

The Role of Emergency Nurses in Cardiopulmonary Resuscitation (CPR) of Cardiac Arrest Patients: A Literature Review

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Abstract

Cardiac arrest can occur anywhere in the hospital area, whether it is in the emergency room, patients who are already in care, outpatients, the patient's family, visitors, or the community of the hospital at work. The literature of the review aims to determine the role of emergency nurses in the administration of pulmonary heart resuscitation in cardiac arrest patients. Literature review through several stages, namely making questions, identification, eligibility, selection of article inclusion, and screening. The Selection Process is listed in the framework of the review literature and obtained the results of article 8 articles. The data showed similar results related to the role of nurses in assisting cardiac arrest patients in hospitals. The results of the article in the review focused on the role of nurses in providing life support to patients with cardiac arrest, almost from all articles reviewed discussing the knowledge, experience, and skills of nurses in providing CPR. The role of nurses in the emergency room in providing life support to cardiac arrest patients is to improve the knowledge, experience, and skills in performing CPR. One way to improve the knowledge, experience, and skills of nurses in providing CPR to cardiac arrest patients is to participate in various training such as Basic Trauma Cardiac Life Support (BTCLS) or Advanced Cardiac Life Support (ATCLS).

Keywords: Role, Emergency, Nurse, Cardiopulmonary Resuscitation (CPR), Cardiac Arrest.

A. INTRODUCTION

Emergency services are an effort to save health in assisting patients or emergency victims quickly and appropriately so that the lives of victims or patients can be saved and avoided disability (Kemenkes RI, 2016). Cardiac arrest or cardiac arrest is a state of a sudden loss of heart function so that the work of the heart is stopped so that it can't pump blood throughout the body and can't supply oxygen in the brain (Lathif et al., 2018). Emergency incidents of cardiac arrest can occur anywhere in the hospital area, whether in patients in the emergency room, patients who are already in care, outpatients, families of patients, visitors, or hospital civitas who are working.

American health services assess that cardiac arrest cases occur more than 420,000 annually, and in Europe as many as 300,000 cases. The southeast Asian region ranks

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third in deaths from cardiac arrests (Nurvitasari et al., 2020). Cardiac arrests in Indonesia do not support data, but there are an estimated 10,000 deaths from cardiac arrests, meaning there are 30 people every day experiencing cases of cardiac arrest (Depkes, 2014).

Cardiac arrest treatment is the ability or effort to be able to detect and provide actions quickly and precisely to restore heart rate in normal conditions, as well as prevent the occurrence of brain death and even the death of harvesters. Based on competency standards from Vanderbilt University School of Nursing, the readiness of nurses in dealing with emergencies is with the ability to think critically, the ability to assess the situation, have adequate technical skills, and the ability to communicate. The readiness of nurses in the handling of cardiac arrest is influenced by several factors, namely the knowledge of nurses related to the handling of cardiac arrest situations, adequate experience, clear rules or protocols, adequate facilities, and supplies, as well as training on handling emergencies. Knowledge greatly affects the skills of nurses in providing action on cases of cardiac arrest. Adequate nurse experience will affect the role of nurses in special tasks in work, in this case, the special task of nurses is to provide cardiac arrest-related actions in the hospital emergency room. Adequate facilities and supplies are everything that can facilitate and facilitate the implementation of business in the form of objects. Training helps nurses to master specific skills and abilities or competencies to succeed in their work (Heng et al., 2011).

The role of nurses in preventing deaths related to cardiac arrest cases is by handling chain of survival, namely providing resuscitation of cardiac massage (CPR) by performing chest compressions as much as 30 times, but it is recommended to do 100-120/minute chest compressions with a depth of 2 inches or 5 cm (AHA, 2015). Rapid and precise CPR delivery in cardiac arrest patients will improve the patient's quality of life or survival rate by two to three times (Hasselqvist-Ax et al., 2015). Life support training in cardiac arrest patients in nurses is very important, to train nurses to recognize the rhythm of collapse and perform manual defibrillation. The obstacles experienced by nurses during practice in hospitals in providing advanced life support and recommendations for prevention and management of cardiac arrest in hospitals should be understood by following some training (Heng et al., 2011).

