








Exploring the challenges affecting

the quality of cardiopulmonary resuscitation from the perspective of Emergency Medical Service personnel: a qualitative study

Exploración de los desafíos que afectan la calidad de la reanimación cardiorrespiratoria desde la perspectiva del personal del Servicio Médico de Emergencia: un estudio cualitativo

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Abstract

Many cases of cardiopulmonary arrest can be reversed with immediate and accurate cardiopulmonary resuscitation (CPR). Successful cardiopulmonary resuscitation is an important criterion for evaluating Emergency Medical Services (EMS) personnel's performance. The present study aims to use EMS personnel's experiences to determine the barriers that affect the quality of cardiopulmonary resuscitation. The present study is a qualitative work with a conventional content analysis approach. The subjects were 20 EMS personnel who were selected through purposeful sampling. Data were collected via semi-structured individual, in-depth interviews with each of the 20 subjects on a face-to-face basis. The data were analyzed using Graneheim and Lundman's approach. The collected data analysis yielded 3 main themes: personal and occupational factors, organizational factors (ineffective management), and socio-cultural factors. For high-quality cardiopulmonary resuscitation, there are cultural, professional, and organizational requirements that must be met. Prehospital emergency administrators can use the present study's findings to plan and take measures toward eliminating barriers and enhancing the effectiveness and quality of cardiopulmonary resuscitation.

Keywords: Cardiopulmonary resuscitation, Cardiac Arrest, Emergency medical services (EMS).

Resumen

Muchos casos de parada cardiorrespiratoria pueden revertirse con reanimación cardiopulmonar (RCP) inmediata y precisa. La reanimación cardiorrespiratoria exitosa es un criterio importante para evaluar el desempeño del personal de los servicios médicos de emergencia (SME). El presente estudio tiene como objetivo utilizar las experiencias del personal de los SME para determinar las barreras que afectan la calidad de la reanimación cardiorrespiratoria. El presente estudio es un trabajo cualitativo con un enfoque de análisis de contenido convencional. Los sujetos fueron 20 miembros del personal de SME, seleccionados mediante un muestreo intencionado. Los datos se recopilaron a través de entrevistas individuales semiestructuradas en profundidad con cada uno de los 20 sujetos en forma presencial. Los datos se analizaron utilizando el enfoque de Graneheim y Lundman. El análisis de los datos recolectados arrojó 3 temas principales: factores personales y ocupacionales, factores organizacionales (gestión ineficaz) y factores socioculturales. Para una reanimación cardiorrespiratoria de alta calidad, existen requisitos culturales, profesionales y organizativos que deben cumplirse. Los administradores de emergencias prehospitalarias pueden utilizar los hallazgos del presente estudio para planificar y tomar medidas para eliminar barreras y mejorar la efectividad y calidad de la reanimación cardiopulmonar.

Palabras clave: Reanimación cardiorrespiratoria, paro cardíaco, servicios médicos de emergencia (SME).

An urgent medical emergency and a major threat to patients' lives, cardiopulmonary arrest happens unexpectedly anywhere anytime¹. Cardiopulmonary resuscitation (CPR) is an emergency procedure performed to restore a person's cardiac function, blood circulation and respiration. Cardiopulmonary resuscitation comprises organized measures taken for patients in cardiopulmonary arrest to keep the circulatory and respiratory systems functioning to provide enough oxygen to the vital organs to keep them from dying until automatic physiological functioning of the blood circulation system recovers². Despite significant developments in the prevention of cardiopulmonary arrest, it remains the most serious issue in healthcare and accounts for unexpected deaths in many countries. Every year, thousands of people lose their lives to cardiopulmonary arrest, many of which deaths occur before the patients are admitted into hospitals^{3,4}. Though over fifty years have passed since the invention of cardiopulmonary resuscitation, the number of resuscitated cases is still small, and even when resuscitation is successful, the resuscitated patient needs special care⁵. The quality of cardiopulmonary resuscitation affects its chances of success in keeping survival of patients⁶. Studies show that the quality of cardiopulmonary resuscitation is determined by such factors as the length of resuscitation, the nature of the underlying disorder, timely use of a defibrillator, and the knowledge and skill of the medic^{7,8}. More than half of mortalities due to cardiac arrest occur outside hospitals, and the immediate intervention of Emergency Medical Service (EMS) personnel as the first healthcare team present by a patient, plays a vital role in decreasing the mortality rate and the consequences of cardiac arrest⁹.

