

Simulation Training for Inactive Nurses with 360 VR content

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Abstract

This study evaluated the effect of simulation training on cardiac arrest in hospitals for inactive nurses with 360 VR content, and attempted to prepare basic data for simulation training for inactive nurses in the future. The design of this study is an experiment study before and after a single group. The study period was from October 13, 2020 to December 17, 2020. The subjects of the study were a total of 21 nurses who participated in the education program for inactive nurses. For simulation training for inactive nurses, Microsoft Powerpoint, hybrid simulation, high-fidelity simulation, and 360 VR content were applied for theories education and practical education. As a result of the study, the satisfaction level of the curriculum for the cardiac arrest situation in the hospital for inactive nurses was 4.78 ± 0.36 points out of 5 points. Understanding of education was 4.71 ± 0.46 points out of 5 points. Usefulness of education was 4.80 ± 0.40 points out of 5 points. Confidence in airway maintenance before and after training, BLS review, manual defibrillator, emergency medication administration, airway maintenance, emergency situation simulation, and debriefing were all significant. According to the results of this study, simulation training of the situation of cardiac arrest in the hospitals for inactive nurses was effective. In future studies, it will be necessary to develop and verify specific teaching and learning methods by applying various cases of cardiac arrest situations in consideration of the type of hospitals

Keywords: inactive nurses, cardiac arrest, simulation, debriefing, satisfaction

1. Introduction

Interest and support for the utilization of inactive nursing personnel is increasing as a method to solve the shortage of nursing manpower in the clinical field. An inactive nurse means a person who has a nurse's license but is not currently work as a nurse. Inactive nurses who have been away from the clinical field for a period of time need education to improve their competency to perform nursing tasks in a rapidly changing clinical field, and to re-acquire knowledge and skills to ensure patient safety.

The retraining course of inactive nurses is an essential connection process for successful return to the nursing

field and becoming an active nurse[1]. The Korean Nursing Association for this purpose regularly operates training courses for reemployment of inactive nurses through job centers in each region[2]. Inactive nurses are educated in theoretical lectures and practical training in nursing in order to re-acquire existing knowledge and skills, and to acquire the latest new knowledge and skills, and then find employment in various medical institutions.

In the post-evaluation of the re-education course for inactive nurses conducted at the Korea Institute for Nursing Policy, CPR was the most useful content in the curriculum[3]. Currently, basic CPR training is being implemented for CPR for inactive nurses[4]. Hospitals are places where the possibility of cardiac arrest patients always exists, and since 80% of the mortality rate in the hospital is cardiac arrest, and the survival discharge rate during cardiac arrest is only 15-20%[5]. It can be said that the necessary education is specialized resuscitation rather than basic resuscitation.

In previous studies, there are various times, methods, and educational contents for cardiopulmonary resuscitation education[6-8]. Currently, specialized Korean resuscitation courses for medical personnel are operated by the Korea Cardiopulmonary Resuscitation Association. Currently, specialized Korean resuscitatorprofessionals are operated by the Korea Cardiopulmonary Resuscitation Association. This course is programmed in a 4.5 hour to 6 hour course to understand the knowledge needed for emergency treatment of cardiac arrest patients in hospitals or ambulances, and to perform related procedures. It is a specialized resuscitation education for certification and quality management[8].

However, there are several practical restrictions for inactive nurses to participate in the specialized Korean resuscitation course operated by the Korea CPR Association. In order for nurses to perform CPR quickly and accurately in unpredictable situations in the clinic, practical education that combines knowledge and procedure is emphasized[9]. Therefore, in this study, in consideration of the level of inactive nurses, a simulation education for cardiac arrest in hospitals according to the 2015 AHA Guidelines was tailored to provide a method for CPR training for inactive nurses in the future.

2. Research method

2.1 Research design

This study is a similar experimental study before-and-after a single group to understand the effects of airway maintenance, manual defibrillator, emergency medication administration, simulation of emergency situations, and debriefing after conducting simulation training based on cardiac arrest situations in hospitals for inactive nurses.