The purpose of attending life support training so that nurses can provide CPR actions quickly and correctly, it is very important in saving human lives against the death rate of cases in-hospital cardiac arrest (IHCA) (Rahmawati et al., 2019). Improper and effective resuscitation will have an impact on the high death rate from cardiac arrest in hospitals. The role of emergency nurses in hospitals is expected to provide cardiac arrest assistance quickly and effectively so that patients can be saved. The purpose of this literature review is to find out "what is the role of emergency nurses in the provision of pulmonary heart resuscitation in cardiac arrest patients?".

B. METHOD

The main focus of this review paper is on the role of emergency nurses in the administration of pulmonary heart resuscitation in cardiac arrest patients. The preparation of this review through several stages is to create a research question by the Picos method (Problem, Intervention, Comparison, Outcome and Systematic), and then conduct a literature review using diagrams, consisting of identification, eligibility, screening, feasibility selection, and determination of articles that fit the inclusion criteria. At the last stage, the review is conducted systematically using tables.

Journal identification is done by searching journal articles in three databases. The databases used by the authors are Google Scholar, Pubmed, and Science Direct. Furthermore, before performing a search, the author chooses the settings on each database search page namely: articles published between 2011-2020, reference types are articles, the language used is English. Keywords used by the author in this literature review there are 5 keywords in each database, namely Role, Nurse, Emergency, Cardiopulmonary Resuscitation, Cardiac Arrest. From these keywords are expected to be conducted a literature review to answer the question of researchers. Then after searching on each keyword, the author combines/compiles the keyword with the conjunction and (And). At the Identification stage, the number of articles obtained on the Google Scholar database is 223 articles, on the Pubmed database are 3 articles and in Science Direct 218 articles.

Eligibility is an eligible article. At this stage the eligible articles are adjusted based on the suitability of the title and abstract article, at the eligibility stage the remaining articles on the Google Scholar database are 7 articles, PubMed database is 2 articles, and Science Direct 5 articles.

Selection of articles that are by the criteria of inclusion must be done the selection process based on the existing inclusion and exclusion criteria. The criteria for inclusion and exclusion have been determined by the author. The inclusion criteria include: there are explanations about modern wound care application management, modern wound care, nurse knowledge, and articles using only English. In the exclusion criteria are articles in the form of systematic review, literature review or meta-analysis, and related articles, can't be read and can't be edited. At this stage, the article needs to be read in whole or full text. Results at the adjustment stage based on inclusion and exclusion criteria are 2 articles on the Google Scholar database, 2 articles on the Pubmed database, and 4 articles on the Science Direct database.

Screening is a stage to see if there are similar articles between the two existing databases. Of the total number of articles that have been selected through the previous stage is 8 articles, and no articles are the same (no duplicates), so at the screening stage, the number of articles remaining is 8 articles. Assessment results attached in Table 1:

Table 1. Research Journal Search Results

No.	Author	Journal	Title	Methods (Design, Sample, Variable, Instrument, Analysis)	Research Results
1.	(Mokhtari Nori et al., 2012)	Iranian Red Crescent Medical Journal	CPR training for nurses: How often is it necessary?	D: A quasi-experiment S: Nurses V: CPR training for nurses I: Questionnaire using valid multiple-choice questions. A: Repeated measures ANOVA	CPR training plays an important role in the skill of competent nurses in providing life support to heart attack patients.
2.	(Lynch et al., 2019)	Resuscitation	Simulation training enables emergency medicine providers to rapidly and safely initiate extracorporeal cardiopulmonary resuscitation (ECPR) in a simulated cardiac arrest scenario	D: Prospective interventional study. S: Emergency medicine physicians and nurses with no prior ECPR/ECMO experience. V: Effective debridement with micro water jet technology (MWT) I : Observation sheet A: Repeated-Measures Observation sheet ANOVA	Simulation training enables emergency medicine providers to rapidly and safely initiate extracorporeal cardiopulmonary resuscitation (ECPR) in a simulated cardiac arrest scenario
3.	(Couper et al., 2020)	Resuscitation	The impact of resuscitation system factors on in-hospital cardiac arrest outcomes across UK hospitals	D: An observational study S: Nurse V: The impact of resuscitation system factors on in-hospital cardiac arrest outcomes I: Observation sheet A: Multi-level Bayesian models	This research shows that individual factors of nurses in performing CPR can increase the chances of survival of patients with heart attacks in hospitals ranging from 10 to 89%