The reasons for the success or failure of cardiopulmonary resuscitation must be determined, and the predictors of successful resuscitation are identified. As the first link in the chain of survival in cardiac arrest, EMS personnel need to know the barriers to successful cardiopulmonary resuscitation. Moreover, an understanding of these professionals' experiences of the barriers that affect the quality of cardiopulmonary resuscitation can help emergency care administrators identify the factors that threaten the lives of patients in need of cardiopulmonary resuscitation. Most studies on barriers to successful cardiopulmonary resuscitation are quantitative works conducted in hospitals and only a few of them address hospital personnel with a qualitative approach. Also, there has never been any qualitative research into the barriers and challenges which affect the quality of cardiopulmonary resuscitation by EMS personnel. In view of the cultural, social, and economic differences between Iran and other countries, the present study is a qualitative attempt to explore the experiences of prehospital EMS personnel of the barriers that affect the quality of cardiopulmonary resuscitation.

The present study is a qualitative work that relies on conventional content analysis. This research method is a mental analysis of the content of textual data in which the researcher explores printed material to extract main themes and patterns which exist in the data^{10,11}.

Sample and settings: In the present study, which lasted from April 2019 to January 2020, 20 members of the EMS personnel who work in urban, rural, and road bases in some major cities in the south-west of Iran were selected via purposeful sampling. The inclusion criteria were, having at least one year of professional practice experience and willing to participate in the study.

Data collection: Data were collected through individual interviews and focus group interviews: 20 individual semi-structured, in-depth interviews were conducted with 20 members of EMS personnel on a face-to-face basis. Each interview was conducted in 1 or 2 sessions lasting from 35 to 60 minutes. The interviews were continued until in-depth data were acquired and the process of participant selection was continued to the point of data saturation.

All the interviews were carried out in the conference hall of the EMS center. Each interview began with a statement of the object of the interview followed by a few descriptive questions on the interviewee's work experience, academic degree, and type of employment contract. Afterward, the structured questions were asked, including: "Can you describe your typical workday in EMS?", "Based on your experiences, what factors influence the quality and efficacy of cardiopulmonary resuscitation?", "As a member of the EMS personnel, what problems and challenges do you face in performing cardiopulmonary resuscitation and providing care to patients in cardiac arrest?" Also, to enhance the clarity of the information provided by the participants, the researchers asked follow-up questions, including: "Can you explain this matter further?", "What do you mean by that?", "Can you give an example or relate an experience?"

As soon as they were completed, the interviews were transcribed and read and re-read several times. Also, during their presence on the field to interview the participants, the researchers observed the location, the interactions between the participants and their colleagues, their conversations and non-verbal behaviors and used their field notes as a supplement to their collected data to fill the gaps in the categories and concepts derived from the data. To avoid misinterpretation of the data and to retain their richness, the researchers took field notes right after each interview, and the interviews were analyzed together with the field notes. Eventually, the collected data were analyzed using the software MAXQDA 10.0 R250412.

Data analysis: In the present study, the data were analyzed according to Graneheim and Lundman's inductive content analysis method (2004). This method consists of 5 steps: 1. Immediate transcription of each interview, 2. Reading the entire transcript of an interview to achieve a general understand-

ing of it, 3. Determination of units of meaning and initial codes, 4. Classification of similar initial codes into more general categories according to their similarities and differences, and 5. Choosing a proper name that covers the resultant categories¹².

Rigor: To ensure the collected data's trustworthiness, the researchers used the criteria suggested by Lincoln and Guba¹³. Also, prolonged engagement and member checks were used to verify the credibility of the data: the participants were presented with a summary of the transcripts of the interviews to confirm the accuracy of the researchers' interpretation. In addition, a peer check was used to confirm the ability of the data; accordingly, all the coded data and categories were examined by 4 nursing professors who were skilled in qualitative research. To achieve dependability of data in the study, three researchers were asked to do an accurate audit of the process of data collection and analysis. To ensure the transferability of the data and make it possible for others to follow the stages in the present research, the researchers provided comprehensive and accurate descriptions of the research method, the characteristics of the participants, the methods of data collection and data analysis, alongside excerpts of the participants' statements.

