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RESEARCH ARTICLE

Knowledge and Practice of Cardiopulmonary Resuscitation (CPR) among Registered Nurses

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Abstract

Cardiopulmonary resuscitation (CPR) is the first-line treatment for cardiac arrest in a hospitalised patient before defibrillation, until advanced life support is available. In hospital settings, it is critical to have sufficient CPR knowledge and skills among registered nurses to perform high-quality CPR until the arrival of the Code Blue team. This study aimed to determine the knowledge and practice ofcardiopulmonary resuscitation among registered nurses. This study used a descriptive quantitative design. Data was collected using a self-administered questionnaire with 24-item multiple-choice questions. The sample included 143 registered nurses working in the multidisciplinary ward. The subjects' general characteristics were analysed with frequency and percentages using SPPS version 26. The Man Whitney U and Kruskal Wallis were used to find the association between the level of knowledgeand the variables. The (P) probability value more than 0.05 was considered statistically insignificant. The registered nurses demonstrated a good level of knowledge and practice in CPR. The total knowledge mean scores were 128 (89.5),and the practice mean score was 140 (97.9). The study revealed no significant association between knowledge and practice with social demographics ($p > 0.005$). The study findings conclude that the registered nurses have good knowledge and practice in cardiopulmonary resuscitation. However, ongoing educational training is critical to ensure knowledge remains current, thus ensuring better outcomes among cardiac arrest patients.

Keywords: Cardiopulmonary Resuscitation, Cardiac Arrest, Resuscitation, Life Support, Code Blue.

1. Introduction

In the hospital setting, cardiac arrest is a time-critical condition in which nurses or medical personnel must make an emergency call and initiate a nurse to perform cardiopulmonary resuscitation (CPR). Cardio-pulmonary resuscitation is a life-saving technique useful in many emergencies, such as when someone's breathing or heartbeat has stopped (Li et al., 2020). It is the first-line treatment for cardiac arrest in a hospitalised patient before defibrillation, and advanced life support is available. Hence, the knowledge and practical skills in CPR during an emergency among nurses in the hospital are highly related to patients'survival rates (Rikhotso et al., 2021).

Early recognition of the event and rapid activation of the emergency response system was necessary to survive cardiac arrest (Meaney et al., 2013). However, the quality of CPR performed is also the main factor in the increased survival rate. One of the primary measures taken to improve survival after cardiac arrest is a focused effortto improve the quality of CPR(Olasveengen et al., 2020). However, the

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impact of high-quality chest compressions has been studied. The American Heart Association (AHA) CPR Guidelines 2020 reaffirm chest compression quality's importance in optimal survival outcomes. Cardiopulmonary resuscitation (CPR) knowledge and training among registered nurses are critical since nurses are frequently the first initial responders to patients in emergency circumstances.

2. Methodology

2.1 Design and Sampling

This cross-sectional study was conducted at a private hospital in Selangor, Malaysia.Registered nurses with at least one year of clinical experience were included in the study. Purposive sampling was used in this study, with registered nurses being selected based on inclusion and exclusion criteria. The population for this study was 316 registered nurses (N=316), and the sample for this study was 175 based on Krejcie Morgan's table. However, 143 registered nurses (S=143) from various services, including Medical, Surgical, ICU, and Accident & Emergency, responded to this survey with a response rate of 81.7%.

2.2 Study tools

The data collection tool consisted of three main parts.

Section A section was on nurses' demographic details with six(6) items. Section B measured nurses' knowledge of CPR using nine items based on the Adult Basic Life Support 2020 American Heart Association guidelines for cardiopulmonary resuscitation. Section C determined the practice of CPR among nurses and had eight(8) questions. Each item in sections A and B was awarded one point for each correct answer. Scores ± 67 % were considered good practice levels, and scores < 67% were considered poor practice. All respondents were given 30 minutes to complete the questionnaires using the provided Google link form.

2.3 Ethical Considerations

Ethical clearance is sought from the Research Management Committee (RMC) of the University affiliation. The proposal for this study was reviewed and approved by RMC. The purpose of the study, informed consent, and the respondent criteria regarding privacy and confidentiality are attached and briefly explained in the Google form.

