

The comparison of the effect of two different teaching methods of role-playing and video feedback on learning Cardiopulmonary Resuscitation (CPR)

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Abstract

Purpose: This study was conducted with the aim to compare the effects of two educational methods of role play and video feedback on learning CPR.

Background: Cardiopulmonary resuscitation (CPR) is a vital basic life support and the first step in response to cardiopulmonary arrest. Studies have shown that succeeding in cardiopulmonary recovery is strongly linked to education (9) and proper educational methods must be applied in order to improve the quality of educating CPR (12).

Method: This study is a quasi-experimental intervention study.

The research society were sixth semester students of nursing bachelor course in Abadan Faculty of Medical Sciences, among which, 44 students were selected via census sampling was the research sample. The students were familiarized with basics of CPR during 45 minute theoretical and half an hour practical training sessions then they were divided into two groups of role play and video self-feedback, and after a month of training via check lists, they were evaluated with OSCE method. In the video of the self-feedback-group, the participants were filmed while practicing and they scored their performance in a check list based on the video playback. A questionnaire of 24 questions was used in order to assess cognitive

learning and a practical checklist of 15 parts was used to assess the psychomotor learning as pre-test and post-test in both groups, prior to the initiation and one month after holding the educational workshop. Data was studied via T-test and Mann Whitney test.

Findings: The results showed that the average difference between the scores of psychomotor learning before and after training in video self-feedback group ($27/98 \pm 615/5$) was significantly higher than the role play group ($17/02 \pm 374/5$) ($p=0/005$). Also, the average difference of the cognitive learning scores before and after the training in video self-feedback group ($6/50 \pm 2/92$) was significantly higher compared to the role play group ($4/04 \pm 3/27$) ($p=0/12$).

Conclusion: The video self-feedback method in comparison to the role play method is more effective in improving cognitive and psychomotor learning of nursing students in basic cardiopulmonary resuscitation.

Key words: Cardiopulmonary resuscitation, role play method, video self-feedback method.

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Introduction

Today, the potential value of cardiopulmonary resuscitation (CPR) is at a level that can decrease death by half if applied properly (1). The faster the CPR starts, the more successful it will be and it can be enhanced to 90 % (2, 3). For each second of delay in initiating the appropriate treatment, the patient would be one step closer to death and disability; with the passing of every minute, 7 to 10% of the subject's survival decreases so that after 10 minutes, the subject's chance of survival is reduced to nil (4). Faced with such serious problems, CPR should be based on scientific principles, legal standards and human forces who possess the appropriate scientific and practical mandates (5). Nurses are the first people who attend the hospitalized patients' bed when there is cardiopulmonary arrest. They should be skilled enough in order to perform CPR (6). The ability to respond quickly and effectively in clinical situations of cardiopulmonary arrest, to maintain and save patients is considered as a substantial and important qualification in the treatment and care group. The competence of cardiopulmonary resuscitation, is the indicator of cognitive domain and psychomotor skills that are implemented when cardiac arrest occurs requiring cardiopulmonary resuscitation (7). The results of a study indicate that, even the presence of a person with higher skills can have a significant impact on the outcome of resuscitation.

Nowadays, most of the students of the world are following the educational methods that can serve in the development and improvement of clinical decision making capacities and continuous and self-centered learning in students (8). According to the studies, practical education methods are more effective than the other educational methods (9). In learning skills, it is only skill-based practical teaching methods that can allow trainees to have the practical use of these skills. (10) The students also, preferred using experimental methods in a clinical environment over theoretical methods such as lecturing (9). As feedback and repetition is a skills learning necessity, video clip overview is one of the most valuable educational methods for teaching skills (11). Nowadays, in teaching skills there is special attention given to video recording and overviewing it by interns (12, 13). When learning any skills, viewing the person by themselves and watching what exactly they have done and where they should improve, may be very helpful (14). Recording allows reviewing all fields several times and it enables the learner to watch the video again in following days to learn more. This method encourages a learner-focused approach and also enables learners to assess themselves in a precise, detailed and documented manner. In this method, the wrong impression and opposite of what has really happened are avoided. The accuracy and validity of feedbacks in this method is very high and is dedicated (15). In relevant professions to the medical sciences, the students' ability in recognizing their strengths and weaknesses is crucial and the right self-assessment can be effective in the growth of a person's abilities. Self-assessment is proved to be a useful and dynamic method in various studies and in Canada and the United

States, self-assessment improvement is considered as an important factor in the professional evolution of medical graduates (16). Self-assessment allows nurses to monitor their clinical performance in work environment and to revise and improve it. This approach encourages nurses to take a more active role in the learning process and to facilitate it continuously (17).

