Comparison of Simulation Effects on Knowledge of Advanced Cardiac Life Support in Nursing Students and Nurses

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Abstract. This study was designed to compare the effects of simulation-based education on knowledge of advanced cardiac life support (ACLS) in nursing students and nurses. All subjects were educated for three days using the study's ACLS protocol. On the first day, manual self-learning was performed. On the second day, a pre-test regarding ACLS knowledge was undertaken before the simulation-based education. On the last day, a post-test was performed after another simulation. Nurses group showed significantly more scores than nursing students did in both pre- and post- test on ALCS algorithm and major electrocardiogram. The total score change of nursing students between pre- and post- simulation measurement was larger than that of nurses significantly. This result suggests that the effect of simulation-based education could be different according to the subjects of education.

Keywords: simulation, nurses, nursing students, knowledge, advanced cardiac life support

1 Introduction

Cardiac arrest is one of most critical situation in a hospital setting. However, the quality of cardiopulmonary resuscitation (CPR) is often poor in the clinical setting and the lack of resuscitation skills of nurses and doctors has been identified as a contributing factor to poor outcomes of cardiac arrest victims. For the improvements in CPR skills, most medical school and nursing colleges administer to their students an advanced cardiovascular life support (ACLS) course from American Heart Association (AHA) [1], and besides most hospitals provide their nurses and doctors with ACLS program regularly. The ACLS program involves high-fidelity simulation-based learning using standardized programs and devices that provide students with safely repeatable clinical situations [2].

The purpose of this study was to compare the effects of simulation-based education on knowledge of ACLS in nursing students and nurses.

2 Method

2.1 Design and subjects

This study was designed to compare the effect of simulation education for nursing students and nurses. The subjects were 51 nursing students and 15 nurses. All subjects had never undertaken simulation-based learning such as the AHA's ACLS program. However, nurses had previous knowledge of ACLS, working in emergency department.

2.2 Procedure

All subjects were educated via study's ACLS protocol that based on the AHA's ACLS program and modulated according to the education schedule for three days.
On the first day, manual self-learning was performed. On the second day, pre-test for knowledge on ACLS was undertaken prior to the ACLS simulation program. After the pre-test, the instructor showed a video to introduce the simulation program and gave a mini-lecture regarding the ACLS's core contents. Subsequently, all subjects underwent simulation practice using a scheduled role within one team according to the four simulation scenarios based on real clinical situations. On the last day, the same instructor screened another video regarding the team concept of ACLS and gave a mini-lecture regarding ACLS review. Subsequently, another simulation practice was performed before the post-test. A post-test was also performed to measure ACLS knowledge, but modulated in a different way compared to the pre-test.

2.3 Instruments and Analysis

The Pre-test and post-test for ACLS knowledge consisted of fifteen questions across four topics: team concepts, ACLS algorithms, major electrocardiograms (ECGs), and defibrillation.
The data obtained before and after the simulation-based education of nursing students and nurses were compared via an independent t-test calculated using SPSS 14.0. A p-value of less than 0.05 was considered significant.

3 Results

The post-simulation scores including total, team concepts, ACLS algorithm, and defibrillation score of nursing students were improved, compared with pre-simulation scores. However, there was a significant decrease in the major ECG score of nursing students between the pre- and post-simulation measurements. In addition, the post-simulation scores of nurses did not show the improvement except ACLS algorithm score, compared with pre-simulation scores.

The total score change of nursing students between pre- and post-simulation measurement was 0.75 $\pm$ 2.43, and that of nurses was -0.67 $\pm$ 2.02, showing the significant difference (p=0.032).

4 Discussion

Many previous studies have shown the effects of simulation-based education on the improvement of knowledge, including performance confidence and learning satisfaction, although each settings of education were so different [3-4]. However, the differences of simulation effects according to the subjects under the same simulation-based education program are questionable.

This study showed nurses' knowledge scores on ACLS algorithm and major ECG were higher than nursing students' scores in both pre- and post-simulation measurement. Nurses who had an experience of ACLS education may be supposed to have more retention of ACLS knowledge. One study also showed that resuscitation training had a positive effect on theoretical CPR knowledge and nurses who worked in high-risk area for cardiac arrest scored significantly higher than those who worked in low-risk areas [5]. This demonstrated that repeated experiences in addition to clinical education could influence subjects' knowledge.

In this study, nursing students' knowledge score on ACLS was improved after simulation-based education. However, post-simulation nurses' knowledge score did not show improvement compared to pre-simulation score. This suggest that although simulation-based education give improvement of knowledge, proper selection of subjects and education program should be considered to get the effect of simulation-based education.

References

1. Rodgers D. L., Securro S. J., Pauley R. D.: The Effect of High-fidelity Simulation on Educational Outcomes in an Advanced Cardiovascular Life Support Course. Simul Healthc 4, 200-206(2009)
2. Okuda Y., Quinones J.: The Use of Simulation in Education of Emergency Care Providers for Cardiac Emergencies. Int J Emerg Med 1, 73-77(2008)
3. Bruce M. L., Alicia S. D., David P. E., Donald V. B., Olive Y. L., Rusty J. L., Sean M. L., Laura L. W.: Comparison of Traditional versus High-fidelity Simulation in the Retention of ACLS Knowledge. Resuscitation 82, 1440-1443(2011)
4. You H. B., Park J. H., Ko J. K.: An Effective Method of Teaching Advanced Cardiac Life Support (ACLS) Skills in Simulation-based Training. Korean J Med Educ 24, 7-14(2012)
5. Passali C., Pantazopoulos I., Dontas I., Patsaki A., Barouxis D., Troupis G., Xanthos T.: Evaluation of Nurses' and Doctors' Knowledge of Basic & Advanced Life Support Resuscitation Guidelines. Nurse Educ Pract 11, 365-369(2011)