

The Effect of Educational Training on Nurses' Clinical Function of Cardiopulmonary Resuscitation

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Abstract

Background and objectives: Cardiopulmonary resuscitation (CPR) is a life-saving intervention which is casually performed by nurses. The nurses' knowledge and skills play a great role in examining the effect of educational training on nurses' performance on the guidelines in manipulating cardiopulmonary resuscitation.

Materials and methods: In this experimental study we evaluated 66 nurses of the emergency Room (ER), ICU, CCU, and internal wards of Taleghani Hospital in Abadan, Iran in CPR before and after educational training. A validated researcher-made questionnaire was used since its validity and reliability were highly observed. It contained demographic information and included 20 items on nurses according to the Cardiovascular Recovery Guide 2016. All participants received an 8-hour training session and the scores were compared before, and one month after, educational intervention. The data were calculated through SPSS software version 16.

Results: Data were collected among the 66 nurses who participated in the study. They were one male and 65 female nurses. Participants' age was 30.27 ± 6.71 years and their work experience of 6.79 ± 6.36 (1-27) years. The educational level of most participants was nursery including bachelor (92.4%) and most in ER (31.8%). Score of the nurses' was 35.24 ± 2.45 at baseline and that increased to 38.07 ± 1.58 after the educational intervention ($p < 0.001$). That was significantly higher in participants who were above 30 years old than those who were less than 30 years old. Their age was correlated by the increasing years of their job experience and was different in nurses who worked in various wards (all $p < 0.001$), but they did not differ in their educational level ($p = 0.13$).

Conclusion: The nurses of Taleghani Hospital had experience of CPR guidelines at the significant level which improved after the educational training; this issue showed the necessity of routine educational sessions on CPR for nurses.

Keywords: Nurses, Education, Knowledge, Cardiopulmonary Resuscitation

Introduction

Sudden cardiac arrest is the leading cause of death in Iran and worldwide (1). As American Heart Association (AHA) guidelines recommended in 2015, early cardiopulmonary resuscitation (CPR) within 3 to 5 minutes of cardiac arrest is the first step after pulse check that can increase the survival rate by 50% (2).

Nurses are usually the first who should be familiar with the patients who need most updated CPR guidelines and should receive proper training on the use of the devices including automated external defibrillator (AED) (3). However, studies have reported that the training programs are insufficient (4) and they have reported less than 50% success rate in CPR guidelines (5). Even when nurses pass the theoretical exams, less than half them cannot correctly perform the guidelines of the CPR clinical function on patients (6). Lack of knowledge and self-confidence or anxiety of the nurses may cause them not to start defibrillation (7). Therefore, several hospitals perform routine training courses at least each 6 months for nurses, but they have concluded that the educational programs that increase the nurses' confidence in skills may not reduce their anxiety (8). Since training alone could not increase nurses' skills, studies have suggested that coaching and practicing after an educational period are the key elements of success (9). They have established various factors which are associated with the amount of attention paid to guidelines of nursing principles, such as practicality of the guideline, job motivation potential, and organizational competence (10). It is suggested, that staff education, an early call for help, and team-work can increase the success rate, but it seems that a great number of medical staff had never renewed their CPR knowledge and the rest have only done so each 5 years (11).

Iranian studies have also reported that CPR is not performed properly in Iran (12) and have described low patient survival rates after CPR (13, 14). Therefore, CPR in Iran requires great attention to consider the fact that periodical education of nurses on CPR is not currently set in hospital guidelines in Iran. The present study aimed to examine the effect of educational training on nurses' CPR so they can perform it well.

Materials and Methods

Study design

In the present experimental study, nurses' CPR was evaluated in emergency departments (ED), intensive care unit (ICU), cardiac care unit (CCU), and internal wards of Taleghani Hospital, Abadan, before and after training courses. The total number of 66 nurses who worked with CPR in ED, ICU, CCU, and internal wards were recruited into the study voluntarily. Before recruitment, the design and objectives of the study were explained to all participants and written informed consent was obtained from those who were willing to participate in the study and they were ensured of confidentiality of their information.

