# Effect of Educational Program on Nurses' Role During and Post CPR in Khartoum State Hospitals

**Elturabi Elsayed Ebrahim**

Department of Nursing, College of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Alkharj, Riyadh, Saudi Arabia

*Abstract*---Background: Cardiopulmonary resuscitation (CPR) is knowing as the sudden, stopped of heart function and respiratory breathing also is stopped unexpected condition and potentially reversible, clinically manifested by unconsciousness, apnea, weak or absent pulse if not treated within minute leads to death. The nurse is importance to knowing about the intervention when found patient arrested now a day not for medical staff must be knowing regarding of CPR but the general population should be training about how to save arrested person.

*Keywords*---airway obstruction, automated external defibrillator (AED), cardiopulmonary resuscitation, do-not-attempt resuscitation (DNAR), Khartoum, post arrested, Sudan, ventricular fibrillation (VF).

## Introduction

Cardiopulmonary resuscitation (CPR) could be an advantageous strategy to lifesaving in numerous emergencies condition like heart attack or near drowning, in which someone's breathing or heartbeat has stopped. The American Heart Association recommends that every person have no experience or untrained to do CPR begin with chest compressions (1). Cardiopulmonary resuscitation (CPR) is main way of re oxygenation of the brain and heart by using basic life support (BLS) technique until suitable or progress therapeutic treatment entry for reestablish normal heart and ventilation if the brain has not oxygenated or innervation of blood for more than four minutes stopped and irreversible damage after about seven minutes and cells of body die if blood flow stopped for one to two hours (2, 3, 4, 5, 6).

CPR is syndicates of outside chest compressions and mouth-to-mouth ventilation for this reason CPR prescribed to be successful ought to be performed inside seven minutes of the stoppage of blood stream (7,8). The airway opens or

management from foreign-body airway obstruction or cricothyroidotomy may be necessary before CPR can be performed. Similarly, non-traumatic cardiac arrest is a seriously condition. The most cause of death in the global every year by millions from the sudden cardiac arrest. Unresponsive patient or no breathing or abnormal breathing for example, agonal respirations and stopped of heart beats is indicated to start CPR (9,10,11). The common causes of cardiac arrest 90% cause from heart diseases of sudden deaths, and non-heart diseases cause 10%. And most be observing in arrested patient for a ventricular fibrillation (VF) rhythm can be commonly happen so the time between arrest and defibrillation affects determine the success of resuscitation.

In other way if patient still pulse and no breathing give oxygen without artificial chest compression (12.13,14). To prevent or decries CPR happen many study recommended the importance of education for all medical team spicily nurse because is nearly and all time with patient nursing staff and medical lack knowledge and skills in acute care, that show from several studies e.g. oxygen therapy, fluid and electrolyte balance, analgesia, rapid response teams, such as METs, improving the educating for medical staff in acute care skills of ward personnel (15,16). If we look for the how is the direct contact with client found the nurse and a previous study demonstrated when all nurses is certified in basic or advance life support training courses that cardiac arrest performances improved and when performance CPR should be follow the accepted clinical guidelines and international standards in cardiopulmonary resuscitation care and effective training and the nurses should be re-certified every two years and during this year's most be refresher trainings are needed to maintain such skills to improve the resuscitation practice (17,18,19,20,21).

Recent literature identified the regular training every 6 months to improve the skills and knowledge of resuscitation and without this training can decline over time even after effective training and across the world, nurses and medical staff are deteriorating to get the standards in resuscitation care, standardized equipment and its understanding are ideal in the clinical practical areas (22,23,24). Nurses have improved the chance of save life patient and is desire to know about CPR because hi aware if cardiopulmonary resuscitation done early can be save patient. Nurses is the first responder in the hospital should be needs to take appropriate actions such as recognition, shouting for help, initiation of BLS, application of AED and reporting to the code blue team using the SBAR communication method (25,26). CPR guide line change during years and the nurse's role increase due to improvement in nursing education and an increased need for expert nurses and an increase noted in the autonomy of the nursing role have led to a change in nurses'.