Ethical considerations: The research plan for the present study was approved by the Ethics Committee and Research Council of Fasa University of Medical Sciences (IR.FUMS.REC.1398.179). Before being interviewed, the participants were informed about the study's objectives, the voluntary nature of their participation, methods of data collection and why their voices were to be recorded, the roles of the researchers and the participants, the confidentiality of the information, and their anonymity. Besides, the recorded interviews were kept in a safe place and were only accessible by the researcher. Afterward, they were asked to complete the informed consent form if they were willing to participate. The participants were also informed that they were free to withdraw from the study at any time.

Results

The average age and work experience of the participants were 33.85 ± 5.66 and 9 ± 4.85 years, respectively. The personal characteristics of the participants are shown in (Table 1). Analyses of the data derived from interviews with the participants yielded 3 main categories and 8 subcategories (Table 2).

Table 1. Individual characteristics of the participants

Participants	Age (year)	Educational level	Work experience (years)	Workplace
P1	38	Bachelor's degree in EMS	11	Urban bases
P2	35	Associate degree in EMS	10	Road bases
P3	39	Bachelor's degree in EMS	16	Urban bases
P4	26	Bachelor's degree in EMS	2	Rural bases
P5	30	Associate degree in EMS	8	Urban bases
P6	31	Associate degree in EMS	7	Urban bases
P7	37	Bachelor's degree in EMS	9	Road bases
P8	34	Associate degree in EMS	10	Road bases
P9	33	Bachelor's degree in EMS	8	Rural bases
P10	46	Master's degree in of nursing	18	Urban bases
P11	29	Bachelor's degree in EMS	5	Urban bases
P12	42	Bachelor's degree in EMS	15	Road bases
P13	28	Associate degree in EMS	4	Rural bases
P14	25	Bachelor's degree in EMS	2	Urban bases
P15	29	Bachelor's degree in EMS	3	Road bases
P16	39	Associate degree in EMS	14	Road bases
P17	32	Bachelor's degree in EMS	5	Urban bases
P18	30	Bachelor's degree in EMS	6	Urban bases
P19	33	Associate degree in EMS	12	Urban bases
P20	41	Bachelor's degree in EMS	15	Road bases

Table 2. Main categories and subcategories of the research

Main categories	Subcategories
Personal and occupational factors	Professional incompetence
	Characteristics of workplace
Organizational factors (ineffective management)	Shortage of medical equipment
	Lack of qualified personnel
	Lack of programs for continuous development of personnel
	Poor performance of dispatch center
	Lack of prehospital emergency care centers
Socio-cultural factors	Public's inadequate basic knowledge of CPR
	Public's interference in the personnel's practice

Personal and occupational factors

Professional incompetence

From the perspective of the participants, EMS personnel must possess professional competencies, including clinical knowledge, skill, clinical experience, presence of mind, and intelligence. EMS personnel must also be skilled in critical thinking, clinical judgment, clinical reasoning, teamwork, and time management. According to the participants, a member of EMS personnel must be an all-around expert. The slightest mistake in cardiopulmonary resuscitation performance can have irreversible side effects and even lead to death.

One of the participants stated that:

“Unfortunately, some of my colleagues lack knowledge and skill in cardiopulmonary resuscitation and don’t even know the basics of it and get nervous and confused. I’ve witnessed cases where their inadequacy caused a patient’s death” (Participant No. 3).

Another participant remarked that:

“In my experience, in addition to knowledge, skill, and clinical experience, EMS personnel need to have teamwork skills in cardiopulmonary resuscitation. Sadly, many of the personnel lack that skill, everybody wants to be boss and dish out orders, which fails teamwork” (Participant No. 2).

Characteristics of workplace

From the perspective of the participants, the work atmosphere of EMS is complicated, unpredictable, and stressful. Driving an ambulance in bad weather conditions and encountering patients and patient companions who are emotionally unstable can adversely affect the EMS personnel’s performance. Thus, the EMS personnel must be able to handle such conditions and possess high levels of tolerance, patience, and emotional stability so that they can remain cool and focused and take effective measures in emergencies, including cardiac arrest.

One of the participants stated that:

“Work in EMS is very demanding, and not everyone can manage the pressure of work in such an environment. You need to be very strong and tolerant. Sometimes, I see some of my highly skilled colleagues fail to use their professional capacities because they can’t handle the stressful atmosphere of the job in emergencies including CPR” (Participant No. 12).