3. Results

Table 1. *Demographic characteristics (n=143)*

Characteristic	Frequency (n)	Percentage (%)
Age		
21-30	79	51.0
31-40	52	36.4
41-50	16	11.2
51 and above	2	1.4
Gender		
Male	17	11.9
Female	126	88.1
Education		
Diploma in Nursing	61	42.7
Post-Basic	61	42.7
Degree / Master in Nursing	21	14.7
Area Specialty		
Medical	41	28.7
Surgical	47	32.9
Critical Care Unit	23	16.1
Accident & Emergency	32	22.4
Have Attended Training Course		
Yes	143	100
No	0	0
Working Experience1 – 5 years	50	35.0
6 – 10 years	53	37.1
11 – 20 years	31	21.7
21 years and above	9	6.3

Table 1 shows the demographic information of the respondents. For gender, 88.1% of the respondents were females from 21 to 30 years old (51.0%). Most of the respondents were diploma in nursing holders (42.7%). Based on discipline of work, 41 (28.7%) respondents were from the medical ward, and 32.9% worked in thesurgical ward. All the respondents have attended the CPR training course.

Table 2. *Knowledge regarding CPR*

Question		Frequency (n)/ Percentage(%)
1. Where is the first place you heard about cardiopulmonaryresuscitation?	Correct	132(92.3)
	Wrong	11(7.7)
2. What kind of patient is CPR performed on?	Correct	143(100)
	Wrong	0(0)
3. Should CPR be performed on adults regardless of the absence or presence of a pulse?	Correct	93(65.0)
	Wrong	50(35.0)
4. Where is the best location for chest compression for CPR?	Correct	116(81.1)
	Wrong	27(18.9)
5. What is the depth of the chest compression in adults?	Correct	125(87.4)
	Wrong	18(12.6)
6. The current order of updated CPR intervention for all age groupsexcept newborns.	Correct	106(74.1)
	Wrong	37(25.9)
7. Is 30:2 for adults, children, and infants if only a single rescuer is Present?	Correct	120(83.9)
	Wrong	23(16.1)
8. 15:2 in children and infants if atleast two rescuers are present?	Correct	132(92.3)
	Wrong	11(7.7)
9. 3:1 in newborns unless a cardiac Cause is known?	Correct	104(72.7)
	Wrong	39(27.3)

Table 2 shows participants' knowledge regarding cardiopulmonary resuscitation. Item No.2 on the indication for CPR had all respondents answering correctly.

Table 3. *Level of knowledge regarding CPR (N=143)*

Level of Knowledge	n (%)
Moderate	15 (10.5)
Good	128 (89.5)

For the cardiopulmonary resuscitation level, 128 (89.5%) of the respondents have good knowledge, and only 15 (10.5%) have a moderate knowledge of cardiopulmonary resuscitation.

Table 4. *Practice regarding CPR (N=143)*

Question		Frequency(n) Percentage (%)
1. Have you ever performed CPR?	Yes	131(91.6)
	No	12 (8.4)
2. CPR is generally continued untilthe person regains return of spontaneous circulation or is declared dead.	Correct	125 (87.4)
	Wrong	18 (12.6)
3. What do you do if a patient is not breathing but has a pulse?	Correct	138 (96.5)
	Wrong	5 (3.5)
4. What do you do when a patient is unresponsive, has no pulse, andnot breathing?	Correct	143 (100)
	Wrong	0 (0)
5. In sudden cardiac arrest, what immediate action isusually taken in your facility/ward?	Correct	130 (90.9)
	Wrong	13 (9.1)
6. When performing CPR, It isalways better to be calm and contented rather than look frightened.	Correct	106 (74.1)
	Wrong	37 (25.9)

7. Lack of continuous training and legal backing prevents you fromperforming CPR.	Correct	125 (87.4)
	Wrong	18 (12.6)
8. Lack of personal experience in positive outcomes to reinforce mycapability to initiate CPR	Correct	108 (75.5)
	Wrong	35 (24.5)

Table 4 shows evidence of the level of practice of the registered nurse in cardiopulmonary resuscitation. How to respond to a patient with no pulse or breathing had 100% correct responses. Other responses varied widely, as shown above.

Table 5. *Practice regarding CPR (N=143)*

Level of Practice	n (%)
Moderate	3 (2.1)
Good	140 (97.9)

As shown in Table 5, for the level of practice, there are 140 (97.9%) of the respondents have good levels of practice, while there are 3 (2.1%) respondents with a moderate level of practice.