Responsibilities during CPR some of these new roles include: The Rapid response nurse, the initiation of external defibrillation, the involvement in CPR decision making, the understanding of the use of resuscitation drugs and the family Support in the cases of witnessed resuscitation. Although changes have not been made in all health care settings, many hospitals are attempting to implement new strategies by giving to the nurses increased responsibilities and making (27). The Ohio State University Medical Center is the first introduced the rapid response nurse where the manager of the Emergency Department was asked to develop a

team of nurses who could respond to crisis situations and trauma interventions and ensure the continued Care of Emergency Department patients (28).

The role of nurses is developing with time until to play important roles in discussing do-not-attempt resuscitation (DNAR) orders with patients and surrogates, this role come from the several factors that support the involvement of nurses in CPR decision making. As a result of lengthy stays, nurses spend a lot of time with many long- term care patients, and could be expected to have a good understanding of their values and beliefs (27). Also the role of nurses during CPR increasable to understanding of Pharmacology education in administering, prescribing and educating patients about medications have grown and nurses understand the use of drugs, can explain the rationale for their use and the dosage to be given in CPR (29,30). If patient recovery from arrested nurses response to put in recovery position and sure from open airway and confirm from pulse by continues monitoring and observation in other hand if unsuccessful resuscitation, relatives should be informed of the bad news fall to the nurses Practitioner and most be expertise to how you deal with relatives and what you say for him if his found in hospital or during the telephone and be honest and never lie to a relative if they ask you over the telephone (31,32,33).

**Method**

**Study design**

The purpose of study was clarify verbally and then written consent was taken, the data was taken post duty of nurse's staff and the program done by scheduling with nurse's staff. This study was quasi experimental hospital base study, before- and after - questionnaire study was conducted on 100 nurse's staff in governmental hospital in Al Khartoum locality.  And fulfill the following criteria:

- Nurses have fixed job.
- Nurses under training.
- Nurses newly graduated.

**Questionnaire**

Self-administered questionnaire to assess knowledge level of participants related to CPR. Was developed by the researcher based on the available literature.

**Statistical analysis**

Analysis was performed using the Statistical Package for Social Sciences (SPSS), following data entry, checking and verification process was carried out to avoid any errors during data entry. Frequency analysis, cross tabulation, and manual revision were all used to detect any errors. The following statistical measures may be used: Descriptive measures include: count, percentage, and arithmetic mean, standard deviation, minimum and maximum, Chi square test, T test was used for quantitative variables and A P value of 0.05 was used to identify a significant difference.

**Result**

This table there was improvement of knowledge regarding nursing intervention during and post arrested patient, whom don't know from (9 %) to (1 % and 0 %) and good score from (48%) to (81%), Open air way from study group (39%) have poor knowledge but this percentage decreased after intervention to (10%). Good knowledge increased from (29%) to (67%) after intervention in knowledge about Restore blood circulation. Regarding knowledge about Stander depth of chest compression increase in good knowledge after implementation of program from (3%) to (49%). Recommendation ratio increase in good knowledge after implementation of program from (4%) to (86%) also increase in good knowledge in number of chest compression from (7%) pretest to (55%) posttest after program intervention. The mean pretest of Performance CPR pretest is (2.56) and STD (0.58) and direction of mean to satisfied knowledge and the mean of posttest of Performance CPR pretest is (1.4) and STD (0.45) and direction of mean to good knowledge.