Organizational factors (ineffective management)

From the perspective of the participants, the most important organizational dysfunctions which affect the quality and efficacy of cardiopulmonary resuscitation are lack of equipment, lack of skilled and efficient personnel, lack of continuing training programs for the empowerment of the EMS personnel, the poor performance of dispatch center, and lack of prehospital emergency medical care centers.

Regarding lack of equipment, one of the participants remarked that:

“Some of our ambulances in the road and rural prehospital emergency services don’t have a direct current (DC) cardio-

version-defibrillation. What am I supposed to do if a patient requires ventricular fibrillation (VF)”? (Participant No.7)

According to another participant:

“One of the administrative issues is the employment of inexperienced personnel in EMS. The EMS administration argues that they will become experienced over time. But EMS is where you should act, not gain experience. How can a member without enough knowledge and skill in cardiopulmonary resuscitation save a patient’s life? How many patients must lose their lives before these people become experienced”? (Participant No. 19)

Referring to organizational factors, another participant stated that:

“For the personnel to be aware of the latest guidelines in cardiopulmonary resuscitation and keep their knowledge and practical skills up-to-date, EMS’s education and administration departments must empower the personnel by holding workshops for them. Unfortunately, at times, we didn’t have a single training program in a whole year” (Participant No. 10).

The inefficiency of the dispatch center is another organizational factor that adversely affects the quality of cardiopulmonary resuscitation. According to one participant:

“The dispatch center personnel in EMS are not knowledgeable enough about cardiac arrest and cardiopulmonary resuscitation. They cannot obtain a history properly or guide patients’ companions about how to perform basic CPR. All they can do is to tell us that a patient is in cardiac arrest and we must get to their location a.s.a.p.” (Participant No. 17).

From the participants’ perspective, the interval between arriving at a patient’s location and transferring him/her to a medical center is another major organizational factor that adversely affects the quality of cardiopulmonary resuscitation. One of the participants stated that:

“Quick presence at a patient’s side is one of the most important links in the chain of saving a patient in cardiac arrest. Due to the lack of prehospital emergency care centers, especially in rural areas and intercity roads, when we get to a patient, because of the lengthy delay between the time of cardiac arrest and the arrival of the personnel, many patients have already died” (Participant No. 18).

Socio-cultural factors

From the participants’ perspective, cardiopulmonary resuscitation’s quality and efficacy are affected by socio-cultural factors, including the public’s poor familiarity with cardiac arrest and cardiopulmonary resuscitation and emotional and unscientific interference on the part of most people (eyewitnesses). One of the participants remarked:

“Many people have insufficient knowledge of cardiac arrest and CPR. On several occasions, when I got to a patient and asked the people who were there what the problem was and why they had called the emergency services, they merely said that that person had stopped speaking and did not make any reactions. After I examined the patient, I realized he or she had been dead for hours” (Participant No. 6).

According to another participant:

“Impulsive and unscientific interference from unknowledgeable individuals has an adverse effect on the quality of CPR. Many times, I have seen patients’ companions interfere in our work, which not only wastes our time but disrupts the correct procedure of performing CPR. For instance, in one mission, we got to the side of a 40-year-old man. The cardiac monitoring results showed he was in asystole, so my colleague and I immediately began CPR. But the patient’s companions kept saying, “Why don’t you just take him to the hospital now? We do not want you to give him CPR, don’t waste time, move now!” (Participant No. 11).

