Original Article

Development of nursing students' performance in advanced cardiopulmonary resuscitation through role-playing learning model

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Abstract:

BACKGROUND: Role play is an educational method that is widely used for skill training because it forces students to think about people who play their role. Therefore, the present study was conducted with the aim of determining the effect of role-playing method education compared to traditional method education on the performance of nursing students in advanced cardiopulmonary resuscitation.

MATERIALS AND METHODS: This is a semi-experimental study in which 70 nursing students in Isfahan University of Medical Sciences were randomly divided into two groups (35 students in each group): role-playing method and traditional method. The performance of nursing students in advanced cardiopulmonary resuscitation was evaluated using a performance checklist before and after training, in both groups. Data were analyzed by SPSS 14 software using descriptive and analytical tests of independent t-test and paired t-test.

RESULTS: The paired t-test showed a significant difference between the mean performance scores after intervention between case and control groups, respectively ($P = 0.01$). Furthermore, independent t-test showed that there was a significant difference between the mean score of clinical performance in the two educational groups ($P = 0.01$).

CONCLUSION: The results of the research show the effectiveness of role-playing method, which leads to improved performance of the students in advanced cardiopulmonary resuscitation. Therefore, this method can help the teachers to plan for the modification of educational programs in the course of apprenticeship and internship and improve the management skills of students' advanced cardiopulmonary resuscitation.

Keywords:

Cardiopulmonary resuscitation, nursing, role play

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Introduction

Cardiopulmonary cerebral stroke is one of the most dangerous life-threatening situations that require urgent action to protect life and prevent irreparable lesions in the body's vital systems.[1] Adequate resuscitation by nurses is an important factor in determining survival from an episode of cardiopulmonary cerebral stroke. In other words, nurses are the first people who reach the patient at the moment of cerebral cardiopulmonary stroke and can begin cardiopulmonary resuscitation (CPR). Hence, it seems that the training of the nursing team at the beginning and during resuscitation is very important and necessary.[2]

However, according to the results of studies, despite the frequent retraining of CPR courses, nurses do not have enough knowledge and practice in the field of CPR. Therefore, educating nurses as the first observers of

cerebral cardiopulmonary stroke in the treatment team should be managed thoroughly, so the resuscitation team can play their key role to eliminate the existing problems and increase the success rate of these operations and eliminate the likelihood of short-term and long-term complications after resuscitation.[3]

In this regard, studies show that not only the students but also the medical treatment personnel lack the training and sufficient knowledge of basic CPR, and therefore, the knowledge and practice of nursing staff and students are not enough to keep the patient alive. In this regard, the results of studies by Hosseini *et al.*, Sayyah (2005), and Mäkinen *et al.* (2010) on medical and paramedical students showed that they have a low level of awareness and performance in CPR.[4,5]

It is important to note that every training leads to learning, but the learning depth and sustainability are different in various educational methods. Various studies have examined the training methods. In this regard, the results of the study by Sotto *et al.* showed that the use of dynamic methods in education such as the simulated patient has improved student's performance as compared to traditional methods.[6] Mohamadirizi's study showed that the 4-step (demonstration) training could increase the level of maternity management skills in midwifery students as compared to conventional clinical method.[7]

One of the active and dynamic methods is the role-playing training approach. In this method, the teacher demonstrates how the device is used or how to perform a procedure and thus provides a practice to a lot of learners in a short time.[8] The best advantage of this method is the use of real objects in education, which are mostly used in practical and technical courses.[9] During role play, desired behaviors are practiced and the learner learns the skills and competencies required for a given behavior. The results of Zhu *et al.* showed that skill evaluation in the role-playing group was significantly better than those of the control group ($P < 0.05$) and role play was approved by over 80% of students.[10]

Furthermore, the study of Mazloomi-Mahmoodabad, *et al.* (2009) showed that the theater method improves awareness, attitude, and practice of students in this field.[11] The study of Soltanian showed that the role-playing approach improves the communication skills at the beginning, during, and end of communication and caring behavior of BSc in nursing students.[8] The study of Sopka *et al.* (2012) showed that the use of demonstrative methods increases the students' basic cardiopulmonary resuscitation skills,[12] whereas Jenko *et al.* in their study showed that the use of this method has no effect on the improvement of students' performance

in relation to cardiac massage in the CPR process.[13] Furthermore, the study of Orde *et al.* showed that the use of 4-step training method compared to the usual method had no significant difference in improving the performance of students.[14]

The development of nursing art and science depends on the knowledge and discretion power of teachers and provides a suitable environment. Clearly, the outcomes of clinical care depend on the learning and caring process.[14] Considering the importance of education in nursing and the fact that nursing students in the emergency department are facing many stressful factors, and since the nursing profession is associated with clinical judgment, students in this profession must learn how to avoid stress, anxiety, or unpleasant feelings, and insensitive and decisive moments provide the necessary support for the clients and adopt an efficient and effective approach.[15] Overall, according to the above, and since no study has examined the effect of advanced CPR based on role-playing approach so far, and since most of the studies are about basic CPR, as well as the controversy in this field, the researcher decided to investigate the impact of advanced CPR training on the performance of nursing students.