Table 1
Study group knowledge about their role during CPR

| Test Performance CPR pretest | Pre test | | | | | | | | Total | Post test | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Good | | Satisfied | | Poor | | Not know | | | Good | | Satisfied | | Poor | | Not know | | |
| | F | P | F | P | F | P | F | P | | F | P | F | P | F | p | F | p | |
| Nursing intervention when found arrested patient | 48 | 48% | 16 | 16% | 27 | 27% | 9 | 9% | | 81 | 81% | 13 | 13% | 5 | 5% | 1 | 1% | |
| Open air way | 31 | 31% | 20 | 20% | 39 | 39% | 10 | 10% | | 68 | 68% | 22 | 22% | 10 | 10% | 0 | 0% | |
| Restore blood circulation | 29 | 29% | 23 | 23% | 39 | 39% | 9 | 9% | | 67 | 67% | 14 | 14% | 17 | 17% | 2 | 2% | |
| Stander depth of chest compression | 3 | 3% | 8 | 8% | 67 | 67% | 22 | 22% | 100 | 49 | 49% | 12 | 12% | 33 | 33% | 6 | 6% | 100 |
| Recommendation ratio | 4 | 4% | 14 | 14% | 40 | 40% | 42 | 42% | | 86 | 86% | 7 | 7% | 7 | 7% | 0 | % | |
| Number of chest compression | 7 | 7% | 5 | 5% | 39 | 39% | 49 | 49% | | 55 | 55% | 16 | 16% | 29 | 29% | 0 | 0% | |
| Mean | | | | 2.56 | | | | | | | | | 1.4 | | | | | |
| Std | | | | 0.58 | | | | | | | | | 0.45 | | | | | |
| Direction of Me | | | | Satisfied | | | | | | | | | Good | | | | | |

Table 2
Nurse's role post CPR

| Test Nurse's role | Pre test Good | | Satisfied | | Poor | | Not know | | total | Post test Good | | Satisfied | | Poor | | Not know | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F | p | F | P | F | P | F | P | | F | P | F | P | F | P | F | P | |
| Regarding to family | 54 | 54% | 8 | 8% | 23 | 23% | 15 | 15% | | 75 | 75% | 17 | 17% | 8 | 8% | 0 | 0% | |
| Post successful CPR | 47 | 47% | 16 | 16% | 17 | 17% | 20 | 20% | 100 | 79 | 79% | 11 | 11% | 10 | 10% | 0 | 0% | 100 |
| Proper position post arrested | 15 | 15% | 14 | 14% | 30 | 30% | 41 | 41% | | 62 | 62% | 16 | 16% | 22 | 22% | 0 | 0% | |
| Mean | | | | 2.35 | | | | | | | | | 1.39 | | | | | |
| Std | | | | 0.931 | | | | | | | | | 0.516 | | | | | |
| Direction Me | | | | Satisfied | | | | | | | | | Good | | | | | |

This table showed that (23%) of study group have poor knowledge about nurse's role regarding to the family post arrested pretest but decreased to (8%) after implementation. near quarter (20%) of study group was not known about post successful CPR role before intervention, after intervention decrease to (0%) within the study group, the good knowledge about Proper position post arrested increased from (15%) before conducting the program to (62%) after conducting the program. The mean pretest of nurse's role post arrested CPR is (2.35) and STD (0.931) and direction of mean to satisfied knowledge and the mean posttest of nurse's knowledge about assessment during and post CPR is (1.39) and STD (0.516) and direction of mean to good knowledge.

**Discussion**

The study reveal that, (20%) of study group were male while (80%) were female, and (49%) in the medial age between (31-50 ) years, and their years of experience range between (5-10)years (44%). Considering that providing a training course for the nurse staff is very important and useful to improve performance in order to perform urgent response and effective cardiopulmonary resuscitation of pt. with cardiac arrest (34, 35). The nurses play a key role in the management of in-hospital cardiac arrest. Often they are first on the scene of an arrest--initiating cardiopulmonary resuscitation (CPR) as well as summoning assistance from the 'advanced life support (ALS)'/'arrest' team. Thus it is argued that nurses should be willing (38). The key recommendations for the nurses and other health care provider assessment of cardiac arrest pt. are unchanged since the previous guidance in 2015 (15). Such as scene" should be safe, trained healthcare professionals using a mobile device to request emergency response while checking the patient's pulse at the location of the carotid artery and whether breathing is present. This can reduce the time until the first compression.