2.2 Research subjects and data collection

The subjects of this study are inactive nurses who participated in the inactive nurse education program conducted by the city B employment center, and those who voluntarily participated after hearing the explanation of the purpose and method of the study. The researcher directly explained the purpose and purpose of the research after providing information that the research subjects could stop participating in the research at any time without forcing them to participate in the research and answering the questionnaire. In addition, while providing the research participants with a consent form about the benefits and inconvenience of participating in the study were sufficiently explained, and it was emphasized that no disadvantages occurred even if they did not participate in the study.

The data collection period lasted from October 13, 2020 to December 17, 2020. A total of 21 subjects

participated in this study, and theoretical education was provided through Microsoft Powerpoint, 360 VR content, skill education was conducted with a high-fidelity mannequin. The total training time was 5 hours[Table 1][figure 1].

Table 1. Simulation course for inactive nurses

Session	Contents & Learning activity	Time(min)	Methods
1st	course orientation basic CPR review	20	demonstration & practice
2nd	Skill learning airway maintenance, manual defibrillation emergency medication, CPR simulation, debriefing	80	demonstration & practice
3rd	ECG learning	20	lecture with video
4th	Simulation 1 Simulation 2	50 50	team based simulation lecture with 360 VR content
5th	Debriefing	40	discussion

* CPR: Cardiopulmonary resuscitation , ECG: electrocardiogram, VR: virtual reality



Figure 1. Screen of 360 VR content

2.3 Research tools

2.3.1 Satisfaction with the curriculum for CPR

Cardiopulmonary resuscitation is artificially circulating blood when cardiac arrest occurs, helping breathing, delaying brain damage, and helping the heart recover from paralysis[8]. In this study, the curriculum satisfaction for CPR consisted of a total of 4 questions. The questions are rated on a 5-point scale, with 1 point = "not satisfied at all", 2 points = "not satisfied", 3 points = "normal", 4 points = "satisfied", 5 points = "very satisfied". The higher the score, the higher the satisfaction with the curriculum for CPR. In this study, Cronbach's $\alpha=.97$.

2.3.2 Education Satisfaction

Education satisfaction was composed of 15 questions in total, consisting of five parts: airway maintenance, manual defibrillator, emergency medication administration, emergency situation simulation, and debriefing. Each part is a total of 3 questions and was measured on a 5-point Likert scale of '(1) not satisfied at all-(5) very satisfied.' The higher the score, the higher the education satisfaction. In this study, airway maintenance Cronbach's $\alpha=.79$, manual defibrillator Cronbach's $\alpha=.97$, emergency medication administration Cronbach's $\alpha=.97$, emergency situation simulation Cronbach's $\alpha=.93$, and debriefing Cronbach's $\alpha=.93$.

2.3.3 Confidence in skills

The skill category consists of airway maintenance, manual defibrillator, emergency medication administration, and emergency situation simulation. Confidence in skills is composed of confidence before and after education for each item. A visual analogue scale was used to measure confidence. This measurement tool is easy to collect and has relatively good reliability according to short-term changes. In this study, a 10 cm mark was used to indicate no confidence at all, and 10 for very confident. The higher the number, the higher the confidence.

2.4 Data Analysis Method

For statistical processing of data, SPSS 24 WIN program was used. The study variables were calculated by frequency, percent, minimum, maximum, mean, standard deviation, and Wilcoxon Signed Rank Test.

3. Research Results and Discussion

3.1 General characteristics

General characteristics in this study are shown in Table 2. The subjects of the study were all women. The ages are highest among 11 persons (52.4%) aged 31 to 40, 6 persons aged 41 to 50 (28.62%), 6 person aged 51 to 60 (14.3%) and 1 person aged 21 to 30. The career were the highest with 9 persons (42.9%) from 1 to 5 years, 6 persons (28.6%) from 6 to 10 years, and 4 person (19.0%) from 11 to 15 years. The period of unemployment was 5 persons (55.6%) for 1 to 5 years and for 6 to 10 years, 5 persons (23.8%) for 11 to 15 years, and 4 person (19.01%) for 16 and 20 years.

