

Improving Nursing Performance Quality in CPR: A Cooperative Action Research Study

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Abstract:Introduction: cardiopulmonary arrest is the major factor beneath many deaths in world every hour, which nurses can save more lives with fast and correct CPR. All studies showed that Survival rate and outcome of CPR correlates closely with performing the process fast and correctly. Hence, this research was designed and carried out to improve nursing performance quality in CPR. Materials and Methods: this is a cooperative action research study using repeated cycles as Kemmis plan (plan, administration, evaluation & reflecting) in Motahari hospital affiliating with Jahrom university of Medical Sciences-2013-2014. 50 practitioner nurses participated in the study and were assessed by ER head nurse (1-week observation, pre-test knowledge and practice by questionnaire and OSCE test). Planning was done by 10 participants including staff and head nurses in 2 theory and clinical phases for 6 months. European Resuscitation Council and American heart association Guidelines has been used. Education was done in the form of workshop (6 nurses) for 10 groups, 70 sessions (2-4 hours), every group 6-8 sessions. Paired T-test was used to determine statistical significance in evaluation phase. This plan was changed, refined and developed through reflection phase. Findings: Mean of OSCE pre-test and post-test were (.3244) and (.9306), respectively, so that Paired samples T test ($p=0.0001$) revealed that there was a significant difference between them. Mean of theory pre- and post-test quiz were (.5093) and (.9181) respectively, so that Paired samples T test ($p=0.0001$) revealed that there was a significant difference between them. Conclusions: it appears that a comprehensive and operational plan by participant on the basis of their actual need is more effective than any other CNE plans. According to the results of this research, this method for CPR education this method for CPR education in all hospitals affiliated to Jahrom university medical sciences.

Keywords: *Action Research, Nursing, Cpr, Quality*

Introduction

Despite important advances in prevention of heart diseases, cardiac arrest remains a substantial public health problem and a leading cause of death in many parts of the world. Sudden cardiac arrest is a growing medical issue in developed countries. Only 3% of victims with out-of-hospital cardiac arrests discharge alive from hospital and less than 1% of them survive neurologically intact [1]. Cardiac arrest occurs both in and

out of the hospital [2]. In contrast, survival chances decrease by 7-10% for every minutes, if CPR is delayed [3,4]. The importance of cardiopulmonary cerebral resuscitation (CPR) for the survival of cardiac arrest patients is very clear and transparent [5,6]. But how to do the process is more important than doing it per se. Hence, cardiopulmonary resuscitation is very important and critical for patients, but

it has serious, dangerous and malignant complications if it is not done correctly. Several complications including; abdominal traumas, chest traumas and heart traumas would have put patients at risk [7].

However, the quality of cardiopulmonary resuscitation (CPR) is a key factor to increase survival after in or out-of-hospital cardiac arrest (OHCA) [8]. There are several standard guidelines for cardiopulmonary resuscitation such as; American Heart Association Guideline for CPR and ECC, European Resuscitation Council CPR guideline (ERC) and Korea medicine CPR (KACPR) guideline. These guidelines are changed and updated every 1-3 years [9-11].

Major changes in recent guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care includes modification of basic life support (BLS) sequence from A-B-C to C-A-B, an emphasis on minimally interrupted, high-quality chest compression, the introduction of chest compression-only CPR, and addition of integrated post-cardiac arrest care concept are the fifth chain in the Chain of Survival [1].

In the field of cardiopulmonary resuscitation numerous improvements including electric defibrillation and closed chest cardiac massage were introduced but the survival of victims of cardiac arrest is still poor [12]. European Resuscitation Council has released new guidelines based on the results of systematic reviews and clinical trials [13]. In every hospital, nursing education especially cardiopulmonary resuscitation education is very considerable [14,15]. Quality assessment of CPR is a main concern of health care managers in every country. Above all, CPR is a process that show efficacy and effectiveness of health care systems and consume many power and energy of hospitals and personnel [16,17].

With respect to considerable emphasis on the importance of high-quality of CPR, it is the best indicator of quality of emergency care for every hospital [18]. CPR is a critical emergency measure in which nursing personnel play a central role in bedside of patients with cardiopulmonary arrest.

Recently, evidence shows that survival from cardiac arrest is dependent on the quality of CPR [19]. The importance of education was highlighted in new ERC guidelines. It aimed at both acquisition and retention of technical skills, early recognition of cardiopulmonary arrest, performance of CPR, and nontechnical skills such as organization and leadership [13]. These basic resuscitation skills deteriorate within three to six months, and need renewal. Although research about the impact of continuing education on patients' outcome is missing, it is likely that performance of CPR may be significantly improved after training [20-22]. Some researches in Iran assessing knowledge and practice of CPR team in hospitals in different universities like Mashhad, Shiraz and Kermanshah reveal that personnel need to practical education [23-25].

This is an international problem since last century. From over 50 years ago that "Closed-Chest Cardiac Massage" article was published in the *Journal of the American Medical Association*, auditing CPR process and procedures were very important and showed there were defects in all parts. Accordingly, education nursing personnel, as the key member of resuscitation team, has been the first educational priority of hospitals. Numerous methods are recommended for CPR education among which workshop method is approved over the other choices by education researches [26-29].