Role play is another educational method that is widely used for skills training. In this method, individuals put themselves in the desired condition and behave as required. This way, they learn how to deal with situations and problems in this specific condition. Using this educational method, skills are enhanced and the learners are put in real conditions. In playing the roles, there are four elements of thinking, feelings, insight and performance involved and these factors cause the increase in effectiveness of role play in skills training. Reviewing the played role, people think deeply about what happens in every role play, based on its circumstances. Students who have learned communication skills through role play, found it to be a useful method for repeating, observing, discussing and pretending the roles to be actual through educational programs (18). Students who were not experienced in role-play learning method, found it to be an enjoyable and useful method and they strongly, emphasized playing roles in a real manner and with honest feedback (19). The implementation of role play educational method, provides active learning, attitude changing, fostering a sense of confidence, and creating the ability of offering solutions (8).

The literature of previous research also studied the success and effectiveness of both these educational methods. Powell et al (2010) in a study aimed to "identify the thoughts and experiences of nursing students from video self-feedback on cardiopulmonary resuscitation on the mannequin", found that reviewing one's practice by students allows them to know their weaknesses better and to discover the healing fields. The researcher believes that another benefit of the project is to involve the students in the process of assessment (20). In another study, Zadmehr et al (2015) aimed to "evaluate the effect of cardiopulmonary resuscitation training via video self-feedback on the nurses' awareness and performance" showed that video self-feedback training, is effective on the nurses' performance in CPR (21).

In recent decades, the need to revise the traditional teaching methods and the use of modern, active and student-centered learning methods in educational systems, is understood and these methods have been widely used in various fields including medical sciences. It seems that student-centered methods can lead to increased student' satisfaction, enhanced learning speed, creating problem solving skills and continuum of learning and critical thinking. Role play and video feedback methods are among the new and student-centered methods. Various studies have shown positive impacts of various educational methods on learning CPR but, few studies have been conducted on comparison of video feedback method and other methods and their effects on the students' learning. Thus, the author

decided to conduct a study with the aim of “Comparing the effects of role play and video self-feedback on learning CPR in bachelor course nursing students of the Abadan Faculty of Medical Sciences”. It is hoped that the results of this research can be a step towards more efficient and sustainable methods in CPR education and training skilled personnel and ultimately, helping to increasingly successful CPR.

Method

This study is a quasi-experimental intervention research that studies the effects of role play and video self-feedback educational methods on learning in nursing students. In this study, independent variables include training methods (role-play and video self-feedback) and dependent variables include cognitive learning and psychomotor learning. The study society consisted of all sixth semester bachelor course students of Abadan Nursing Faculty of which, 44 people were selected via census sampling as the research sample and were studied during the research. Inclusion criteria were: having a desire to participate in the study, participating in hospital basic CPR workshop for the first time, having no clinical experience in ICU and emergency and urgent sections, selecting the nursing in crisis, emergency and unpredictable events unit during the first semester of 2016-17. The study samples were placed into two groups of role-play (22 people) and video self-feedback (22 people). To conduct the research, the students were requested to fill in the conscious satisfaction form then, they were assured about the confidentiality of the information. Then, all students took the theoretical pre-test (hospital basic CPR, based on the questionnaire of cognitive learning assessment) practical pre-test (basic CPR in OSCE method) (all the students had 3 minutes to perform the operation of cardiopulmonary resuscitation on a specialized mannequin afterwards, their performance was assessed in accordance with the practical evaluation check list). Later, all the students took part in a theoretical training session (1 hour) and a practical training session (2 hours) and they were familiarized with the principles of hospital basic cardiopulmonary rehabilitation. Then in the form of two groups of 1 and 2, group 1 played roles, while group 2 were exposed to video self-feedback. Each group entered a separate training session and were familiarized with the corresponding training methods to perform their CPR training accordingly. In Group 1 and during the training session, the trainer played the role of cardiopulmonary resuscitator on a specialized type D mannequin for 3 minutes based on a pre-designed scenario (QCPR) for the students, then the students practiced in this way so that they had 3 minutes to play the role of cardiopulmonary resuscitator on a specialized type D mannequin (QCPR) and after the practice, they were given the assessment check list and they scored themselves and also, the mannequin display showed the CPR quality percentage of each student after they entered it into the assessment checklist later after each training session. In the second group (video feedback), 2 trainers trained the students using this method, one as the resuscitator that has 3 minutes to perform cardiopulmonary resuscitation on the