Discussion

The present study is a qualitative study conducted to explore EMS personnel’s experiences of the challenges and barriers that affect the quality of cardiopulmonary resuscitation. Analyses of the participants’ experiences showed that the barriers to effective cardiopulmonary resuscitation could be classified into three categories: personal and occupational factors, organizational factors, and socio-cultural factors. In the present study, personal and occupational factors were found to be among the major barriers to effective cardiopulmonary resuscitation. From the participants’ perspective, professional competencies, including clinical knowledge and skill, have a significant impact on the quality of cardiopulmonary resuscitation. Likewise, the results of the study of Rajeswaran (2018) show the medical personnel’s adequate professional knowledge and awareness are crucial to the efficacy and success rate of cardiopulmonary resuscitation; thus, administrators must hold regular workshops to keep the personnel’s knowledge and skill up-to-date and continuously assess their abilities in this area¹⁴. The studies of Munezero et al. (2018) and Finn et al. (2018) indicate that education plays a significant part in enhancing nurses’ knowledge of cardiopulmonary resuscitation, and continuous educational programs in this field are necessary^{15,16}. According to the participants’ experiences, EMS’s work atmosphere and conditions affect the personnel’s performance. The participants believed that EMS personnel need to be highly resilient to adapt to the hard and stressful work conditions in this field. Since cardiopulmonary arrest cases, patients’ companions may display abnormal and aggressive behaviors, EMS personnel must possess such psychological abilities as patience and emotional stability to manage their feelings and emotions and treat patients’ companions appropriately. Similarly, the studies of Tubbert (2016) and Li et al. (2019) report that emergency care nurses need to be resilient and patient enough to be able to employ their skills in critical and emergencies and take effective clinical measures^{17,18}. From the participants’ perspective, lack of experienced and efficient personnel and lack of equipment are among major organizational factors that adversely affect cardiopulmonary resuscitation quality. Likewise, the study of Bijani et al. (2018) shows that a shortage of skilled personnel and equipment affects the quality of triage in emergency departments¹⁹. Similarly, Wolf et al. (2018) reported that lack

of skilled nursing personnel and work overload, and the resultant fatigue in emergency departments lead to patients’ dissatisfaction and poor-quality care²⁰. Another organizational factor that affects the quality of cardiopulmonary resuscitation is the inefficiency of dispatch centers. The present study results show that dispatch center personnel do not have enough knowledge about cardiopulmonary resuscitation and fail to inform patients’ companions properly about how to give first aid.

Ng et al. (2018) state that dispatch centers play an increasingly important role in cardiopulmonary resuscitation. A dispatch center is the first link in the chain of survival in cardiac arrest, and without quick access, the following links become useless²¹. According to Brooke et al. (2012), the success rate of cardiopulmonary resuscitation is largely determined by the knowledge and skill of dispatch center personnel: they must be skillful at obtaining patients’ medical histories, identifying their problems by asking key questions, and providing the necessary guidelines in emergencies, especially cases of cardiac arrest. Thus, dispatch center personnel must be continuously trained to perform effectively²². According to Lee et al. (2020), dispatch center personnel’s performance has a great impact on the efficacy of cardiopulmonary resuscitation when cardiac arrest occurs outside the hospital²³.

The present study results show that the interval between arriving at the location of a patient in cardiac arrest and transferring him/her to a medical center is an influential factor in the success rate of cardiopulmonary resuscitation. The participants mentioned that this interval is sometimes too long due to distance, especially in rural areas. EMS administrators can reduce the length of this interval by setting up emergency care centers in rural areas. According to Snooks et al. (2019), seconds count in saving a patient’s life in prehospital emergency care centers. Quick access to ambulance services in life-threatening situations is vital, and delay can result in death²⁴. The results of the study of Bürger et al. (2018) show that quick access to prehospital emergency care services can significantly decrease the mortality rate and consequences of cardiac arrest²⁵. Similarly, Kitamura et al. (2014) report a direct relationship between the length of time an ambulance takes to arrive at a patient’s location and the distance to a medical center on the one hand, and the consequences and mortality rate of patients with cardiovascular events²⁶.

Socio-cultural factors also were found to affect the quality of cardiopulmonary resuscitation. The present study results show that the public’s poor familiarity with cardiopulmonary resuscitation and their unwanted interference in the work of EMS personnel have an adverse effect on the quality and success rate of cardiopulmonary resuscitation. Thus, the public’s awareness of cardiac arrest and cardiopulmonary resuscitation must be raised. Since time is a crucial factor in the success rate of cardiopulmonary resuscitation and because, in some cases where distance is too long, an ambulance cannot get to a patient in time, the CPR knowledge and skill of patients’ companions and the public, in general, can prove very helpful. The study of Özbilgin et al. (2015) and Chen et al. (2017) report that the public’s knowledge and skill in car-

diopulmonary resuscitation positively impact the success rate of cardiopulmonary resuscitation. Accordingly, awareness-raising campaigns and educating the public in this area can have many benefits²⁷⁻³⁰.

Conclusion

The prerequisite of high-quality cardiopulmonary resuscitation is agreeable socio-cultural and organizational conditions. By identifying the barriers to effective cardiopulmonary resuscitation and taking measures to eliminate them, EMS administrators can decrease the mortality rate due to cardiac arrest and enhance patients' access to safe care. Moreover, the public's familiarity with cardiac arrest and cardiopulmonary resuscitation must be improved.

