Original Research

The Effect Of Neonatal Cardiopulmonary Resuscitation Training On The Knowledge Of Neonatal Ward Nurses

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Abstract

Background: Proper training of resuscitation team plays an important role in improving the quality of resuscitation process. For this reason, transferring the knowledge of neonatal resuscitation plays an important role in increasing the knowledge and skills of neonatal nurses. Based on this, this study was conducted with the aim of examining the effect of cardiopulmonary resuscitation (CPR) training on the knowledge of neonatal nurses.

Method: This semi-experimental study was conducted on 40 nurses working in the neonatal ward, who had been selected by available sampling method. The data collection tool was the nurses' knowledge questionnaire designed based on the latest guidelines of American Heart Association that has been localized in Iran. The data was analyzed by SPSS-21 statistical software, using descriptive statistics (table, mean, standard deviation) and inferential statistics (pair t-test).

Results: The score of neonatal nurses' knowledge was 11.42 ± 1.82 before the intervention and increased to 14.62 ± 1.92 after the intervention. However, paired t-test did not show a significant difference between the scores of knowledge of neonatal nurses before and after the intervention ($P < 0.01$).

Conclusion: The results of this study showed the effectiveness of education on the knowledge of neonatal nurses. Therefore, it is necessary for managers and healthcare officials to first evaluate the cardiopulmonary resuscitation of neonatal nurses and based on that design appropriate training programs to increase the knowledge and skills of neonatal nurses, which are the main factors in the professional development of staff in any organization.

Keywords: Training, Cardiopulmonary resuscitation, Knowledge, Nurses, Neonatal ward

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Introduction

Cardiorespiratory arrest is considered a stressful event in the care of hospitalized children and infants (1). According to the report of World Health Organization (WHO), approximately 3-6% of infants need cardiopulmonary resuscitation (2). About 99% of infant deaths decrease with cardiopulmonary resuscitation (3). In most cases, the chance of survival of infants in cardiopulmonary resuscitation (CPR) is higher than that of adults (4). Sufficient knowledge and skill is the main requirement of effective resuscitation within a golden time frame, which is only a few minutes (5, 6). The skill and ability of first people who encounter patients who just had a cardiopulmonary arrest have a great impact on the effectiveness of resuscitation process (7). The use of guidelines for neonatal cardiopulmonary resuscitation plays an important role in increasing the knowledge and skill of treatment staff (8). The latest revision of cardiopulmonary resuscitation guideline was updated in 2020 by the American Heart Association (9). Based on the results of studies, correct training of CPR team plays an important role in improving the quality of resuscitation process (3). For this reason, transferring the knowledge of neonatal resuscitation plays an important role in increasing the knowledge and skills of neonatal ward nurses (10). Because the process of resuscitating infants requires a high level of knowledge, awareness and skills compared to adults (11). One of the reasons for failure in cardiopulmonary resuscitation is the lack of correct and principled implementation of educational programs and retraining courses, especially for nurses (12). For this reason, sufficient knowledge, efficient training and correct implementation of resuscitation process increase the success rate of cardiopulmonary resuscitation (13). According to the instructions of neonatal resuscitation program (NRP), it is important and necessary to follow the standard protocols of neonatal cardiopulmonary resuscitation for successful implementation of resuscitation (14). Because it is the responsibility of neonatal nurses to recognize the condition and time of resuscitation (10). Accordingly, the process of cardiopulmonary resuscitation in the neonatal department is considered a specialized and sensitive skill in nursing care (15). Therefore, it is necessary for managers and healthcare officials to first prepare and organize training programs for cardiopulmonary resuscitation of newborns by fist examining and assessing the knowledge and skill of nurses (16). Because training is a powerful tool in professional development and plays an important role in improving the employees' performance and efficiency (17). Therefore, it can be said that staff training is a very strategic and important issue that is considered a main factor in the growth and development of any organization. Also, staff training as the main factor in the development of any organization is an important component of any organization that makes the organization dynamic and effective (18). Since education plays an important role in increasing the clinical efficiency of nurses and physicians in the care and treatment process (9), the use of educational processes plays an effective role in improving the quality of clinical and nursing care (19, 20). Thus, this study was conducted with the aim of examining the effect of cardiopulmonary resuscitation training on the knowledge of neonatal nurses.

Method

This semi-experimental study with pre-test/post-test design was conducted on 40 nurses working in the neonatal ward of Shahid Sayad Shirazi Hospital in Gorgan, Golestan province in 2022. The inclusion criteria for this study included being a nurse working in the neonatal ward with a bachelor's or master's degree in nursing. According to the prediction made, all the samples were working in the neonatal department for 6 months after the training. Convenience sampling method was used in this study with a non-random manner.