The inclusion criteria consisted of having at least nursing associate's degree, but the job experience and age were not limited. Any participant who did not participate in the training sessions during the study or who worked in another hospital was excluded from the study. Nurses who met the appropriate criteria were included into the study by census method.

For checking of nurses on CPR, a questionnaire was designed by 3 faculty members who confirmed the content validity. The reliability of the questionnaire was approved by three faculty members (Cronbach's Alpha of 0.7). This questionnaire contained demographic information, including age, sex, educational level and general working experience plus 20 items (i.e., with choices including yes, partial, and none) regarding the cardiopulmonary resuscitation guidelines of 2016. Each item was scored by 0, 1, and 2 for the responses of no, partial, and yes choices, respectively, resulting in a maximum score of 40 and minimum of 0. Nurses were considered unsatisfactory when the score was 0-10, intermediate when 11-20, satisfactory when 21-30, and excellent when 31-40. The questionnaire was filled in by the participants before, and one month after, educational training.

Educational training consisted of an 8-hour training session, given to all the participants, in three groups of 22 by an educational supervisor at Taleghani hospital. They were certified as the trainers of CPR and the training was first conducted on a simulator. Practical training on the simulator of the QCPRC model of the Laerdal Company and the construction of the country of Norway, under the same conditions including the same time, was carried out by the teacher, teaching aids and a stationary simulator. After teaching of all participants practiced for 4 hours in the workshop on simulator. The time of this training was set based on the nurses' work shifts. Data were reported through frequency and percentage, or mean \pm standard deviation (SD). The results of the questionnaire scores were compared using Paired samples T-test. For the statistical analysis, the statistical software SPSS version 16.0 for windows (SPSS Inc., Chicago, IL) was used. P values of 0.05 or less were considered at the significant level.

Results

The participants were 66 nurses and one of them was male and the rest were female. Mean \pm SD of participants' age was 30.27 ± 6.71 (i.e., ranging in range from 23 to 48 years old) and nurses' experience was 6.79 ± 6.36 (1-27) years. The educational level of most participants was nursery bachelor (92.4%), while the rest (6.1%) were nursery associate, or (1.5%) nursery Msc. Most (31.8%) worked in ED, and 19.7% worked in CCU, while 16.7% worked in men and 16.7% in women's internal wards, and 15.2% in ICU.

Mean \pm SD score of the nurses' was 35.24 ± 2.45 at baseline and increased to 38.07 ± 1.58 after the educational intervention ($p < 0.001$).

The classification of the participants' age showed that the higher scores before and after intervention were in the experienced group (i.e., <30 and >30 showed) as ($p < 0.001$) (Table 1). Moreover, there was a significant negative relationship between the scores and age ($r = -0.33$, $p\text{-value} = 0.006$). Classification of the nurses' experience showed a significant difference in mean scores of nurses with various job experiences. This revealed that the scores increased by increasing the years of experiences ($p < 0.001$) (Table 1). There was also a significant difference in mean scores of nurses who worked in various wards and the nurses who worked in men's internal ward showed the highest increase in mean score ($p < 0.001$) (Table 1). But the mean scores of nurses did not differ significantly based on their educational level ($p = 0.13$), as shown in Table 1.