specialized Type D mannequin (QCPR), and the other as the cameraman (he filmed his colleague's training using his mobile phone), respectively. Then the resuscitation trainer reviewed his film and analyzed his performance and rated himself in accord to the performance assessment checklist. And they watched their percentage of CPR quality on the mannequin's display. Then they changed places with each other. After that, the students did the training in pairs similarly, one in the role of resuscitator and the other as the cameraman. Both groups did their training in the clinical skills center for a month.

Assessment instruments:

The data collection instruments in this study included: 1) information form containing the characteristics of research units. 2) The questionnaire of 24 questions in the field of cognitive learning for the students' cognitive learning assessment 3) check list, containing 15 correct consecutive CPR measures to assess the students' psychomotor learning. The questionnaire of cognitive learning assessment, is a researcher made questionnaire that contains 24 multiple-choice (4 choices) questions and is designed in accordance with the latest resuscitation guidelines (American Heart Association 2015) and its validity and reliability is verified as well. The amount of Cognitive learning in nursing students would be determined with a maximum of 24 and a minimum of zero score. To determine the amount of students' cognitive learning in basic CPR, before the training workshop and a month after that, each of two groups of students (role-play and video feedback) were given three minutes to perform the CPR on special Type D mannequins then, with using a performance assessment checklist containing 15 practical skills (regarding correct sequential measures of basic CPR) and Mr. Naderi's thesis (Master of Nursing) and in accord to the protocol 2015 of America Heart Association, the necessary modifications were performed and its validity and reliability was obtained and their psychomotor learning was measured accordingly. The CPR quality percentage that is evaluated within the checklist of psychomotor learning assessment, is measured based on the percentage that is screened on the mannequin's display after the CPR operation. The scoring is done as giving no scores to the correct performance and a negative score to a wrong or failing performance in accord to record measures that are determined in the checklist. Finally, if everything is done correctly and completely, there is a zero score and if all the items are wrong, the (-215) score is assigned respectively. The categorization of practical skills would be as follows: 49 percent less (weak) (negative score 107 to 215), 75-50 percent (needs more education) (negative score of 106 to 53), and higher than 76 percent is the acceptable level (negative score of 52 and higher). Comparing the mean scores of the students' assessment checklist for 2 groups finally indicates the method that is more effective in learning CPR.

The visual and content validity of the cognitive domain questionnaire and checklist of psychomotor domain were obtained using scientific resources and texts and by asking the opinions of eight instructors of the nursing school, and

the reliability of the cognitive learning questionnaire was calculated through the test-retest method as 77%. To determine the reliability of the psychomotor field checklist, via assigning two simultaneous observers, the clinical skills were assessed for fourteen students in a reconstructed scene of a given situation at Clinical Skills Center of the faculty. In order to determine the reliability of the clinical skills checklist, Pearson's correlation coefficient was used and a Pearson correlation coefficient of 88% was obtained.

Methods of data analysis:

The data was analyzed using the statistical SPSS Version.16, Mann-Whitney statistical test and independent T-test. The Mann-Whitney test was used to check the amounts of cognitive learning and psychomotor learning in the nursing students, regarding the basic cardiopulmonary resuscitation prior to role-play and video self-assessment training sessions.