If there are multiple providers, concern for head and neck injury can be addressed. If there are limited numbers of rescuers, it is not advisable to spend time in attempting to protect cervical spine injury (37). These study revealed the increase of the good knowledge about the nurse's knowledge about their role during CPR all the components of knowledge were significantly improved in the

posttest compared with the pretest evaluation significantly by the Mean pre 2.56 post 1.4 Std pre 0.58 post 0.45. the first components is the assessment when found arrested pt improve posttest with highly significant after intervention of the program. If you're trained in CPR and you've performed 30 chest compressions, open the person's airway using the head-tilt, chin-lift maneuver. Check for normal breathing, taking no more than five or 10 seconds. Look, listen and feel for the person's chest (1). in our study we found lack or poor knowledge about open air way performance this result decrease after intervention of the program this indicate the importance of program to increase knowledge and performance to decrease mortality rate from air way obstructive. In our study about restore blood circulation and position of arrested pt. found decrease in knowledge but after intervention of the program the knowledge increase with highly significant p-value =(0.000) we observed in our study were similar to (Kleinman et al., 2015Proper hand position is necessary for effective compressions, and hand placement can affect outcomes during resuscitation) (37).

The 2015 American Heart Association Guidelines reinforce the depth of compressions to at least 2 inches for the adult patient (1). In this study we found more than half of study group poor knowledge about stander depth before intervention but after intervention we observe improve in knowledge with highly significant. The study group in our study is sufficiency knowledge about the recommendation ratio of compression to breath but increase to good knowledge after intervention. It is reasonable for rescuers to perform chest compressions at a rate of 100 to 120/min (1, 15). In our study found half of study group not know about the rational number of chest compression before intervention and increase the knowledge after intervention of program with highly significant p-value = (0.000). in this study focusing about the role of nurse in many ways in the above discussion identifying the role during CPR and now should be know the role of nurse post CPR and role of nurse regarding of the family of arrested pt. the knowledge was significantly improved in the posttest compared with the pretest evaluation significantly by the Mean pre 2.35 post 1.39 Std pre 0.931 post 0.516. in some previous study when unsuccessful resuscitation, relatives need to be informed by physician or by the head nurse practitioner and never lie to a relative.

If they ask you over the telephone you must be honest and tell them what has occurred (31). This result is in harmony with another researcher who reported that nurse can be tell the family and give supporting to the family this result improving after intervention of the program with highly significant (p value = 0.000). Also the position after successful CPR is used in the management of victims who are unresponsive but have breathing and pulse. When an unresponsive victim is lying supine, the airway may become obstructed by the tongue or mucus and vomit. These problems may be prevented when the victim is placed in the recovery position, because fluid can drain easily from the mouth (33). The present study revealed more than twenty of study group not know about the proper position post arrested CPR pretest but after intervention of program the result decrease to the zero there was an improvement in nurse's staff pre and posttest of intervention CPR program.

**Conclusion**

From the present study concluded that there was an increase in mean of good knowledge and practice about nurse's role during and after cardiopulmonary resuscitation concept and steps after implementation of the program. There was improvement in nurse's knowledge regarding Nursing intervention when found arrested patient and how to open air way. Nurses were concerned more restore blood circulation through many steps like the stander depth of chest compression, recommendation ratio and the number of chest compression. Increased knowledge about the role of nurses after cardiopulmonary resuscitation and how to deal with the arrested patient family also knowing the proper position post arrested.

