Effect of station training method on students’ cardiopulmonary resuscitation activity

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Abstract

Aims: Having comprehensive knowledge and skill of Cardio Pulmonary Resuscitation (CPR) is necessary for all medical staff nowadays. Use of simulation training is a good method for improving students’ clinical skills in resuscitation. This method develops participants’ skills and helps them learn about new equipment and procedures. This study was designed to examine the effect of station training method on students’ skills in CPR.

Methods: In this interventional study data was gathered in two phases, before and after intervention. Units of study were 37 senior students of nursing and midwifery in faculty of Booyeh. Data was collected using standard checklists by observing students’ performance in basic and advanced CPR in stations of Objective Station Clinical Evaluation (OSCE) before and after station training. Data was analyzed by SPSS 11.5 software using descriptive statistic indices and Wilcoxon non-parametric test.

Results: Students’ performance in basic and advanced CPR demonstrated a significant difference before and after station training, considering their average information.

Conclusion: Station training will enhance nursing and midwifery students’ knowledge of basic and advanced CPR, if taught correctly and practically.

Keywords: Educational Method, Cardio Pulmonary Resuscitation (CPR), Station Training, Objective Structured Clinical Evaluation (OSCE)

Introduction

Cardiopulmonary Resuscitation (CPR) is a process which tries to make the life possible by restoring the two vital organs of the body (heart and lungs). It is clear that the success of CPR is feasible if the necessary measures are taken rapidly and fully and successively [1]. If resuscitation is done quickly, in 40-60% of cases is able to save life. Successful resuscitation requires the skill and performance of resuscitators, and saving the human’s life in critical moments of struggling of life and death only depends on the knowledge and awareness of those who are present at bedside [2]. Therefore, in the moment which the patients' life is pending between life and death, the efficient, knowledgeable and skillful manpower is one of the undeniable rights of the patient [3].

Unfortunately, the theoretical and practical training of the important topic of CPR is not specified in the course design of medical groups and medical graduates are in different levels of knowledge and skill, based on their interest and the faculty in which they have studied [1].

In a study in Tehran University of Medical Sciences, 80% of the residents gained a low CPR knowledge score [4]. In a similar study in the Izmir Ataturk in Turkey, 94% of participants had experienced CPR just once during their training course and their basic and advanced resuscitation knowledge score was low [5]. Thoen et al. evaluated 10 professionals working in a medical ward (CPR nurses) for cardiopulmonary resuscitation in a study in 2001. Thus, a short checklist including seven parts along with software attached to the model was used and measured the qualitative parameters, and concluded that only 6.5% of them correctly perform the CPR operation [6].

Considering the fact that cardiopulmonary resuscitation is discussed in different lessons theoretically and students are not practically trained, they are not enough efficient in facing with patient and due to lack of sufficient information will confront problems in this field. On the other hand, under critical conditions, only their knowledge and skill help them save the patient. Simulation training of resuscitation improves the knowledge and performance of participants and familiarizes them with equipment and procedures [7]. But how to assess students’ learning and their performance has always been controversial.

One of the clinical methods of evaluation which has been implemented since 90s in most allied medical science and medical faculties by Harden is OSCE method (Objective Structured Clinical Evaluation). This method, as a completely valid, stable and
practical way, has been easily able to assess basic and fundamental skills of learners in specialty categories and cognitive, emotional and psychomotor domains and eliminates the intervention variables by showing students’ skills in different stations [8]. The method was used by Makinen for evaluation of CPR performance among newly graduate nursing experts of two universities [9]. Fortunately, CPR training has been inevitable for students in clinical skills’ training centers during recent years and different teaching methods are performed for students such as replication and lectures, etc. But sometimes, the effect of these methods is under question.

The purpose of this study was to evaluate the station training method and its effect on the rate of students’ CPR performance.

Methods

This intervention study was conducted (in two phases of before and after intervention) in 2007. The study population consisted of 37 students studying at nursing and midwifery last semester who were selected using census sampling method. To determine the clinical skill, the test of "Objective Structured Clinical Examination" (OSCE) was used. OSCE is an examination for determining the clinical competency based on practical test that is done using simulated environments and stations. In this test, the patient and actual condition variables are removed, but the studied patient is put within a condition which is almost similar to the actual condition. In designing this test, four stations were used by researchers to evaluate the performance of students. In this method, each student entered a classroom and performed the asked procedures in the given station on the model without any contact with others. Thus the sample’s skills in doing the necessary operations and procedures were assessed.

