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# The Impact of Self-Learning on the Improvement of Neonatal Resuscitation Knowledge and Skills among Nurses

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## ABSTRACT

**BACKGROUND AND OBJECTIVE:** Neonatal resuscitation training for healthcare workers can prevent pregnancy-related mortality and reduce disability among birth asphyxia survivors. Since the participation of nurses in workshops is not always possible for recertification, in this study, we aimed to investigate the impact of self-learning, using the new edition of neonatal resuscitation textbook on the improvement of nurses' skills and knowledge in this area.

**METHODS:** In this cross-sectional study, 58 nurses at Babol hospitals, who had received the neonatal resuscitation certificate less than two years ago, were provided with the new edition of neonatal resuscitation textbook (published in 2011). Practical training was performed under the supervision of a trained instructor at the skill laboratory. After eight weeks, a knowledge test was performed based on the textbook, and Megacode skill test was carried out, using the skill assessment checklist in the textbook. The scores were rated as follows: poor (<17), acceptable (17-19), and favorable (> 19). Afterwards, the mean scores of the previous workshop and self-learning were compared.

**FINDINGS:** The comparison of knowledge scores revealed that 39.4% and 56.9% of the subjects obtained favorable scores in the previous workshop and self-learning (p=0.27), 10.4% and 36.2% obtained acceptable scores (p=0.05), and 44.8% and 6.8% had poor scores (p=0.0002), respectively. Moreover, the comparison of skill scores showed that 48.3% and 34.5% of the subjects obtained favorable scores in the previous workshop and self-learning (p=0.33), 34.5% and 43.1% had acceptable scores (p=0.052), and 17.2% and 22.3% obtained poor scores (p=0.56), respectively.

**CONCLUSION:** Based on the obtained results, self-learning is more effective in improving theoretical knowledge rather than practical skills. Therefore, participation in skill workshops is recommended for the improvement of neonatal resuscitation skills.

**KEY WORDS:** *Resuscitation, Course assessment, Workshop, Neonate, Training*.

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## Introduction

Neonatal resuscitation training for healthcare workers is a simple, affordable, and accessible strategy, which can prevent pregnancy-related mortality and reduce disability in birth asphyxia survivors (1). Therefore, familiarity with these essential skills is necessary for the staff of delivery units and child caregivers.

For more than two decades, the Neonatal Resuscitation Program (NRP) has set an international training standard for neonatal resuscitation, with the aim of developing the knowledge and skills of hospital staff (2).

Formal training should be planned, based on a predefined structure within a limited period of time. In fact, it is important to ensure the adequate training of healthcare staff in health institutions and designate a specific method and time frame for future training (3). In a previous study, subjects who participated in a conventional resuscitation class for six hours were compared with those participating in a self-directed program, which comprised of a textbook, instructional videos, a resuscitation equipment kit, and a 90-min simulation session.

Based on the findings, the resuscitation skills, knowledge, learner satisfaction, and learner confidence did not significantly differ between the groups. Instructors believe that devoting a great amount of time to lectures demote practical skill training in preparation courses.

In fact, passive training may not meet the educational needs of adult learners. The International Liaison Committee on Resuscitation recommends the use of active learning and simulation-based training under close-to-reality conditions (4).

The comparison of long-distance learning and traditional training for the improvement of neonatal resuscitation skills and knowledge has also revealed similar findings (5). On the other hand, in a systematic review of studies focusing on long-distance training of medical personnel for critical and palliative care, it was concluded that participation in training classes is useful for promoting professional and educational skills (6).

With this background in mind, in this study, we aimed to evaluate the impact of self-learning on restoring and increasing the neonatal resuscitation knowledge and skills of licensed nursing staff and determine the significance of factors such as age, work experience, and duration of employment.

## Methods

This cross-sectional study was performed on licensed nurses at hospitals, affiliated to Babol University of Medical Sciences during April-July 2014. By using the records of previous workshops, the knowledge and skill test results of 58 nurses were extracted. The nurses had received a certificate in neonatal resuscitation two years ago (maximum), had at least two years of experience in neonatal care, and had worked at the neonatal ward over the past six months.

The requirement for receiving the workshop certificate (similar for all courses) was obtaining a passing grade on the knowledge and Megacode skill tests. The candidates received the new edition of neonatal resuscitation textbook, published in 2011, along with a DVD containing instructional videos (7). The written exam consisted of multiple-choice and short-answer questions, based on the provided textbook. The participants received four hours of practical training in the skill laboratory in the presence of an instructor. After eight weeks, the candidates participated in the Megacode skill test, performed on a mannequin with a similar scenario.

The participants' responses were evaluated, based on the NRP checklist designed to assess neonatal resuscitation knowledge and skills. The scores were rated as follows: poor (<17), acceptable (17-19), and favorable (>19). The obtained data were classified in terms of age, workplace, experience of working with children, duration of employment in the last hospital unit, test scores, and the time gap since the last workshop. For data analysis, t-test was performed, using SPSS version 20. P-value less than 0.05 was considered statistically significant.

