better equip nurses to respond effectively to cardiac arrest by providing a blend of theoretical comprehension and practical application. Furthermore, these training programs should encompass the latest guidelines and best practices in CPR (23). Keeping nurses updated with current information ensures they are adequately prepared to deliver optimal care during emergencies.

The importance of the present study extends to various stakeholders. For nurses, it emphasizes the continual need for education and training in CPR, highlighting the imperative to bridge the disparity between perceived confidence and actual knowledge. Health institutions, particularly those offering emergency and critical care services, may need to reassess and enhance their training programs to guarantee nurses' readiness for CPR scenarios. The strength of this study lies in its focus on self-efficacy, a crucial yet sometimes underestimated aspect which enriches our understanding of nurses' readiness to handle cardiac arrest situations. The findings of this study make a significant contribution to the current literature by emphasizing the importance of implementing educational interventions and in-house training programs. These initiatives are essential for addressing knowledge gaps and enhancing nurses' competence in CPR. The emphasis on gaining practical, hands-on experience and undergoing regular CPR re-certification aligns with established best practices and recommendations from relevant health organizations.

Crucially, the study's findings hold implications for patient care and safety. Despite their self-reported confidence, the observed low levels of knowledge among nurses raise concerns regarding the quality of CPR administered in emergency and ICU settings. This underscores the necessity for targeted interventions, including regular and comprehensive CPR training, to enhance nurses' knowledge and ensure a high standard of care for critically ill patients.

In summary, the current study holds significance for the nursing profession, healthcare institutions, and, ultimately, patient outcomes. It underscores the importance of addressing knowledge gaps and ensuring that nurses are adequately prepared to deliver effective CPR, particularly in high-stress and time-sensitive situations.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

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