These procedures consisted of BLS (basic life support including 1-opening the airway and mouth-to-mouth breathing 2-cardiac massage) and ALS (Advanced life support including 1- correct intubation of the model 2-Identification of cardiac arrhythmias and giving shock to the model using the electroshock). Before intervention in the pre-test phase, sample performance was evaluated. The inclusion criterion was obtaining a score limit less than 80% (out of 400 points of 4 checklists). For each checklist score, 100 points was considered. Since none of the students could gain 80% or higher all were included in the study. Then the CPR workshop was held using station training during three days practically and theoretically using models in stations for students, and at the end of three days students were reevaluated in terms of basic and advanced CPR performance using the OSCE method.

Then, the obtained mean score of the checklist before and after CPR three-day workshop was analyzed for each student using the nonparametric paired Wilcoxon test at the significance level of 0.05. To determine the scientific validity of this checklist, one of the reliable references of CPR was used [10]. Its content and face validity was confirmed by expert faculty members. For assessing the scientific validity using observation, its reliability was determined using "inter observational" method with the correlation of 0.9, indicating that the test is replicable. Data was analyzed using SPSS 13 software.

Results

8 (22%) of the subjects were male and 20 of them (55%) were studying nursing and 17 (45%) were studying midwifery. Subjects were in the age range of 21 to 28 years.

Results of the study showed that CPR performance in each of four stations, including mouth-to-mouth breathing and cardiac massage, intubation and giving shock to the patient, has been better than pre-training performance. However, change in electroshock devices management was more obvious compared to other procedures (Diagram 1).

It was also found that the basic and advanced performance considering the mean data, showed a
statistically significant difference before and after intervention, with confidence coefficient of 95% (p <0.001), indicating that the method of station training can change the students’ performance. In the performance of advanced CPR a significant difference was observed compared to basic CPR; the advanced performance score of students was higher than their basic performance (Table 1).

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<th>Evaluated topics</th>
<th>Obtained Score’s Mean</th>
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<tr>
<td></td>
<td>Before Intervention</td>
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<tr>
<td>Performance of basic procedures 1 and 2</td>
<td>57.13±25</td>
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<tr>
<td>Performance of advanced procedures 1 and 2</td>
<td>63.29±20.20</td>
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<tr>
<td>The rate of basic and advanced performance</td>
<td>120.43±32.95</td>
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Discussion

This study showed that nursing and midwifery students had not a proper basic and advanced performance before training. The mean of the obtained score in this research is consistent with Guldal et al. in Turkey [5] and Razavi et al. in Mashhad, indicating the poor skill of medical interns in cardiopulmonary resuscitation [11]. Results of a study by Makinen et al. that has assessed the CPR performance status among Swedish and Finnish nursing students using OSCE are approximately in accordance with present study [9]. The reduction in CPR performance is possibly because clinical skills are often taught traditionally and experimentally during the clinical course on patients. This issue is in contrast with the principles of medical ethics. Because the skill in this area, should be taught theoretically before implementation on patients, and then practically on models and in some cases on animals so that finally, after enough experience the learner would be allowed to perform it on patients.

Accordingly, during recent years, training centers were established and strengthened in universities of medical sciences with the aim of providing practical training of skills, and several educational programs were held as workshops such as cardiopulmonary resuscitation, surgery, etc. and conducted evaluations confirmed its highly positive effect on increasing the knowledge and improving students' performance and other reports suggest reduction in errors of medical students. Findings of the present study also showed that station training has led to improvement in performance of nursing and midwifery students in the area of basic and advanced cardiopulmonary resuscitation. The results of this study are consistent with that of Eliasi in 1999 in Iran University of Medical Sciences [12], Haghighi et al. in Shahroud [13] and study of Davari et al. that evaluated the effect of basic CPR training on knowledge and performance of third year high school girls [14] and also with Suzuki study that investigated the impact of OSCE approach on the students’ long-term memory for the knowledge of basic CPR [15]. In addition, present results are consistent with Bahman Bijari et al. study that has compared the integrated approach of teamwork and practical approach with traditional method and evaluated the students’ skill in cardiopulmonary resuscitation of neonates through OSCE [16].

Among the limitations of this study were small sample size and lack of control group that have been partially removed with regard to Wilcoxon test, in which individuals are compared to themselves. Considering the fact that the experience of cardiopulmonary resuscitation in actual conditions is not possible for all students because of few resuscitation cases and ethical issues, given the research findings, using models and modern educational tools and designing of training stations will promote the cardiopulmonary resuscitation skills in simulated workshops.

Conclusion

CPR station training can lead to improvement of nursing and midwifery students' performance in the field of basic and advanced cardiopulmonary resuscitation if performed correctly and applicably.

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