Table 2. General characteristics (N=21)

Categories		n(%)
Gender	Woman	21(100.0)
Age	21-30	1(4.8)
	31-40	11(52.4)
	41-50	6(28.6)
	51-60	3(14.3)
Total career(year)	1-5	9(42.9)
	6-10	6(28.6)
	11-15	4(19.0)
	16>	1(4.8)

	Other	1(4.8)
Career interruption period	1-5	6(28.6)
	6-10	6(28.6)
	11-15	5(23.8)
	16-20	4(19.0)

3.2 The degree of satisfaction with the curriculum of the subjects

Table 3 shows the curriculum satisfaction and education satisfaction of the subjects. The satisfaction level of the curriculum was 4.78 ± 0.36 points out of 5 points. Understanding of education was 4.71 ± 0.46 points out of 5 points. Usefulness of education was 4.80 ± 0.40 points out of 5 points. Education satisfaction were consisted of BLS review, manual defibrillator, emergency medication administration, airway maintenance, emergency situation simulation, and debriefing. Among the detailed items, the level of satisfaction in education was all 4.86 ± 0.36 points.

Table 3. Curriculum satisfaction and education satisfactions (N=21)

Categories	Min	Max	Mean \pm SD
Satisfaction with the curriculum	4	5	4.78 ± 0.36
Understanding of education	4	5	4.71 ± 0.46
Usefulness of education	4	5	4.80 ± 0.40
Education satisfactions			
BLS review & Manual defibrillaton & Emergency medication	4	5	4.86 ± 0.36
Airway maintenance	4	5	4.86 ± 0.36
Emergency situation simulation	4	5	4.86 ± 0.36
Debriefing	4	5	4.86 ± 0.36

3.3 Confidence in technical skills of the subjects

The confidence in the technical skills of the subjects was shown in Table 4. There were significantly different before and after simulation training in airway maintenance, manual defibrillator and emergency medication administration, and confidence in simulation and debriefing for emergency situations.

Table 4. Confidence in technical skills of the subject (N=21)

Variable rate	Before education	After education	Z	p alue
BLS review, manual defibrillaton, & emergency medication	2.21 ± 2.17	6.66 ± 1.52	-3.74	<.001
Airway maintenance	2.36 ± 2.42	6.68 ± 1.52	-3.74	<.001
Emergency situation simulation	2.12 ± 2.00	6.55 ± 1.48	-3.74	<.001
Debriefing	2.31 ± 2.48	6.66 ± 1.63	-3.74	<.001

4. Conclusions and suggestions

When a nurse in the hospital detects a patient with cardiac arrest, it is obligated to start CPR immediately, and ensure that professional psychological resuscitation takes place within an early time[10]. Therefore, this study conducted simulation training on cardiac arrest in hospitals for inactive nurses, and then confirmed the satisfaction of the curriculum and education satisfaction, and evaluated the effectiveness. This study prepared basic data for CPR training for inactive nurses in the future. As a result of the study, satisfaction with the curriculum was above average. Airway maintenance, manual defibrillator, emergency medication, emergency simulation, and debriefing, which are detailed items of educational satisfaction, were all above average. Confidence in the technical skills before and after education was significant in airway maintenance, manual defibrillator, emergency medication administration, emergency simulation, and debriefing. Through the results of this study, it was confirmed that simulation education on cardiac arrest in hospitals for inactive nurses is effective.

This study has the academic significance of confirming the effect of 360° content in simulation training for inactive nurses and suggesting its use at a point in time when the research applied by photographing an image with a 360° camera is insufficient [11]. In addition, it has practical significance in that it presents an example of simulation education for inactive nurses.

This study is a pilot study conducted with a small number of convenience recruitment personnel, and there is a limitation on generalization of the study results. Based on this study, the following suggestions are made for future research. First, it is necessary to increase the possibility of generalization by expanding and applying the research subjects. Second, it is necessary to grasp the performance ability by objectively evaluating the subject's technical skills. Third, it is proposed to establish an education method that can systematically apply simulation education for cardiac arrest in hospitals.

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