

Comparison of Effect of Simulation-based Neonatal Resuscitation Education and Traditional Education on Knowledge of Nursing Students

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ABSTRACT

Background: Simulation is used for teaching neonatal resuscitation; however, studies assessing the impact of simulation-based neonatal resuscitation education (SBE) have produced variable results. In this study, we aimed to assess the effect of SBE on nursing students' knowledge.

Methods: This experimental study was conducted at Faculty of Nursing of Neyshabour University of Medical Sciences on 80 nurses selected through convenience sampling method. The data was collected using a standardized questionnaire for neonatal resuscitation designed based on the Neonatal Resuscitation Program (NRP; 7th Ed, 2016). To analyze the data, we performed independent samples t-test, Mann-Whitney U test, Pearson correlation coefficient, and paired t-test in SPSS, version 16.

Results: There were no significant differences in the level of knowledge of neonatal resuscitation between the two groups at pre-test ($P=0.452$). However, comparison of the two groups at post-test reflected that the mean score of the students in the SBE group was significantly higher than the traditional group ($P<0.001$).

Conclusion: SBE was significantly more effective than traditional neonatal resuscitation education.

Keywords: Neonatal resuscitation, Simulation-based education (SBE), Traditional resuscitation

Introduction

Neonatal mortality constitutes a large portion of death in children under than five years (1). In 2013, it was estimated that less than 3 million neonates died worldwide (2), 98% of which occurred in the middle- and low-income countries, and asphyxia accounted for 25% of all the mortalities (3). Approximately 10% of all newborns require some assistance for breathing at birth and less than 1% require extensive resuscitation (4). Thus, teaching proper resuscitation technique and its regular practice are of marked significance.

The need for resuscitation may be anticipated before birth in only 50% of the cases (5), and skilled personnel are not present for neonatal resuscitation at all settings. In South Asia and sub-Saharan Africa, only about one-third of women deliver in the presence of a skilled birth attendant (6). Zimbabwean neonatal intensive care unit

(NICU) nurses used completely inappropriate techniques to stimulate breathing (7). Simulation is used for teaching neonatal resuscitation and procedural skill training. Studies assessing the impact of simulation-based resuscitation education (SBE) have produced discrepant results (8). Cavaleiro et al. reported no significant differences in acquisition of neonatal resuscitation-related knowledge after simulation-based training compared with self-study (9). In that study, a single simulation session was held and only cognitive skills were assessed, which might explain this outcome.

In a study by Lee et al., traditional neonatal resuscitation program (NRP) with an extra simulation-based training session significantly improved performance and confidence as compared to traditional NRP course alone (10). Nonetheless, Weiner et al. showed that self-study

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with a simple low-fidelity manikin was not superior to the standard NRP course (with standard neonatal manikin) as measured by nurses' Mega Code Performance, cognitive skills, and self-confidence (11).

Curran et al. compared SBE with a pre- and post-test design, suggesting that SBE was not more effective than an instructional video for neonatal resuscitation education (12). Most of the studies in this regard assessed knowledge, cognitive skills, self-confidence, and performance and studies using clinical outcome measures are limited. Herein, we compared the application of simulation for teaching neonatal resuscitation with the traditional method.

Methods

This experimental study was conducted on 80 second-year nursing students aged 19 to 22 years in Neyshabour University of Medical Sciences, Neyshabour, Iran, from April 30 to June 30, 2016.

We enrolled all the undergraduate nursing students who were doing the third semester and had not passed any resuscitation programs. We excluded those with prior experience in neonatal resuscitation. We divided the students into two groups of SBE and traditional education (or non-simulation-based; n=40 for each group).

The reason for choosing nursing students was the substantial role that graduate nurses play in neonatal resuscitation and their employment in NICUs. Learning proper neonatal resuscitation techniques is of great importance to prevent neonatal mortality. With this background in mind, first the pre-test was taken using a standardized 20-item questionnaire designed based on NRP (by American Academy of Pediatrics and American Heart Association, 7th Ed, 2016). Then, the neonatal resuscitation book was provided to the two groups to study during a three-week period. After this period, the groups were invited to participate in a 5-hour neonatal resuscitation session according to NRP 2016. In the traditional group, training was based on the traditional techniques of neonatal resuscitation, while for the SBE group it was performed on a moulage. Post-test was taken from both groups after training. To analyze the data, we used independent samples t-test, Mann-Whitney U test,

Pearson correlation coefficient, and paired t-test in SPSS, version 16.

Results

The pre-test analysis did not show any significant differences in the level of knowledge of neonatal resuscitation between the two groups (P=0.452; Table 1). However, at the post-test stage, the mean knowledge score of the SBE group was significantly higher than the traditional group (P<0.001).

The difference in post-test scores in the traditional education group was significantly higher than the pre-test scores of the same group (P=0.04). Likewise, the post-test scores in the SBE group were significantly higher than the pre-test scores of that group (P=0.001).

Discussion

Given the limited number of studies, inconsistent results, and absence of clinical outcomes in most studies, there is insufficient evidence demonstrating that use of SBE improves outcomes. Draycott et al. developed a simulation-based training intervention for obstetrical and neonatal teams. Following the introduction of the course, incidence of hypoxic-ischemic encephalopathy (HIE) decreased from 27.3 to 13.6 per 10,000 births. However, other factors might have affected the incidence of HIE, which were not adjusted for in the analysis (13). That study demonstrated the potential benefit of SBE on actual patient outcomes.

In our study, we only measured the level of knowledge of trainees by a questionnaire and did not follow-up the effects of education on newborns. Contrary to our results, Cavaleiro et al. reported no significant differences in acquisition of neonatal resuscitation-related knowledge after SBE compared with self-study. The limitations of that study were the use of a single simulation session and only assessment cognitive skills (9).

In a study by Lee et al., traditional NRP with an extra SBE session significantly improved performance and confidence levels as compared to the traditional NRP course alone (10). This finding was consistent with our results. Weiner et al. revealed that self-study with a simple low-fidelity manikin was not superior to the standard

Table 1. The mean scores of knowledge at pre- and post-test stages

| Topics taught | Pre-test score (mean±SD) | Post-test score (mean±SD) | P-value |
|----------------------------------|--------------------------|---------------------------|---------|
| Traditional group | 12±3.5 | 14.25±1.35 | 0.04 |
| Simulation-based education group | 11.45±2.45 | 19.31±0.5* | 0.001 |
| P-value | 0.452 | P<0.001 | |

NRP course (with standard neonatal manikin) as measured by nurses' Mega Code Performance, cognitive skills, and self-confidence (11).

In addition, Curran et al. examined the effect of SBE on neonatal resuscitation in a pretest and posttest design study, suggesting that SBE was not more effective than an instructional video for neonatal resuscitation education (12). In the current study, video tutorials were not employed; therefore, results obtained by Lee were not comparable with our findings.

Conclusion

According to the findings of this study, SBE was significantly more effective than traditional neonatal resuscitation education.

Limitations of the study

This study only assessed learning outcomes (knowledge) rather than clinical outcomes or other variables such as cognitive skills, confidence, and satisfaction of nurses.

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