Materials and Methods

This was a quasi-experimental study before and after intervention based on single-blind method (statistical), in which 70 nursing students in Isfahan University of Medical Sciences participated. According to the formula, 35 students were calculated for each group.

The study was conducted on fourth-semester students who chose the course of emergency apprenticeship. Emergency apprenticeship courses had been held for 9 days, during the academic year of 2016–2017. Every apprenticeship course was about 6 h, in the morning. Both groups were including three subgroups with nine or ten students. The study was conducted in two separate semesters, and students did not know about each other.

After asking the allowance of the respected head teacher of critical care nursing department to work with students, during 10 days, the researcher took part in both the groups which were being taught with the traditional teaching method and the role-playing teaching method.

During the role-playing method, students at first theoretically got familiarity about stages of CPR, as well as the needed devices and drug. Then, they were informed about the aim and the process of the learning. After that, the stages of CPR were explained and showed by the teacher. At this step, the researcher tried to explain the process by means of the simulation as well

as the real devices being used in the CPR room. During all practical exercises, the trainer was present to observe and control the process. Once observing how the trainer performed, the students started to work, at first, with a molage, but real drug and devices. If they had performed well, they would have been given a chance of working with the real patients. In these groups, however, the students, after going to the CPR room, considering the situation of the patient, did any needed reaction in the presence of the teacher. They were allowed to do real CPR, if necessary. Then, they were checked by the teacher at the moment.

Initially, qualified people were selected for the research, passing theoretical courses of CPR, having no clinical experience in emergency, not having taken part in the similar research, and not being absent more than 1 day during the apprenticeship. Before training, he/she filled the questionnaire of personal and academic particulars and the questionnaire of performance of both the groups in the emergency department of educational hospital affiliated to the Isfahan University of Medical Sciences. It is worth noting that to keep training consistent across both groups of students, it was strived that the trainings should be conducted by one of the instructors of the critical care nursing group (the researcher).

To evaluate the CPR performance, five cases of cardiac resuscitation requirement were considered, and each case was randomly assigned to each of the students. Based on the checklist, the student's performance in dealing with the patient was evaluated from the time the patient arrived to the emergency department and resuscitation room. Based on the scenarios including cardiac arrest, ventricular tachycardia, ventricular fibrillation, marked bradycardia, and pulseless electrical activity, the student should take the role play as a real situation and administer cardiac massage, shock, and medication on a standardized and full basis according to the resuscitation case to save the patient's life. This training was conducted at the emergency room in educational hospitals affiliated to the Isfahan University of Medical Sciences using real equipment. The researcher, according to the same number of training days for the intervention group, conducted the traditional training for the control group.

To assess the control group, the performance evaluation checklist was filled for all students before and after the training, as it was done for the intervention group by the researcher. The student's CPR performance test was performed individually. Furthermore, the students did not have any knowledge of the contents of the checklists at any of the examinations. Data collection tools in this study were individual/academic data (age and gender (and advanced CPR performance checklist.

This checklist contains 63 items with five sections of chest compression and artificial respiration (20 items), tracheal intubation (14 items), electroshock (15 items), and recovery management (5 items) drugs (p items). The questionnaire was completed before and after the intervention for both the groups by the researcher.

The validity of this tool was confirmed based on content validity, i.e., the latest books and articles on the subject of research[3] were obtained and submitted to five experts and professors in the field of emergency medicine for evaluation. The reliability was also determined by the test–retest method. Here, the researcher performed the test for ten students twice with 2-week interval and its reliability was confirmed with r = 0.7. Data were analyzed using SPSS 14 software((SPSS Inc., Chicago, IL, USA).) and descriptive tests, including mean, standard deviation, frequency, and percentage. The analytical tests included independent *t*-test with the aim of comparing mean scores before and after the intervention between the two groups and paired sample *t*-test with the aim of comparing intragroup performance scores. In all tests, the confidence coefficient was 95% and the significance level was set at 0.05.

Ethical consideration

Ethical aspects of this study were approved by the Nursing and Midwifery Care Research Center (approved research project no. 296147). All of the subjects were informed about being free to participate in the research and nondisclosure of personal information. They all signed written informed consent.

Results

The results of this study are based on the data of 70 students participating in the research. The most percentage of participants were male (65%). Mean and standard deviation of their age were 20.8 ± 4.06. There was no statistically significant difference between the two groups in terms of age, sex, and the total average ($P > 0.05$).