All personnel and managers in Jahrom Motahari hospital supposed that they had a good structure, knowledge, attitude, practice and situation in CPR, but all got perplexed when they found that their perception was wrong (after the first research phase of action research). Based on their new appreciation and university accreditation results, researchers decided to design and implement this research to improve nursing performance quality in CPR process.

Method and Material

This is a cooperative action research study using repeated cycles as Kemmis suggested: (assessment and planing, administration,

evaluation & reflecting)) in Motahari hospital affiliated with Jahrom university of medical sciences-2013-2014.

Assessment and Planning Phase

Research team did these steps: step 1: an expert managerial team consists of (matron, 2 clinical supervisors, 3 head nurses, 3 staff nurses) was formed and research aims and method were presented. This team convened 1-2 sessions every week for their cooperative duties. Step 2: selecting 50 license practitioners nurses(LPN),(N=170). Inclusion criteria were: minimum of 2-year employment history, at least 3 patients in their ward and their shift experienced arrest last year, at least working in general or emergency (ER) wards in the last 6 months and are willing to participate in this research. Step 3: They were assessed one by one with ER ward head nurse (by observation technique 1-6 week, then their knowledge was evaluated by standard instrument (American Heart Association CPR Written Exam).

For validity, translate-and retranslate process was done by expert panel consists of specialists in English language and CPR Team. Instrument Reliability was accepted by test-retest method on 10 personnel apart from research samples (0.79). 40-question theory quiz was given (1 point for every correct answer) that contained: ACLS, suffocation, Chest compress, Patient evaluation, ventilation and CPR Generalities. Practice was evaluated by OSCE test. OSCE test was used to assess nurses' performance in 9 stations in 6 minutes, under supervision of an associated professor of medical education and one expert in CPR, according to an arrest patient scenario, (1 positive point every correct performance), which contains: Danger check, conscious check, breathing check, pulse check, Air way management with maneuver, Air way management with tools, Chest compress correctly, Child chest compress correctly and Removing foreign body from air way.

Step 4: according results of assessment, after determining goals and strategies, operational plan in 1 phase for adult and

child CPR was defined. Planning was done by 50 LPN after 3 sessions of brain storming and 12 hours of continuous work by an expert managerial team as insiders.

Action Plan was checked and controlled by researchers as outsiders and advisors. Action plan that consisted of theory and clinical parts for 6 months was approved. In this Research, guidelines of European Resuscitation Council (ERC) and American heart association 2010 [30-32] were used as educational content. According to team capacity, free time of educators, free time of nurses, educational equipment and hospital situation, education process was offered in the form of workshop to 10 groups (6 nurses for every group), 70 3-4 hour sessions, and 6-8 sessions in 6 months for each group. Sessions' content included one session of physiology and anatomy of heart, 2-3 sessions of arrhythmias, 4 sessions of emergency medicine, 5 sessions of ABG, 6-7 sessions of clinical and practice training and 8 session of team management. According to group coordination, in every group more than half of educational content was presented by participants, based on individual ability. Teachers were fixed and used head nurses and supervisors as teachers.

Phase 2: After replacing participants in the groups, the plan was administrated within 6 mounts. After the first workshop and at the end of every group course, the expert managerial team assessed viewpoint of participants separately and changed and revised action plan, if needed. For example, we made changes in the time of 17 sessions, the place of 10 sessions, 2 session lecturers and revised 3 educational goals. Teachers try to create cordial atmosphere by eating breakfast in class.

Phase 3: expert managerial team got stronger by including key personnel (n=2), supervisors and head nurses (n=4). Evaluation was done like pre-assessment in phase 1. The participants were evaluated one by one with ER ward head nurse (by observation technique during 1-6 weeks exactly 2 weeks after end their course. Then their knowledge was evaluated by standard

instrument (American Heart Association CPR Written Exam). Next, participants' practical skills were evaluated by OSCE test. Paired T-test was used to determine statistical significance in the evaluation phase.

Phase 4: In action research, interactive reflection among participants, researchers and expert managerial team happened in individual and group manners in all phases. The plan was changed, refined and developed in reflection phase. After 3 weeks we had 5 focus group discussions (FGD) for group reflecting. Moreover, we have 12 FGD at the end. The aim of these FGDs is to appreciate participatory viewpoints about implementation of plan and revise them and at the end evaluating plan, for the next cycle planning.

Results

Insufficient or bad attitude of services, guards or nurses towards dead on arrival patients was the focal point of our observation. Other significant results were as follows: Priority Air way management as the first intervention that was an expire procedure, some wrong techniques like rate of massage to respiration, described some wrong drugs, bad management in CPR process, unawareness of new methods and protocols of resuscitation, disuse and misinterpretation of ABG, disuse of ABG at correct time, disuse of tools and equipment,

male nurses were fair in practice but not bad in theory, unlike female nurses.