Table 1: Mean scores of the participants based on the working unit/ward

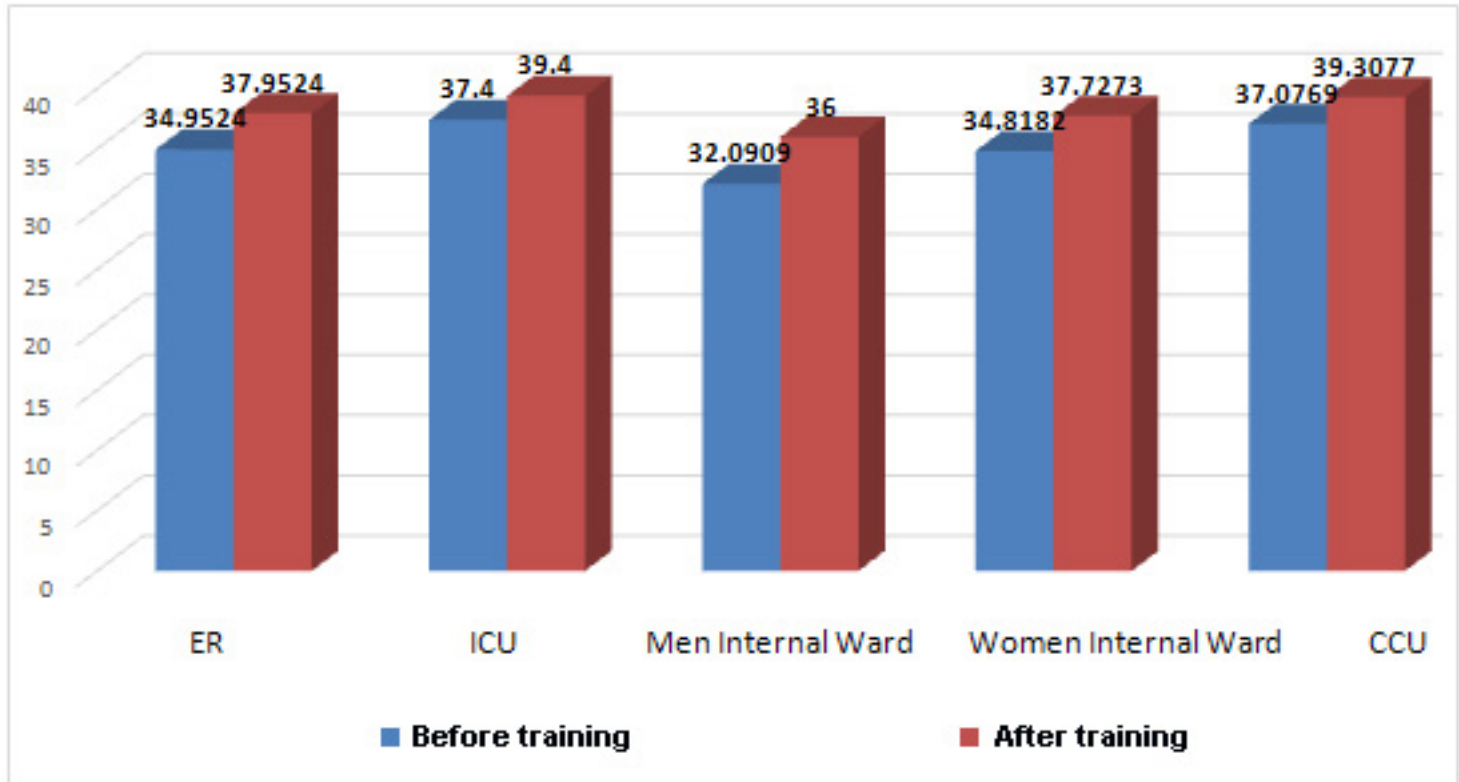


Table 2: Mean and standard deviation of participants' scores based on their demographic characteristics

Variable's category		Number of nurses	Before intervention	After intervention	p-value
Age category	<30	45	34.42±2.54	37.48±1.54	<0.001
	>30	21	37.0±0.77	39.33±0.65	
Work experience	≤5 years	35	34.11±2.27	37.31±1.43	<0.001
	5-10 years	19	36.15±2.47	38.57±1.50	
	≥11 years	12	37.08±0.66	39.50±0.52	
Working unit/ward	ED	21	34.95±1.85	37.95±1.11	<0.001
	ICU	10	37.40±0.84	39.40±0.69	
	Men's Internal	11	32.09±2.87	36.0±1.78	
	Women's Internal	11	34.81±1.60	37.72±1.0	
	CCU	13	37.07±0.64	39.30±1.58	
Educational level	Associate	4	36.75±0.50	39.25±2.45	0.13
	Bachelor	61	35.09±2.49	37.96±0.50	
	Master	1	38.0±0	40.0±0	

Discussion

The present study determined that the nurses of Taleghani hospital had a satisfactory CPR clinical function which increased after receiving educational training of CPR guidelines, with higher mean scores in experienced nurses with higher job experiences.