4.	(Eng et al., 2013)	Resuscitation	Improving the quality of cardiopulmonary resuscitation by training dedicated cardiac arrest teams incorporating a mechanical load-distributing device at the emergency department	<p>D: A phased, prospective studies</p> <p>S: Nurse emergency department</p> <p>V: Improving the quality of cardiopulmonary resuscitation by training dedicated cardiac arrest teams incorporating a mechanical load-distributing device at the emergency department</p> <p>I : Observation sheet</p> <p>A: Odds ratios (OR) presented.</p>	The formation of a life-support treatment team in heart attack patients can be associated with a decrease in NFR within the first 10 minutes of resuscitation. Cardiac arrest team training on nurse's role in 'pit crew' protocol can improve CPR quality in ER well
5.	(Elazazay et al., 2012)	Life Science Journal	Effect of Cardiopulmonary Resuscitation Training Program on Nurses Knowledge and Practice	<p>D: A quasi-experimental research study</p> <p>S: Nurses who are working in Tanta Cancer Institute, Ministry of health (111 nurses)</p> <p>V: Nurses' knowledge related to cardiopulmonary resuscitation</p> <p>I: Questionnaire sheet</p> <p>A: Spearman's test (rho)</p>	An effective training program in improving the knowledge and performance of CPR-related nurses that has improved sharply and then declined one month later, the study recommends annual assessments and refresher courses to nursing staff by - date guidelines for conveying cognitive knowledge and psychomotor skills of CPR and to provide standard care to heart attack victims
6.	(Guetterman et al., 2019)	BMJ Qual. Staf	Nursing roles for in-hospital cardiac arrest response: higher versus lower performing hospitals	<p>D: A descriptive qualitative study</p> <p>S: 158 semi-structured interviews with nurses, physicians, respiratory therapists, pharmacists, quality improvement staff, and administrators</p>	Hospitals that excel in IHCA's survival emphasize mentoring and empowering nurses on the front lines and ensuring clinical competence and adequate nursing training for IHCA care. Nurses have a very important role to play in effectively responding to IHCA.

				<p>V: Analysis identified distinct nursing roles in IHCA care and support for roles.</p> <p>I: Semi structured interviews</p> <p>A: MAXQDA qualitative</p>	
7.	(Blanco-blanco & Peter, 2019)	Nursing Ethics	The advocacy role of nurses in cardiopulmonary resuscitation	<p>D: A critical qualitative design</p> <p>S: One with patients and relatives, two with nurses, and one with physicians</p> <p>V: Role is in cardiopulmonary resuscitation from the perspective of patients, relatives, and health professionals in the Basque Country (Spain).</p> <p>I: Four discussion groups</p> <p>A: Consolidated Criteria for Reporting Qualitative Research (COREQ)</p>	The role of nurses as advocacy needs improvement and empowerment for ethical nursing practices in providing life support measures to heart attack patients and providing perspectives of patients and relatives, nurses and doctors.
8.	(Robinson et al., 2016)	Postgraduate Medical Journal	Cardiac arrest leadership: in need of resuscitation?	<p>D: Cross-sectional survey</p> <p>S: 102 members of a cardiac arrest team at an Acute Hospital Trust in the UK with 892 inpatient beds.</p> <p>V: Perceptions of leadership and team working among members of a cardiac arrest team and to evaluate future training needs</p> <p>I: Questionnaire sheet</p> <p>A: Analysed in Microsoft Excel 2010</p>	Leadership training is integrated into ALS (Resus Council, UK) qualifications. However, this study found that regardless of this training; leadership standards vary. These findings demonstrate the urgent need for further dedicated heart attack leadership training with a focus on improving key leadership tasks such as role assignments, team briefings, and briefings