Table 6. *Relationship between knowledge and practices with socio-demographics*

Demographic data	Knowledge (P-value)	Practice (P-value)
Gender	0.531	0.272
Age	0.202	0.099
Highest education level	0.715	0.523
Area Specialty	**0.001**	0.688
Training(BLS)	-	-
Working experience	0.208	0.591

P <0.05

The relationship between knowledge and practices with socio-demographics among the registered nurses on cardiopulmonary resuscitation was tested using Kruskal-Wallis and Mann-Whitney U tests. There was a statistically significant link between levels of knowledge and area speciality, with the value being 0.001.

4. Discussion

4.1 The Level of Knowledge of Nurses on Cardiopulmonary Resuscitation

This study has shown that nurses had a good to moderate knowledge regarding Cardiopulmonary resuscitation. This study contradicts another study, which showed that most respondents did not know how to perform CPR (Tsegaye & Tesfaye,2015). Another study showed a deficit in CPR knowledge and skills among a large percentage of critical care nurses performing CPR (Alnutaifi,2021).

The study revealed no significant association between level of knowledge with age, sex, education, and the number of years of work experience. However, the knowledge is significantly associated with an area speciality in this study. The nurses from ICU and Accident and Emergency showed more knowledge due to more frequent practices of the skills, supporting the theory that a higher frequency of action in CPR circumstances increases skill retention. ICU nurses have high self-confidence and knowledge due to lots of exposure to CPR and eventually contribute to a positive and better outcome for their patients (Spinelli, Brogi, Sidoti, Pagnucci, & Forfori, 2021). There are 143 (100%) respondents who have attended CPR training.

The basic knowledge of CPR is widespread among nurses mostly because they are part of the curriculum used in the various nursing training colleges and hospitals in Malaysia. However, their ability to retain the knowledge to practice is a challenge. This is consistent with a study by Hansen et al. (2019) that stated attending further training courses on life-saving manoeuvres. A certified BLS-D course organised by instructors dedicated to CPR training must be mandatory for every healthcare personnel working in every hospital.

4.2 Level Practice of CPR among Registered Nurses

The study found that 140 people (97.9%) knew how to perform CPR properly. Age, gender, area speciality, training, and years of work experience did not affect the number of people who couldperform CPR effectively.

For the area of expertise, 32 (67%) of emergency nurses were proficient at performing CPR, followed by critical care nurses 23 (58 %), slightly more numerous. This is because emergency nurses are the first line of contact in emergency settings, implying their ability to perform CPR.

A present study stated that nurses working in the emergency room and critical area are expected to have competent skills in performing CPR on cardiac arrest patients. Again, the study by Spinelli et al. (2021) also showed that ICU nurses have high self-confidence and knowledge due to lots of exposure to CPR and eventually contribute to positive and better patient outcomes. The nurses who have worked 6 - 10 years also constituted 63%, suggesting that long work may have exposed them to many years of CPR practice.

Conversely, a study by Rikhotso et al. (2021) revealed a knowledge gap in CPR among the nurses. Despite prior resuscitation training, years of practice, and confidence in CPR, participants' theoretical knowledge was lacking. Another study done by Alnutaifi (2021) showed a deficit in CPR knowledge and skills among a large percentage of critical care nurses performing CPR. This study discovered that CPR practice is unaffected by current assignment, gender, age, academic qualification, nursing experience, or critical care unit experience. The increase in well-performed CPR could be related to the fact that there is an increase in cardiac arrest cases that require that CPR should be done regularly.

Furthermore, the results for CPR practice among nurses revealed that the vast majority had performed CPR at some point in their careers. About 131 (91.6%) of the nurses performed well, while 12 (8.4%) conducted CPR significantly as part of their professional duties, indicating that the nurses could do CPR. Skills must be engaged or trained to keep competency, and CPR is no exception (Dufourq, Nicole Goldstein, & Botha, 2017). Inadequate cardiac arrest treatment can lead to social concerns, deterioration of healthcare quality, and economic losses due to hospital staffing shortages, lack of training, operational systems, and insufficient equipment or facilities (Oermann et al., 2012). Low level of cardiopulmonary resuscitation practice in developing countries and attributed it to a lack of training for the health workers afterschool (Al-Ani & Mustafa, 2014).