CPR is an important measure to improve the mortality and morbidity of patients after cardiopulmonary arrest. Thus, it is essential to pay more attention to success rate of CPR (15). In Iran, a recent study reported that 95.2% of CPR attempts were unsuccessful and less than 5% survived to receive hospital discharge (16). Nurses play a significant role in patients' survival, as they are the first who come to the patients' aid, so Success rate of CPR is significantly associated with the nurses' skills (17, 18).

Studies have indicated that nurses' knowledge is significantly associated with their CPR performance (19), and have, therefore, suggested that periodical education of nurses on CPR can increase nurses' knowledge and skill (20). Thus, many countries perform routine educational programs for nurses, and they have reported that it increases nurses' knowledge and skill, but it may not decrease their anxiety (8).

The results of this study agrees with an Iranian study, Saghafinia and colleagues (2015) who designed a 20-item questionnaire and reported that 54.75% of nurses responded correctly to the knowledge question; however, the psychomotor skills were very low and that increased after training (21), which is consistent with the results of the present study, considering the association of knowledge and clinical function (22). They also showed that the nurses' knowledge that increased to 80.6% after education, decreased to 64.3% after two years, which indicates the necessity of periodic education of nurses about CPR (21). Another study that examined CPR performance of nurses in Fasa showed that among 140 Iranian nurses, a 4-hour course could significantly increase their CPR performance (23). This is consistent with the results of the present study. Studies in other countries have also confirmed that nurses' knowledge significantly increase after education(24,25). Källestedt confirmed that standardized cardiovascular education could increase the knowledge of nurses that was consistent with our study outcomes. The findings of the present study were confirmed by his colleagues (24). In addition, Moule reported that nurses' clinical practice increased after training for cardiopulmonary resuscitation guidelines (25). Moreover, the results of studies in other countries are consistent with the results of the present study and emphasize the necessity of educational programs for nurses involved in CPR.

Another finding of the present study was statistically significant higher scores in nurses with higher experience, which is in line with previous research, indicating the association between experience of the CPR team leader and success rate (26). Moreover, studies have indicated that even experienced nurses require training on CPR

(27). The present study also indicated that after invention, the score of nurses with the highest experience reached nearly the maximum score, which showed the efficacy of training in experienced nurses. Hosseini et al showed that the trainer's skill and experience play a significant role in success of the training (28), which is consistent with the results of the present study.

Some studies have also focused on the type of education that can have the highest efficacy which suggests using human models, educational films, and reference books as the best method with the highest efficacy (29). The significant increase in nurses' skills in the present study showed the efficiency of the training sessions that were performed by skilled educational supervisors with high experience. All of these studies are consistent with the current study, suggesting that a continuing education course can significantly increase the clinical performance of nurses' cardiopulmonary resuscitation. So, this is a matter of great importance and must be included in Clinical decision-making.

Beside the strengths of the current study, it also had some limitations, such as limited sample size and taking place in one hospital. Moreover, the nurses' were only evaluated for a short period after educational training. These limitations result in non-generalizability of the results. Thus, it is suggested that future multi-centric studies evaluate the nurses' after educational programs in longer follow-ups. In conclusion, nurses' knowledge significantly increased after an 8-hour educational session by an educational supervisor in CPR which indicated the efficacy of CPR training for nurses who can perform effectively to increase the success rate of CPR in Iran.

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