Limitations: The present study addresses only EMS personnel's perspective and the views of the receivers of their care are not considered. Also, given cultural, economic, and social differences between different nations, the researchers suggest similar studies in other countries.

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References

1. Cheskes S, Byers A, Zhan C, et al. CPR quality during out-of-hospital cardiac arrest transport. *Resuscitation*. 2017; 114:34-39. doi: 10.1016/j.resuscitation.2017.02.016.
2. Fordyce CB, Hansen CM, Kragholm K, et al.: Association of Public Health Initiatives with Outcomes for Out-of-Hospital Cardiac Arrest at Home and in Public Locations, *JAMA Cardiol*, 2017; 2(11): 1226-1235. doi: 10.1001/jamacardio.2017.3471.
3. Matsuura TR, Bartos JA, Tsangaris A. et al. Early effects of prolonged cardiac arrest and ischemic postconditioning during cardiopulmonary resuscitation on cardiac and brain mitochondrial function in pigs. *Resuscitation*. 2017; 116:8-15. doi: 10.1016/j.resuscitation.2017.03.033.
4. Daya MR, Schmicker RH, Zive DM, et al. Out-of-hospital cardiac arrest survival improving over time: Results from the Resuscitation Outcomes Consortium (ROC). *Resuscitation*, 2015; 91: 108-115. <https://doi.org/10.1016/j.resuscitation.2015.02.003>.
5. Gräsner JT, Lefering R, Koster RW. EuReCa ONE-27 Nations, ONE Europe, ONE Registry: A prospective one-month analysis of out-of-hospital cardiac arrest outcomes in 27 countries in Europe. *Resuscitation*. 2016 Aug; 105:188-95. doi: 10.1016/j.resuscitation.2016.06.004.
6. Nehme Z, Andrew E, Bernard S, Smith K. Impact of cardiopulmonary resuscitation duration on survival from paramedic witnessed out-of-hospital cardiac arrests: An observational study. *Resuscitation*. 2016; 100:25-31. doi: 10.1016/j.resuscitation.2015.12.011
7. Sasson C, Rogers MA, Dahl J, Kellermann AL. Predictors of survival from out-of-hospital cardiac arrest: a systematic review and meta-analysis. *Circ Cardiovasc Qual Outcomes*. 2010; 3: 63-81. doi: 10.1161/CIRCOUTCOMES.109.889576
8. Dyson K, Bray J, Smith K, Bernard S, Finn J. A systematic review of the effect of emergency medical service practitioners' experience and exposure to out-of-hospital cardiac arrest on patient survival and procedural performance. *Resuscitation*. 2014; 85: 1134-1141. doi: 10.1016/j.resuscitation.2014.05.020.
9. Lyon RM, Nelson MJ. Helicopter emergency medical services (HEMS) response to out-of-hospital cardiac arrest. *Scand J Trauma Resusc Emerg Med*. 2013; 21:1. doi: 10.1186/1757-7241-21-1.
10. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs*. 2008 Apr; 62(1): 107-15. doi: 10.1111/j.1365-2648.2007.04569.
11. Moretti F, van Vliet L, Bensing J, et al. A standardized approach to qualitative content analysis of focus group discussions from different countries. *Patient Educ Couns*. 2011 Mar; 82(3): 420-8. doi: 10.1016/j.pec.2011.01.005.
12. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*. 2004; 24(2):105-12. <https://doi.org/10.1016/j.nedt.2003.10.00>.
13. Cypress BS. Rigor or Reliability and Validity in Qualitative Research: Perspectives, Strategies, Reconceptualization, and Recommendations. *Dimens Crit Care Nurs*. 2017 Jul/Aug; 36(4): 253-263. doi: 10.1097/DCC.0000000000000253.
14. Rajeswaran L, Cox M, Moeng S, Tsima BM. Assessment of nurses' cardiopulmonary resuscitation knowledge and skills within three district hospitals in Botswana. *Afr J Prim Health Care Fam Med*. 2018;10(1): e1-e6. Published 2018 Apr 12. doi:10.4102/phcfm.v10i1.1633.
15. Munezero JBT, Atuhaire C, Groves S, Cumber SN. Assessment of Nurses knowledge and skills following cardiopulmonary resuscitation training at Mbarara Regional Referral Hospital, Uganda. *Pan Afr Med J*. 2018 Jun 11; 30: 108. doi: 10.11604/pamj.2018.30.108.15398.
16. Finn JC, Bhanji F, Lockey A, et al. Part 8: education, implementation, and teams: 2015 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Resuscitation*. 2015; 95: e203-e224. doi: 10.1016/j.resuscitation.2015.07.046.
17. Tubbert SJ. Resiliency in Emergency Nurses. *J Emerg Nurs*.2016;42(1):47-52. doi: 10.1016/j.jen.2015.05.016
18. Lin CC, Liang HF, Han CY, Chen LC, Hsieh CL. Professional resilience among nurses working in an overcrowded emergency department in Taiwan. *Int Emerg Nurs*. 2019 Jan; 42: 44-50. <https://doi.org/10.1016/j.ienj.2018.05.005>
19. Bijani M, Khaleghi A. Challenges and Barriers Affecting the Quality of Triage in Emergency Departments: A Qualitative Study. *GMJ*. 2019; 8: e1619. DOI:10.31661/gmj.v8i0.1619.
20. Wolf LA, Delao M, Perhats C, Triaging the Emergency Department, Not the Patient: United States Emergency Nurses' Experience of the Triage Process. *J Emerg Nurs*. 2018; 44(3): 258-266. doi: 10.1016/j.jen.2017.06.010.