In addition, after intervention some of these problems resolved, spirit of cooperation and friendship have been raised in CPR team, and we had 3 cases of CPR (chest compression) initiated by supervisors that not any without any responsibility in ER ward and CPR team. According to group reflecting, supervisor's performance was the aftermath of this turnabout in his attitude. Moreover, personnel asserted that they would monitor patients more seriously in case they knew the importance of EKG problems.

Our finding in reflecting and evaluating phases included: revolution in viewpoint of participators concerning OHCA, need to follow up and develop our plan by

physicians, guards and services force as participants, developing our evaluation as a long term evaluation in actual clinical situations.

The mean of OSCE pre-test and post-test were (.3244) and (.9306), respectively, so that Paired samples T test ($p=0.0001$) revealed that there was a significant difference between them. Mean of theory pre- and post-test quiz were (.5093) and (.9181) respectively, so that Paired samples T test ($p=0.0001$) revealed that there was a significant difference between them.

OSCE station	Pre- test		Post- test		Paired samples T test		
	Mean	Std. Deviation	Mean	Std. Deviation	t	df	Sig(2-tailed)
Danger check	.0600	.23990	.9750	.15811	-21.932	49	.000
conscious check	.2000	.40406	.9750	.15811	-11.590	49	.000
breathing check	.7000	.46291	1.0000	.00000	-4.583	49	.000
pulse check	.5000	.50508	.9250	.26675	-5.649	49	.000
Air way management with maneuver	.3000	.46291	.9250	.26675	-8.510	49	.000
Air way management with tools	.2800	.45356	.8500	.36162	-8.062	49	.000
Chest compress correctly	.0600	.23990	.8750	.33493	-5.649	49	.000
Child chest compress correctly	.2000	.40406	1.0000	.00000	-8.062	49	.000
Removing foreign body from air way	.7000	.46291	.8500	.36162	-10.218	49	.000
Total	.3244	.27386	.9306	.15851	-13.957	49	.000
Theory quiz	Pre- test		Post- test		Paired samples T test		
ACLS	.4548	.40791	.9114	.24227	-3.188	49	.003
Suffocation	.2450	.20510	.8028	.16207	-8.062	49	.000
Chest compress	.4650	.24749	1.0000	.00000	-9.857	49	.000
Patient evaluation	.5444	.24513	.8812	.24011	-5.769	49	.000
Ventilation	.7680	.38409	1.0000	.00000	-2.287	49	.028
CPCR Generalities	.5673	.17765	.7071	.30511	-8.576	49	.000
Total	.5093	.17487	.9181	.17003	-9.203	49	.000

Discussion

Like other studies conducted in Mashhad, Tabriz, Shiravan, Shiraz, Ahvaz and Kermanshah demonstrating knowledge and practice of all nurses was in weak or moderate level, our research results, especially in pre-assessment, reveals that nurses need to enhance their knowledge and practice [23-25].

The studies carried out in SHim, Preusch made it clear that personnel's knowledge and practice failed to meet the required qualifications. Although assessment of resuscitation skills was very difficult and considered a big challenge for researchers, results of assessment phase was worrisome for managers. Therefore they had more support from action plan to improve this situation. This result reveals that CPR team needs practical education that is required to be implemented in the form of in-service or CNE plans [24-32].

As mention in results, all factors characterized as common problems in CPR and demonstrated in other studies were transparent in our OSCE pre-test. According to Carol Davey, First Aid Trainer Assessor, there are common and similar mistakes made by individuals that have received CPR training. These problems have been highlighted during First aid training updates where individuals are being reassessed on their knowledge and CPR delivery [33].

Like that of Almasoudi's thesis in Georgia State University, pre-test results of this research reveal that personnel lack acceptable scores in respiratory management [34]. likewise, in Ildiko's research a great deal of emphasis was cast on incompetency of nurses in CPR knowledge and practice [35].

Research of Marie-Louise Södersved was indicative of efficacy of workshop on CPR team [36]. This is in parallel with our research results.

In this research, as in other researches, education is effective. However, the difference is that in our research we covered all CPR procedures that were in accordance with the defect in our hospital. While in other studies, only two education methods were compared and accordingly these studies failed to solve the problem systematically. As a whole, all of these researches confirm our results without exception.

According to our observation, we needed an education model that changes attitude, knowledge and practice that we did not reach such a model. It was the limitation of our research.

Conclusion

It appears that a comprehensive and operational plan by participant on the basis of their actual need is more effective than any other CNE plans. This study results suggest that all CNE plans should be done by participants in every phase especially in CPR. According to the results of this research, this method for CPR education in all hospitals affiliated to Jahrom university medical sciences.

Acknowledgment: This article was derived from a PhD thesis of Mohsen Hojat with project number (394240), and ethic code: (jums.ethic.1393 / 92) Isfahan University of Medical Sciences, Isfahan, Iran and Jahrom University of Medical Sciences, Jahrom, Iran. We appreciate Clinical Research Development Center of motahari hospital affiliated to Jahrom University of Medical Sciences.

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