To compare the mean of the nursing students' theoretical scores in cardiopulmonary resuscitation skill, after the training with both methods of role-play and video self-feedback, the non-parametric Mann-Whitney test was used. As in Table 1, a significant difference was observed between the average rankings of two groups ($p=0/001$). To compare the mean of the nursing students' theoretical scores in cardiopulmonary resuscitation skill, before the training with both methods of role-play and video self-feedback, the independent T-test was used. As shown in Table 1, no significant difference was observed between the mean of the nursing students' theoretical scores in cardiopulmonary resuscitation skill, before training with both methods of role-play and video self-feedback ($p=0/560$). In this regard, the study of the mean of two groups shows that the average score of role-play was 3.09 ± 14.32 and video self-feedback was 2.52 ± 13.82 .

To compare the mean of the nursing students' practical scores in cardiopulmonary resuscitation skill, after the training with both methods of role-play and video self-feedback, the Mann-Whitney test was used. As in Table 2, a significant difference was observed between the average rankings of two groups ($p=0/001$). To compare the mean of the nursing students' practical scores in cardiopulmonary resuscitation skill, before the training with both methods of role-play and video self-feedback, the Mann-Whitney test was used. As in Table 2, no significant difference was observed between the average ranking of two groups ($p=0/112$). In order to compare the average difference between the nursing students' theoretical and practical scores in cardiopulmonary resuscitation skill, before and after the training with both methods of role-play and video self-feedback, the independent T-test was used (Table 3).

In order to compare the average difference of the nursing students' theoretical scores in cardiopulmonary resuscitation skill, before and after the training with both methods of role-play and video self-feedback, the independent T-test was used. As in Table 3, the average difference of the nursing students' theoretical scores in

cardiopulmonary resuscitation skill, before and after the training in the video self-feedback group, is significantly higher than the role-play group ($p=0/012$). The study of the average difference of theoretical scores in both groups shows the average difference of the nursing students' theoretical scores in cardiopulmonary resuscitation skill, before and after the role-play equals 3.27 ± 4.04 and in the video self-feedback it equals 2.92 ± 6.50 respectively. To compare the average difference of the nursing students' practical scores in cardiopulmonary resuscitation skill, before and after the training with both methods of role-play and video self-feedback, the Mann-Whitney test was used. As in Table 3, a significant statistical difference was observed between the average ranking of two groups ($p=0.005$).

Conclusion

The results of current research showed an increase in the amount of the nursing students' cognitive learning after training through both role-play and video self-feedback methods. In the Zahedmeh and colleagues' study (21) aiming at the study of effect of video self-feedback training on the nurses' awareness and performance in performing cardiopulmonary resuscitation, it was shown that the mean of awareness scores of each group, was increased in the pre-test and post-test. In the Akho and colleagues' study (22) for simulating the effect of cardiopulmonary resuscitation on the nursing students' acquisition and retention of knowledge and self-efficiency in Jordan, increased awareness scores were reported.

In most studies, the average scores of awareness in each group in the post-test, was significantly increased in comparison to the pre-test, therefore, these results confirm that regardless of type of training and the applied method for teaching, education can be considerably effective on increasing the nurses' awareness. That is compatible with the study results in the field of the effects of different educational methods on nursing staff's awareness and knowledge about cardiovascular resuscitation, such as Zahedmeh (21), Mohsenpoor (23), Mokhtari (6), Bakhsha (24), and Adine (11).

However, in the Managheb and colleagues's study (25) the results showed, the mean of scores in the intervention group had a significant statistical difference in comparison to the scores before training ($0.000 > p$), while there was no statistically significant difference in the control group ($0.98/0 > p$); therefore, the results of Managheb's study shares similarities with the intervention group of the current study. However, it is different in the control group in terms of the results of this study, perhaps due to the reason that the control group in the Managheb's study, no new methods were used for teaching to enhance the students' cognition after the educational workshop that was held for both groups; while in this study, both groups took advantage of a new educational method (methods of role-play and video self-feedback). Comparison of the nursing students' cognitive learning, before and after training in the two groups of role-play and video self-feedback showed that the students' cognitive learning after implementation of the

Table 1: Comparison of theoretical scores of cognitive learning in nursing students in cardiopulmonary resuscitation skill, before and after the training with both methods of role-play and video self-feedback

P value	Total Rankings	Average Ranking	Number	Group	Intervention Period
0/001	351	15/95	22	Role Play	Post Intervention
	639	29/05	22	Video Self Feedback	
0/560	3/09	14/32	22	Role Play	Pre Intervention
	2/52	13/82	22	Video Self Feedback	