**Recommendation**

- Updating the current nursing curriculum so as to include cardiopulmonary resuscitation guidelines.
- Practice cardiopulmonary resuscitation for prevention of cardiopulmonary arrest and periodically assess health care personnel adherence to guidelines.
- Policies and procedures that produced by ministry of health should maintain optimum level of nurses" knowledge and skills.
- Evidence based nursing and continuing updating protocol regarding cardiopulmonary resuscitation is important to improve nursing knowledge and practices.
- Health education to nurses in hospitals and continuous medical education.
- Nurses need continuous and regular courses about cardiopulmonary resuscitation especially in the assessment of deteriorated patient.
- Provide training station and poster about cardiopulmonary resuscitation in hospital.
- Generalize program in other hospital

**Acknowledgments**

**References**

1. American Heart Association states Guidelines 2015.
2. "Checklist for Parents of Children with Arrhythmias". American Heart Association. 2009-01-16. Retrieved 2010-04-11.
3. Smith, Nathalie, MSN, RN. "Anoxic Brain Damage". Third Age.
4. Tuhrim, Stanley. "Anoxic Brain Injury". Mount Sinai Medical Centre.
5. Brass, Lawrence, MD (PDF). Heart Book. Chapter 18: Stroke. Yale University.
6. Turkowski, Ken. "A pleas for VBAC education".
7. Hyperbaric Oxygen Therapy". Family Health News. [6] Jasmeet Soar a, Jerry P. Nolan et al European Resuscitation Council guidelines for Resuscitation 2015 Section 3. Adult advanced life support.

8. Pozner CN. Basic life support (BLS) in adults. 2014 Dec 17 [cited 2015 Mar 31].

9. Sandra. Netting msn-anp.; Mills, Elizabeth Jacqueline, Lippincott Manual of Nursing Practice, 10 Edition (2014).

10. Meaney PA, Bobrow BJ, and Mancini ME, et al. Cardiopulmonary resuscitation quality: [corrected] improving cardiac resuscitation outcomes both inside and outside the hospital: a consensus statement from the American Heart Association. Circulation. 2013; 128:417–35.

11. Püttgen HA, Pantle H, Geocadin RG. Management of cardiac arrest patient's to maximize neurologic outcome. Curr Opin Crit Care. 2009; 15:118–24.

12. Attitudes of Doctors Working in Abant Izzet Baysal University Health Research and Application Center on Cardiopulmonary Resuscitation Hamit Yoldaş,1 Hasan Kocoğlu,1 Hakan Bayır,1 İsa Yıldız,1 Akcan Akkaya,1 Abdullah Demirhan,1 and Ümit Yaşar Tekelioğlu2 2016

13. Erdil F. Kardiyak Arrest ve Kardiyopulmoner Resusitasyon. 2. Baskı Ankara: Aydoğdu Ofset; 1994. pp. 7–31.

14. Field JM, Hazinski MF, Sayre MR, et al (November 2010). "Part 1: executive summary: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care". Circulation. 122 (18 Suppl 3): S640–56.

15. Jasmeet Soar a, Jerry P. Nolan et al European Resuscitation Council Guidelines for Resuscitation 2015 Section 3. Adult advanced life support.

16. Butcher BW, Quist CE, Harrison JD, Ranji SR. The effect of a rapid response team on resident perceptions of education and autonomy. J Hosp Med 2015; 10:8–12.

17. Posner CN. (2015). Advanced cardiac life support (ACLS) in adults. Up-to-date. Retrieved from http://www.uptodate.com.

18. Nurses' Resuscitation Performance: Study on the Effectiveness of Training and Support at a Teaching Hospital in KSA International Journal of Cardiovascular and Cerebrovascular Disease 3(4): 21 -27, 2015.

19. Green, S. M., Roback, M. G., Kennedy, R. M., & Krauss, B. (2011). Clinical practice guideline for emergency department ketamine dissociative sedation: 2011 update. Annals of emergency medicine, 57(5), 449-461.