C. RESULTS AND DISCUSSION

Research related to the role of emergency nurses in providing pulmonary heart resuscitation in cardiac arrest patients is a step that must be achieved by health care workers, especially nurses who are in charge of the emergency room, to provide life support to patients with heart attacks, especially cardiac arrest, from eight articles reviewed about the role of emergency nurses in providing pulmonary heart resuscitation in cardiac arrest patients, from two articles reviewed about the role of emergency nurses in providing pulmonary heart resuscitation in cardiac arrest patients, two studies conducted by this review paper using experimental study design, two articles using prospective studies, one article using qualitative descriptive studies, one article using qualitative critical studies, one article using observational studies, and one article using cross-sectional descriptive studies. All articles reviewed are entirely related to the role of emergency nurses in providing pulmonary heart resuscitation in cardiac arrest patients.

The results of the study Mokhtari Nori et al., (2012), with the title of the study "CPR training for nurses: How often is it necessary?" showed that CPR training has an important role to play in the skill of nurses who are competent in providing life support to heart attack patients. The research has an impact on the success rate of emergency nurses in providing life support to cardiac arrest patients in hospitals, with CPR training expected the role of nurses in providing health services to patients is getting better, and nurses can provide life support quickly, and appropriately in heart attack patients, especially cardiac arrest patients.

The results of the study Lynch et al. (2019), with the research title "Simulation training enables emergency medicine providers to rapidly and safely initiate extracorporeal cardiopulmonary resuscitation (ECPR) in a simulated cardiac arrest scenario" showed the results that simulated training allows emergency drug providers to quickly and safely initiate extracorporeal cardiopulmonary resuscitation (ECPR) against simulated heart attack patients. The research shows that it is necessary and very important for simulation training to provide life support to patients with cardiac arrest so that nurses can prepare medications that should be given to patients and know what to do when dealing with patients with cardiac arrest. The role of nurses is needed because, in hospitals, emergency nurses are the first health care workers to receive patients with any condition, so nurses who are in charge of the emergency room must have competent knowledge and skills in dealing with various types of patient conditions to provide life support to patients.

The results of Couper et al. (2020), with the study title "The impact of resuscitation system factors on in-hospital cardiac arrest outcomes across UK hospitals", showed that individual factors of nurses in performing CPR can increase the chances of survival of patients with heart attacks in hospitals ranging from 10 to 89%. Nurses have an important role in providing life support to cardiac arrest patients, in the study explained that the role of nurses is very important, either in providing nursing care or

providing life support to cardiac arrest patients, it is expected that nurses who work in the emergency room and inpatients have competent skills related to administering CPR to patients with cardiac arrest. The quality of nurses in providing life support to patients with heart attacks will have an impact on patient satisfaction levels, and the patient's family.

The results of the study Eng et al. (2013), with the title of the study "Improving the quality of cardiopulmonary resuscitation by training dedicated cardiac arrest teams incorporating a mechanical load-distributing device at the emergency department", showed that the formation of a life-support response team in heart attack patients could be associated with a decrease in NFR in the first 10 minutes of resuscitation. Cardiac arrest team training on the role of nurses in the 'pit crew' protocol can improve the quality of CPR in the ER well. It can be said that in addition to the individual role of a nurse needs also teamwork to improve maximum results in providing life support to patients with heart attacks. Teamwork plays a role in the success rate of medical teams in providing CPR measures to save patients' lives.