4.3 Factors that Influence the Practice of CPR

The study sought to determine the factors that influence the practice of cardiopulmonary resuscitation among nurses. The adjusted odds ratio obtained for age, sex, education, area speciality, training, and years of work experience while performing CPR were not statistically significant. However, this agrees with a study by Tsegaye & Tesfaye (2015), in which the participants had a good attitude toward CPR and were aware that CPR is a life-saving measure, so every healthcare provider must be confident in their ability to do it. However, a study by Mohammed et al. (2020) discovered that junior doctors and medical students in a representative tertiary care hospital in Upper Egypt severely lack CPR skills. Despite this lack of understanding and, as a result, potential proficiency, attitudes toward CPR were generally positive. A lack of personal experience significantly influences the practice of CPR. The odds of those ICU nurses were five times that of general nurses, which is statistically significant. Nurses with higher qualifications tend to be more knowledgeable in cardiopulmonary resuscitation than nurses with lower qualifications. Guetterman et al. (2019) highlighted that hospitals that excel in IHCA survival prioritise mentoring and empowerment of front-line nurses, as well as clinical competence and adequate nursing training for IHCA care.

Nurses have a critical role in efficiently reacting to disasters. To perform their position effectively, nurses must complete training to develop competent skills in dealing with hospital emergencies, including cardiac arrest. However, this study was conducted only in a single hospital and hence cannot be compared with the findings of this study. Despite these negative findings, our informative meeting positively impacted the participants.

The percentage of the participants who considered adequate preparation at the end of the course rose significantly. Nurses who lack experience have a 65 per cent lower chance of performing CPR than those who have experience. A study by DiLibero, J., & Misto, K. (2021) reported that the personal experience of nurses has a positive outcome because it reinforces their abilities to initiate CPR. In another study the nurses were found to sufficient knowledge on the importnace ad purpose of CPR but had poor knowledge on technique of delivering CPR for achievng optomal results (Vural et al., 2017).

4.4 Study Limitations and Recommendations

First, this study was conducted in one hospital setting and among a small study population. The small sample size limits one's ability to generalise to larger populations. Second,the practice was assessed using

a self-administered questionnaire, which may not accurately reflectperformance during a cardiac arrest. It is not easy to assess performance by questionnaire only.

The result of this study strongly recommended the need for effective, structured, continuous basic life support programs among registered nurses by hospital management for every new recruitment staff on the CPR technique using current AHA 2020 guidelines and practices. According to the American Heart Association, CPR training is required for nurses at least every two years. Hospital trainers should plan refresher courses, workshops, and in-service training to keep their CPR expertise current. The Code Blue Committee should conduct yearly mandatory Mock drill training on the current practice of CPR for nurses to decrease patient morbidity or mortality by ensuring that trained nurses can perform CPR effectively.

5. Conclusion

This study concludes that the registered nurses performed CPR on their patients when needed. This means that once the announcement of Code Blue was heard, the nurses needed to run and perform their CPR. It involved all nurses in the hospital. Moreover, most nurses have experience with cardiopulmonary resuscitation in their working areas, such as Surgical and Medical, not in a critical area or emergency only. According to the study, there is no statistically significant relationship between nurses' knowledge and practice related to cardiopulmonary resuscitation and their demographic characteristics. However, there is a significant relationship between knowledge and area speciality. The result of this study may provide knowledge and practice about cardiopulmonary resuscitation among nurses in the multidisciplinary ward and critical care unit in a private hospital.