20. Terzi, A. B. (2012). Nurse's Role in the Modern Resuscitation Era. Hospital Chronicles, 7(1), 25-31.

21. Bobrow, B. J., Vadeboncoeur, T. F., Spaite, D. W., Potts, J., Denninghoff, K., Chikani, V., & Abella, B. S. (2011). The Effectiveness of Ultra brief and Brief Educational Videos for Training Lay Responders in Hands-Only Cardiopulmonary Resuscitation Implications for the Future of Citizen Cardiopulmonary Resuscitation Training. Circulation: Cardiovascular

22. Quality and Outcomes, 4(2), 220-226.

23. Meex, I., De Deyne, C., Dens, J., Scheyltjens, S., Lathouwers, K., Boer, W., & Jan's, F. (2013). Feasibility of absolute cerebral tissue oxygen saturation during cardiopulmonary resuscitation. Crit Care, 17(2), R 36.

24. Sutton, R. M., Niles, D., Meaney, P. A., Aplenc, R., French, B., Abella, B. S., & Nadkarni, V. (2011). Low-dose, high-frequency CPR training improves skill retention of in-hospital pediatric providers. Pediatrics, 128(1), e145-e151.

25. Sawyer, T., Sierocka-Castaneda, A., Chan, D., Berg, B., Lustik, M., & Thompson, M. (2012). The effectiveness of video-assisted debriefing versus

oral debriefing alone at improving neonatal resuscitation performance: a randomized trial. Simulation in Healthcare, 7(4), 213-221. [25] Bukiran, A., Erdur, B., Ozen, M., & Bozkurt, A. I. (2014). Retention of nurses' knowledge after basic life support and advanced cardiac life support training at immediate, 6-month, and 12-month post-training intervals: a longitudinal study of nurses in Turkey. Journal of Emergency Nursing, 40(2), 146-152.

26. McReynolds, M. C., Mullan, P. B., Fitzgerald, J. T., Kronick, S., Oh, M., & Andreatta, P. (2013). On-site Simulation Training Improves Nurses' First-Responder Cardiopulmonary Resuscitation Performance: Traveling Simulation Program. Annals of Behavioral Science and Medical Education, 19(1), 8-13. 156, 39.

27. Nurse's Role in the Modern Resuscitation Era Aggela- Beth Terzi, RN, MSc 2012.

28. Sinclair T. The role of the Rapid Response Nurse: Hospital wide and in Trauma Resuscitations. J Trauma Nursing 2006; 13: 175- 177.

29. First Aid Manual. St John Ambulance, St Andrews Ambulance and British Red Cross.

30. Hüpfl M, Selig HF, Nagele P (October 2010). "Chest-compression-only versus standard cardiopulmonary resuscitation: a meta-analysis". Lancet 376(9752): 1552–7.

31. Acute Medicine A Handbook for Nurse Practitioners John Wiley & Sons Ltd The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England 6th edition 2010.

32. Breitkreutz R, Price S, Steiger HV, et al. Focused echocardiographic evaluation in life support and peri-resuscitation of emergency patients: a prospective trial. Resuscitation 2010; 81:1527–33.

33. Singapore General Hospital Institute for Medical Simulation & Education 167 Jalan Bukit Merah, Connection One2011.

34. Choi HS, Lee DH, Kim CW, Kim SE, Oh JH. Peer-assisted learning to train high-school students to perform basic life-support. World J Emerg Med. 2015; 6:186–90.

35. Krajina I, Kvolik S, Steiner R, Kovacevic K, Lovric I. Cardiopulmonary resuscitation, chest compression only and teamwork from the perspective of medical doctors, surgeons and anesthesiologists. Iran Red Crescent Med J.2015;.

36. Carpico, B., & Jenkins, P. (2011). Resuscitation review to improve nursing performance during cardiac arrest. Journal for Nurses in Professional Development, 27(1), 7-12.

37. Kleinman ME, et al. (2015). Part 5: Adult basic life support and cardiopulmonary resuscitation quality. 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care.

38. Fadalla, Musab MohamedAhmed Al. Impact of an educational program on recognition and management of Ventricular arrhythmias guideline among critical care nurses in Khartoum City, Sudan. Diss. Elbagir Abdulrahman, 2018.