The results of the study Elazazay et al. (2012), with the research title "Effect of Cardiopulmonary Resuscitation Training Program on Nurses Knowledge and Practice", showed the results that the training program is effective in improving the knowledge and performance of nurses related to CPR that has increased sharply and then decreased one month later, the study recommends annual assessments and refresher courses to nursing staff by - date guidelines for conveying cognitive knowledge and psychomotor skills of CPR and to provide standard care to heart attack victims. Life support training for patients with heart attacks is very supportive of the potential of nurses in providing action against patients with cardiac arrest, this is one of the efforts to improve the quality of nurses as one of the medical personnel who has a very important role to the safety of patients and maintains the life of patients. CPR training for nurses periodically is very supportive of the knowledge and skills of nurses in providing emergency measures to patients, so it is expected that the number of deaths from heart attacks can be helped quickly, and appropriately.

Guetterman et al. (2019), under the title "Nursing roles for in-hospital cardiac arrest response: higher versus lower performing hospitals", showed that hospitals that excel in IHCA survival emphasize mentoring and empowerment of nurses on the front lines and ensure clinical competence and adequate nursing training for IHCA care. Nurses have a very important role to play in effectively responding to IHCA. Nurses have a very important role in the safety and life of patients, so a nurse in addition to providing nursing care is also required in providing life support to patients with emergency conditions. The first step that must be achieved by nurses to perform their role properly is to follow the training to have competent skills in handling emergency cases, one of which is the case of cardiac arrest in hospitals. The ability of nurses is expected to encourage the performance of other medical teams in providing optimal health services to prevent soaring death rates from cardiac arrest.

Blanco-blanco & Peter (2019), titled "The advocacy role of nurses in cardiopulmonary resuscitation", showed that the role of nurses as advocacy needs improvement and empowerment for ethical nursing practices in providing life support measures in heart attack patients, and providing perspectives of patients as well as relatives, nurses, and doctors. Nurses have an important role, one of which is to protect patients, so that nurses in providing life support to patients with cardiac arrest should pay attention to the ethical aspects of the actions that will be given to patients so that nurses in providing actions can pay attention to aspects of applicable nursing practice laws and can pay attention to the legal aspects of the patient and the patient's family.

The results of the study Robinson et al., (2016), with the research title "Cardiac arrest leadership: in need of resuscitation?", show that leadership training is integrated into the qualifications of ALS (Resus Council, UK). However, this study found that regardless of this training; leadership standards vary. These findings demonstrate the urgent need for further dedicated heart attack leadership training with a focus on improving key leadership tasks such as role assignments, team briefings, and briefings. The results of the study showed that nurses in providing basic life support need leadership in a team to perform CPR, the role of individuals in providing life support will be different so that each nurse in charge of providing relief measures can focus on what the patient needs so that the hope is that the patient can be helped and avoid disability and even death.

D. CONCLUSION

The results of the literature review of some of the articles above can be explained that the steps to maximize the role of nurses who are in the emergency room in providing life support to cardiac arrest patients is to improve knowledge, experience, and skills in performing CPR. One way to improve the knowledge, experience, and skills of nurses in providing CPR to cardiac arrest patients is to participate in various training such as Basic Trauma Cardiac Life Support (BTCLS) or Advanced Cardiac Life Support (ATCLS).

REFERENCES

1. American, H. A. (2015). *AHA guidelines update for CPR and ECC*.
2. Blanco-blanco, J., & Peter, E. (2019). The advocacy role of nurses in cardiopulmonary resuscitation. *Nursing Ethics*, 27(2), 333–347. <https://doi.org/10.1177/0969733019843634>
3. Couper, K., Mason, A. J., Gould, D., Nolan, J. P., Soar, J., Yeung, J., Harrison, D., & Perkins, G. D. (2020). The impact of resuscitation system factors on in-hospital cardiac arrest outcomes across UK hospitals: An observational study. *Resuscitation*, 151, 166–172. <https://doi.org/10.1016/j.resuscitation.2020.04.006>