## Results

In this study, the average age of female participants (n=58) was 33 years. The subjects' average work experience with children was 6.5 years (minimum of two years). The mean time interval between the last workshop and the present assessment was 20±4 months. The comparison of scores showed that 38% of the participants who obtained poor scores in the previous workshop could achieve acceptable or favorable results through self-learning. Based on the findings, the change in knowledge score was significant among subjects with poor or acceptable scores; however, no significant difference was

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observed in subjects with favorable scores on the performed tests (table 1). In terms of skill assessment, the number of subjects with favorable scores reduced by 13.8% through self-learning, compared to the workshop. However, changes in neonatal resuscitation skills were not significant in any of the groups (table 1). In total, subjects who obtained higher scores on the knowledge test in previous workshop could also get higher scores on both Megacode skill test after the workshop (p=0.000) and the skill test performed in our study (p=0.04). The knowledge score in the workshop had a significant correlation with learning new theoretical materials (p=0.04) and knowledge retention (p=0.009). In other words, the primary self-learning of the staff was effective in holding a more effective workshop and increasing the level of staff knowledge; this effect was maintained after a long time after the workshop. On the other hand, history of working with newborns had no significant relationship with knowledge retention or learning new theoretical materials, while work experience had a significant association with skill retention (p=0.04) and learning new skills (p=0.03). However, learning new theoretical materials and knowledge retention had no significant correlation with age, workplace, knowledge score, or skill score.

**Table 1. Comparison of the frequency distribution of knowledge and skill scores in the previous workshop and self-learning among the nursing staff of Babol hospitals**

| Variables | Previous workshop N(%) | | | Self-learning N(%) | | |
|---|---|---|---|---|---|---|
| Test scores | Favorable | Acceptable | Poor | Favorable | Acceptable | Poor |
| Knowledge | 23 (39.4) | 9(15.4) | 26(44.8) | 23 (56.9) | 21 (36.2) | 4(6.8) |
| Skill | 28 (48.3) | 20 (34.5) | 10(17.2) | 20 (34.5) | 25 (43.1) | 13(22.3) |

*p<0.05

## Discussion

In the present study, acceptable results were reported regarding the improvement of knowledge scores through self-learning. However, it was revealed that participation in workshops is required for the promotion of practical skills. These findings were consistent with previous studies, which compared self-learning with conventional training. In these studies, self-learning, accompanied with educational videos, was as effective as traditional classroom learning (8-13). Based on the evaluation, experience of working with children had a direct relationship with knowledge retention and self-learning of new skills. It seems that the duration of employment in neonatal wards and continuous close contact with newborns can be effective in maintaining and improving the skills required for child care, including neonatal resuscitation. On the other hand, in a study by Bijari et al., skills had an inverse relationship with age and work experience (8).

In a study by Refaey et al. regarding resuscitation training, the knowledge and skills of the staff had a significant positive correlation with their age and work experience. However, several studies have shown that nurses' knowledge and skills in adult cardiopulmonary resuscitation (CPR) had no significant relationship with age or work experience (10). In this regard, Parajulee et al. showed no significant relationship between work experience and the test results (11). Furthermore, the results of a study by Al Kaudary et al. showed no significant relationship between the theoretical knowledge of nursing personnel and their work conditions. These findings were consistent with earlier research, which indicated that the age and work experience of nurses had an inverse correlation with their tests scores. In fact, younger or less experienced individuals could obtain higher scores (12).

Self-learning can be a good strategy for theoretical training of neonatal resuscitation. A study by Bijari et al. showed that self-learning through media and studying learning materials is as effective as learning by an instructor (8). In a study by Niknafs, which aimed to examine the relationship between resuscitation skills and variables such as studying the resuscitation booklet, full participation in workshops, practical training, and practice of neonatal resuscitation, resuscitation skills had a significant relationship with practical training and studying the resuscitation booklet.

It was also found that proper practice can play a major role in resuscitation training; otherwise, participation in neonatal resuscitation not only does not lead to skill reinforcement, but strengthens poor

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performance among the staff (14). In our research, self-learning and knowledge retention exhibited no significant relationship with workplace, knowledge score, or practical skills; this finding has been also confirmed in similar previous studies (15,16). The results of our analysis showed that self-learning alone (without participation in workshops) can boost and retain the theoretical and principal skills of the personnel.

Accordingly, self-learning can be applied to reduce the time devoted to workshops for the licensed staff. However, unresponsiveness of the personnel to more advanced questions indicated that self-learning is not effective in enhancing particular skills and only serves to moderately maintain and enhance the skills of the personnel. In other words, although self-learning is effective in increasing theoretical knowledge, it is not equally helpful in learning practical skills. Therefore, comprehensive training courses, involvement of instructors, adherence to a coherent program, and use of suitable facilities for practical training are necessary to enhance the skills of personnel who are less familiar with neonatal resuscitation. In conclusion, the present results confirmed the effectiveness of self-learning in improving the knowledge of the staff, although the findings did not support skill improvement.

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