21. Ng YY, Leong SH, Ong ME. The role of dispatch in resuscitation. Singapore Med J. 2017; 58(7): 449-452. doi:10.11622/smedj.2017059.
22. Brooke Lerner E, Thomas D, Bentley J, et al., Emergency Medical Service Dispatch Cardiopulmonary Resuscitation Prearrival Instructions to Improve Survival from Out-of-Hospital Cardiac Arrest. Circulation. 2012; 125(4):648-655. https://doi.org/10.1161/CIR.0b013e31823ee5fc.
23. Lee, S.C.L., Mao, D.R., Ng, YY, et al. Emergency medical dispatch services across Pan-Asian countries: a web-based survey. BMC Emerg Med. 2020; 20(1):2-8. https://doi.org/10.1186/s12873-019-0299-1.
24. Snooks, H. A., Khanom, A., Cole, R, et al., What are emergency ambulance services doing to meet the needs of people who call frequently? A national survey of current practice in the United Kingdom. BMC Emerg Med. 2019; 19(82):2-8. https://doi.org/10.1186/s12873-019-0297-3.
25. Bürger A, Wnent J, Bohn A, Jantzen T, Brenner S, Lefering R, Seewald S, Gräsner JT, Fischer M: The effect of ambulance response time on survival following out-of-hospital cardiac arrest—an analysis from the German resuscitation registry. Dtsch Arztebl Int 2018; 115: 541–8. doi: 10.3238/arztebl.2018.0541.
26. Kitamura T, Iwami T, Kawamura T et al. Ambulance calls and prehospital transportation time of emergency patients with cardiovascular events in Osaka City. Acute Medicine & Surgery 2014; 1: 135–144. https://doi.org/10.1002/ams2.25.
27. Özbilgin Ş, Akan M, Hancı V, Aygün C, Kuvaki B. Evaluation of Public Awareness, Knowledge and Attitudes about Cardiopulmonary Resuscitation: Report of İzmir. Turk J Anaesthesiol Reanim. 2015; 43(6): 396-405. doi:10.5152/TJAR.2015.61587.
28. Chen M, Xuan Li YW, Hou L, et al. Public Knowledge and Attitudes towards Bystander Cardiopulmonary Resuscitation in China, BioMed Research International. 2017: 2-7. https://doi.org/10.1155/2017/3250485.
29. Henstock P. Artificial Intelligence in Pharma: Positive Trends but More Investment Needed to Drive a Transformation. Archives of Pharmacology and Therapeutics. 2021 Jan 8;2(2).
30. Lamelas P, Diaz R, Orlandini A, Avezum A, Oliveira G, Mattos A, Lanas F, Seron P, Oliveros MJ, López-Jaramillo P, Otero J. Prevalence, awareness, treatment and control of hypertension in rural and urban communities in Latin American countries. Journal of hypertension. 2019 Sep 1;37(9):1813-21.



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