4. Departemen, K. R. (2014). Heart Healthy Environment.
5. Elazazay, H. M., Abdelazez, A. L., & Elsaie, O. A. (2012). Effect of Cardiopulmonary Resuscitation Training Program on Nurses Knowledge and Practice. *Life Science Journal*, 9(4), 3494–3503. <http://www.lifesciencesite.com>.
6. Eng, M., Ong, H., Li, J., Quah, J., Annathurai, A., Mohamed, N., Xiong, Z., Boon, K., Tan, K., Pothiawala, S., Ho, A., Khiaw, C., & Fook-chong, S. (2013). Improving the quality of cardiopulmonary resuscitation by training dedicated cardiac arrest teams incorporating a mechanical load-distributing device at the emergency department. *Resuscitation*, 84(4), 508–514. <https://doi.org/10.1016/j.resuscitation.2012.07.033>
7. 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. (2019). Nursing roles for in-hospital cardiac arrest response: higher versus lower-performing hospitals. *BMJ Qual. Staf*, 28(11), 1–9. <https://doi.org/10.1136/bmjqs-2019-009487>
8. Hasselqvist-Ax, I., Riva, G., Herlitz, J., Rosenqvist, M., Hollenberg, J., Nordberg, P., Ringh, M., Jonsson, M., Axelsson, C., Lindqvist, J., Karlsson, T., & Svensson, L. (2015). Early Cardiopulmonary Resuscitation in Out-of-Hospital Cardiac Arrest. *New England Journal of Medicine*, 372(24), 2307–2315. <https://doi.org/10.1056/nejmoa1405796>
9. Heng, K. W. J., Fong, M. K., Wee, F. C., & Anantharaman, V. (2011). The role of nurses in the resuscitation of in-hospital cardiac arrests. *Singapore Medical Journal*, 52(8), 611–615.
10. Kemenkes RI. (2016). Integrated Emergency Management System. Regulation of The Minister of Health of the Republic of Indonesia Number 19 of 2016 Concerning Integrated Emergency Management System, 1–18.
11. Lathif, A., Wahid, A., & Hafifah, I. (2018). The Influence of Cardiac Pulmonary Resuscitation (CPR) Practical Tutorial Toward Knowledge And Motivation To Help The Victim Of Cardiac Arrest In High School Student Of Darul Hijrah Putera Islamic Boarding School. *Journal of Nursing Science*, 6(2), 1689–1699.
12. Lynch, W. R., Vandyck, T., Hebert, C., Waldvogel, J., Havey, R., Weinberg, A., Cranford, J. A., Rooney, D. M., & Neumar, R. W. (2019). Simulation training enables emergency medicine providers to rapidly and safely initiate extracorporeal cardiopulmonary resuscitation (ECPR) in a simulated cardiac arrest scenario. *Resuscitation*, 138(February), 68–73. <https://doi.org/10.1016/j.resuscitation.2019.03.002>
13. Mokhtari Nori, J., Saghafinia, M., Kalantar Motamedi, M. H., & Khademolv Hosseini, S. M. (2012). CPR training for nurses: How often is it necessary? *Iranian Red Crescent Medical Journal*, 14(2), 103–106.
14. Nurvitasari, M., Jainurakhma, J., & Muhammad, Z. (2020). Effect of Cardiac Arrest Management Training on the Ability of Ordinary People To Perform High-Quality Cardio Pulmonary Resuscitation. *Belitung Nursing Journal*, 6(4), 122–126. <https://doi.org/10.33546/bnj.1117>

15. Rahmawati, A., Emaliyawati, E., Kosasih, C. E., Magister, M., Kritis, K., Padjajaran, U., Fakultas, D., Universitas, K., & Bandung, P. (2019). Identification of Code Blue Implementation: Literature Review. *Jurnal Keperawatan Sriwijaya*, 6(2).
16. Robinson, P. S., Shall, E., & Rakhit, R. (2016). Cardiac arrest leadership: in need of resuscitation? *Postgraduate Medical Journal*, 92(1094), 715–720. <https://doi.org/10.1136/postgradmedj-2015-133738>