Table 2: Comparison of the mean of practical scores in the nursing students' psychomotor learning in CPR skill, after training with two methods of role-play and video self-feedback

P value	Total Rankings	Average Ranking	Number	Group	Intervention Period
0/001	354	16.09	22	Role Play	Post Intervention
	636	28.91	22	Video Self Feedback	
0/112	562.5	25.57	22	Role Play	Pre Intervention
	427.5	19.43	22	Video Self Feedback	

Table 3: Comparison of the average difference between the nursing students' theoretical and practical scores in cardiopulmonary resuscitation skill, before and after the training with both methods of role-play and video self-feedback

P value	Standard Deviation	Average Difference of Theoretical Scores	Number	Group	Score
0.012	3.27	4.04	22	Role-play	Theoretical Score
	2.92	6.50	22	Video Self-feedback	
0.005	374.5	17.02	22	Role-play	Practical Score
	615.5	27.98	22	Video Self-feedback	

video self-feedback method increased more in comparison to the role-play method. In a similar study that Zahdmehr et al (21) conducted, the results showed that the comparison of mean of awareness post-test scores did not show a significant difference between the experimental and control groups, which is inconsistent with the results of this study. The reason behind it can be the one month practicing opportunity in video self-feedback method before having the test, which was given to the students in this study, as well as assessing the students' awareness based on the practical concepts of resuscitation. Comparing the average scores of the nursing students' psychomotor learning in basic cardiopulmonary resuscitation before and after training through methods of role-play and video self-feedback, showed significant statistical differences. In the study that Lee and colleagues (26) conducted in China in order to study the effect of evaluation prior to training and feedback on improving and maintaining the nursing students acquired skills on the cardiopulmonary resuscitation, it was shown that the students' skills in the test group was higher after retraining classes. Results of the Paul and colleagues' (20) and Zahdmhr and colleagues' study (21) showed that the video feedback boosts the students and nurses' performance level in cardiopulmonary resuscitation skill, which is similar to the results of the current study. The results of the Hazavei et al (27) and Managheb and colleagues' study (28) showed that an increase was observed in the people's average performance in skills after training with educational method of role-play, which is consistent with our study. The results of most studies have revealed similar results to our study indicating that the educational intervention has improved the nurses' performance in cardiopulmonary resuscitation. In this regard, the study results from the Adine (11), Nouri et al (29), Hosseini et al (1), Mokhtari et al (6), Bakhsha's et al (24) studies are compatible with our study. Comparing the average difference of the nursing students' psychomotor learning scores in cardiopulmonary resuscitation before and after the training showed that the video self-feedback group ($5/615 \pm 98/27$) was significantly higher than role-play group ($5/374 \pm 2.17$) ($005/0 = p$). In a study by Paul et al (20), the results showed that all the students believed that their review of their practical performance, enables them to know their weaknesses better and to discover improvement fields. In another study by Yu M S (30), the results showed that the test group students had better results in competence, communication skills and motivation compared to the control group in post-test that was held 8 weeks after the pre-test. It seems that the self-awareness of one's performance via reviewing the videotape, increases the competence in performing clinical skills. The results of Managheb's et al study (25) showed that the difference of average scores in learning clinical skills in the group that were provided with the video feedback, was considerably significant in comparison to the group that did not receive any kind of feedback about its performance ($000 / 0 > p$) and also it showed that not only the video feedback improves the interns' abilities in taking descriptions and physical examination, but also it increases the accuracy of diagnosis and treatment as well. In a study that was conducted by Nicholas Potos (31), the

test group had significantly higher test results therefore, Potosi and colleagues advised using the mannequins together with audio and visual feedback in training basic CPR. Practicing and feedback are the most important principles of learning skills and the video feedback method is the simplest practicing method and the most complete feedback method. Additionally, students in this method can assess themselves and perform the self-learning via reviewing the recordings. Studies also have shown that the best way to improve performance, is to have the individuals assess themselves (Namadi Vosoughi). This self-assessment, through increased awareness and commitment to change, allows nurses to consider their clinical practice in the workplace and to take action in order to improve it. The study also confirms the fact that the video self-feedback training is an effective method in clinical skills training. It is hoped that this research is a step toward improving clinical skills.

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