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6. References

1. Al-Ani, B. A. J., & Mustafa, M. A. al-K. (2014). Assessment of Nurses' Knowledge towards Cardiopulmonary Resuscitation at Al-Najaf City's Teaching Hospital. Kufa Journal for Nursing Sciences, 4(1), 173–182. https://doi.org/10.36321/kjns.vi20141.2434
2. Alnutaifi, N. (2021). Knowledge and skills of cardiopulmonary resuscitation among critical care nurses in Kuwait hospitals. American Journal of Nursing Research, 9(2), 64–70. https://doi.org/10.12691/ajnr-9-2-4
3. DiLibero, J., & Misto, K. (2021). Outcomes of in-hospital cardiac arrest. Critical Care Nursing Clinics of North America, 33(3), 343–356. https://doi.org/10.1016/j.cnc.2021.05.009
4. Dufourq, N., Nicole Goldstein, L., & Botha, M. (2017). Competence in performing emergency skills: How good do doctors really think they are? African Journal of Emergency Medicine, 7(4), 151–156. https://doi.org/10.1016/j.afjem.2017.05.011
5. Guetterman, T. C., Kellenberg, J. E., Krein, S. L., Harrod, M., Lehrich, J. L., Iwashyna, T.J., Kronick, S. L., Girotra, S., Chan, P. S., & Nallamothu, B. K. (2019). Nursing roles for in-hospital cardiac arrest response: Higher versus lower-performing hospitals. *BMJ Quality & Safety*, *28*(11), 916–924. https://doi.org/10.1136/bmjqs-2019-009487
6. Hansen, C., Bang, C., Stærk, M., Krogh, K., & Løfgren, B. (2019). Certified basic life support instructors identify improper cardiopulmonary resuscitation skills poorly. Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare, 14(5), 281–286. https://doi.org/10.1097/sih.0000000000000386
7. Li, C.-T., Huang, Y.-J., Yeh, C.-M., Chen, W.-L., Chen, G.-Y., Cai, H.-X., Xu, W.-Q., & Hou,
8. H.-T. (2020). Designing an escape room educational game for cardiopulmonary resuscitation training: The evaluation of learning achievement and flow state. *2020 9th International Congress on Advanced Applied Informatics (IIAI-AAI)*. https://doi.org/10.1109/iiai-aai50415.2020.00165
9. Meaney, P. A., Bobrow, B. J., Mancini, M. E., Christenson, J., de Caen, A. R., Bhanji, F., Abella,
10. B. S., Kleinman, M. E., Edelson, D. P., Berg, R. A., Aufderheide, T. P., Menon, V., & Leary, M. (2013). Cardiopulmonary resuscitation quality: Improving cardiac resuscitation outcomes inside and outside the hospital. Circulation, 128(4), 417–435. https://doi.org/10.1161/cir.0b013e31829d8654
11. Mohammed, Z., Arafa, A., Saleh, Y., Dardir, M., Taha, A., Shaban, H., AbdelSalam, E. M.,& Hirshon, J. M. (2020). Knowledge of and attitudes towards cardiopulmonary resuscitation among junior doctors and medical students in Upper Egypt: Cross-sectional study.
12. *International Journal of Emergency Medicine*, *13*(1). https://doi.org/10.1186/s12245-020-00277-x

13. Oermann, M. H., Kardong-Edgren, S. E., & Odom-Maryon, T. (2012). Competence in CPR. AJN, *American Journal of Nursing*, 112(5), 43–46. https://doi.org/10.1097/01.naj.0000414320.71954.34

14. Olasveengen, T. M., Mancini, M. E., Perkins, G. D., Avis, S., Brooks, S., Castrén, M., hung, S. P., Considine, J., Couper, K., Escalante, R., Hatanaka, T., Hung, K. K. C., Kudenchuk, P., Lim, S. H., Nishiyama, C., Ristagno, G., Semeraro, F., Smith, C. M., Smyth, M. A., … Rajendran, K. (2020). Adult Basic Life Support: 2020 International Consensus ON cardiopulmonary Resuscitation and Emergency CARDIOVASCULAR Care Science with Treatment Recommendations. Circulation, 142(16_suppl_1). https://doi.org/10.1161/cir.0000000000000892

15. Rikhotso, M., Perrie, H., Scribante, J., & Jooma, Z. (2021). Cardiopulmonary resuscitation skills profile and knowledge of nurses working in an academic hospital. SA Heart, 18(1). https://doi.org/10.24170/18-1-4772

16. Spinelli, G., Brogi, E., Sidoti, A., Pagnucci, N., & Forfori, F. (2021). Assessment of the knowledge level and experience of healthcare personnel concerning CPR and early defibrillation: an internal survey. *BMC Cardiovascular Disorders*, *21*(1), 1–8. https://doi.org/10.1186/s12872-021-02009-2

17. Tsegaye, W., & Tesfaye, M. (2015). Knowledge, Attitude and Practice of Cardiopulmonary Resuscitation and Associated Factors in Ethiopian University Medical Students. Journal of General Practice, 03(04). https://doi.org/10.4172/2329-9126.1000206

18. Vural, M., Koşar, M. F., Kerimoğlu, O., Kızkapan, F., Kahyaoğlu, S., Tuğrul, S., & İşleyen, H. B. (2017). Cardiopulmonary resuscitation knowledge among nursing students:A questionnaire study. *Anatolian Journal of Cardiology*, *17*(2), 140–145. https://doi.org/10.14744/AnatolJCardiol.2016.7156