In this study, the clinical performance of students in relation to the resuscitation process was examined before and after the training. A pretest performed on the clinical performance of the students before starting the training program for the two groups indicated that all students had a poor clinical performance in advanced CPR such that the mean of total clinical performance score of students in the intervention group before the training was 20.30 ± 2.03, and in the control group, it was 19.9 ± 3.08. Therefore, based on the independent *t*-test results, there was no significant difference between the mean pretest scores in both the groups.

Furthermore, the mean of total clinical performance scores after training intervention in intervention and control groups was 48.01 ± 9.01 and 35.80 ± 1.63, respectively. The paired sample *t*-test showed a significant difference between the mean clinical performance scores of students before and after intervention in the two groups of intervention (role-playing training) and control (traditional training) (P = 0.001). Furthermore, the results of independent *t*-test showed that there is a significant statistical difference between the mean scores of performance in the two training groups (P = 0. 001) after intervention [Table 1].

Furthermore, the highest and the lowest mean scores, obtained in various dimensions of performance checklist after intervention in both interventional and control groups, were for chest compression (13.01 ± 3.01 and 11.06 ± 1.01) and electroshock (7.05 ± 1.02 and 5.06 ± 1.05), respectively.

Discussion

According to the study results, there was a significant increase in the mean score of performance after the intervention than before the intervention in both role-playing traditional learning groups. In other words, this increase represents the effectiveness of both educational methods in changing the level of nurses' performance about teaching the CPR. Furthermore, the students' performance score in the role-playing group was significantly higher than the traditional group after intervention, and therefore, the difference was significant. In this regard, the results of the study by Pike and O'Donnell showed that clinical simulation on learner increased self-efficacy in preregistration nursing education.[16] In this regard, the study of Adib-Hajbaghery *et al*. showed that the lowest score among the nursing students was related to the using of care and treatment equipment.[17] Furthermore, Mohamadirizi *et al*. (2017) in their study on midwifery students showed that the existence of a feeling of dominance in students is an emphasis on the effectiveness of learning based on demonstration approach and its use for real hospitalized people. Totally, these studies confirm the findings of our study and all indicate the effectiveness of active teaching methods in the training skills.[18]

It is also important to note that due to the complexity of the CPR and the low persistence level of skills, it is necessary to use active teaching methods that can store these skills in the long-term memory. In this regard, in their study, Abdolmaleki *et al*. point to the fact that using active learning techniques can enhance team performance in resuscitation process and train people with multiple skills. Furthermore, these trainings can improve the communication skills between different professions and provide a coherent team of accountable people, which results in providing higher quality care to patients and improving disease outcomes.[19] The study of the Foronda *et al*. showed that using active and practical educational methods had a positive effect on the students' social skills and positive intentions and could decrease the negative psychological variable.[20] The study by Karimi-Moneghi *et al*. also showed that using role play would enhance the learning of practical skills of the students, especially in the psychomotor dimension.[9]

Furthermore, the results of our study showed that among the dimensions of the checklist, the chest compression dimension was the highest score relative to other dimensions in both the groups. One of the reasons for this increase is the high motivation of students to carry out the chest compression in the resuscitation room and to create a sense of usefulness as one of the members of the resuscitation team. Furthermore, in this study, the lowest performance score was related to electroshock. The reason for this decrease was the low level of students' skills in using medical equipment. In this regard, the study of Adib-Hajbaghery *et al*. showed that the lowest score among the nursing students was related to the use of care and treatment equipment.[17]

It is worth noting that this research was limited like other researches, including the difference in students' mental abilities, which was controlled by random selection of samples. Another constraint was the information transfer capability and mentioning the dormitory teaching method by the learners, which was partially controlled by dividing the samples into two semesters. Another of our limitation was the small sample size, and it is suggested that future studies should be conducted with a larger sample size.

Conclusion

The results of the research show the effectiveness of role-playing education, which increases the performance of students in advanced CPR. It can also be said that the use of role-playing training methods will increase the learning persistence in learners by creating positive experiences, because in this way, they not only succeed in learning and using these skills in the real clinical environment but also experience how to become

Table 1: Comparison of mean performance score of students for cardiopulmonary resuscitation operation before and after intervention in two training groups

Performance	Educational group, mean±SD		*t*-test results (*P*, *t*)
	Role playing	**Traditional**	
Before intervention	19.9±3.08	20.30±2.05	0.1, 1.5
After intervention	48.01±9.01	35.80±1.63	0.001, 1.3
Paired *t*-test results (*P*, *t*)	0.001, 0.61	0.002, 0.21	

SD=Standard deviation

professionals. In addition, by assigning the learner to various CPR roles, the range of learning will increase.

Conflicts of interest

There are no conflicts of interest.

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