The data collection tools included a demographic information questionnaire (age, work experience,

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cardiopulmonary resuscitation training) and the nurses' knowledge questionnaire in regard to the cardiopulmonary resuscitation process. This questionnaire with 20 questions on a 4-option Liker scale has been developed based on the latest guidelines of American Heart Association (2020) regarding basic and advanced cardiopulmonary resuscitation for infants. Questions in this questionnaire are scored from 0 to 20 points. Each correct answer is given a score of 1 and each wrong answer is given a score of 0. Negative mark is not given to wrong answers. The higher score in this tool indicates the higher knowledge of neonatal cardiopulmonary resuscitation.

In order to check the validity of this questionnaire, after translating the American Heart Association 2020 guideline, it was given to 10 experts, including nurses with master's degree in critical care nursing and pediatric nursing, a cardiologist, and a neonatologist. After checking the validity of its content, some questions were changed according to the experts' opinion. Then, this questionnaire was given to 10 people (3 nurses with bachelor's degree in nursing, 2 nurses with master's degree in nursing, 2 nurses with doctorate in nursing, 1 cardiologist, 1 neonatologist, and 1 staff with master's degree in health education) to determine its face validity. All 20 questions of this questionnaire had an item score of above 1.5. Therefore, the questions were retained in the questionnaire. Then, the researcher gave the questionnaire to 10 faculty members and instructors of cardiovascular resuscitation workshop to check its content validity and determine its content validity ratio (CVR). They were asked to choose one of the 3 options; "necessary", "useful but not necessary" and "not necessary" for each of the questions. Then, all 20 questions that had a score of above 0.62 based on Lawshe table were kept in the questionnaire (23).

In order to measure the content validity index (CVI) of the questionnaire, the same 10 people who assessed its face validity determined the relevance of each item by giving a score of from 1 (not relevant), 2 (relatively relevant), 3 (relevant), or 4 (completely relevant). The items that obtained the score of higher than 0.79 was considered appropriate in terms of content validity index (23). To measure the reliability of knowledge questionnaire, it was given to the participants to complete it after giving explanation that we intent to measure the validity and reliability of the questions, not the knowledge of participants. After that, the questionnaire was given to 10 nurses working in the the hospital who were not currently working in the neonatal department. First, the questionnaire was given to nurses and 2 weeks later, it was given to the participants again in the same format. To determine its reliability, the paired t-test showed the correlation coefficient of 0.89 with the retest method. The ICC of 0.89 was also obtained for this tool, which indicated an appropriate agreement of evaluators.

In this study, the neonatal cardiopulmonary resuscitation training was held in the training hall of the hospital. The main lecturer of this course was a pediatric nursing expert with clinical experience in the neonatal department. Part of the training course was also delivered by a specialist in emergency medicine and neonates. The educational content of this course was based on the reference books of emergency medicine, neonatal medicine and neonatal cardiopulmonary resuscitation guidelines of the American Heart Association and the latest published guidelines for neonatal cardiopulmonary resuscitation along with the neonatal resuscitation textbook. One of the main topics of this training course was familiarization with basic resuscitation skills, advanced resuscitation skills and post-resuscitation care. Data was collected by a validated questionnaire before and after the intervention. Before carrying out the study and completing the questionnaires, explanation about the confidentiality of personal information and possibility of withdrawal at any time was given to the participants, they were also informed about the purpose of this study that and also the results of this study will not be used to evaluate them. At the time of completing the questionnaire, the

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researcher was present and answered any question or doubts that the participants had. After collecting the data, it was entered into SPSS-21 software to be analyzed by descriptive statistics (table, average, standard deviation) inferential statistics (paired t-test) at the significant level of 0.05.

Results

The mean age of participants in this study was 31.72 ± 7.52 years, and they had the mean work experience of 8 years. All samples had experience in cardiopulmonary resuscitation of infants. The score of nurses' knowledge before the intervention was 11.42 ± 1.82 and after the intervention was 14.62 ± 1.92. The paired t-test did not show a significant difference between the scores of nurses' knowledge before and after the intervention ($P < 0.01$).

Discussion

The results of this study showed that cardiopulmonary resuscitation training increases resuscitation knowledge of neonatal nurses. Golfiroozi et al (2022) in their study to examine the effect of education on the skills of emergency nurses, showed that education significantly increases the skill of cardiopulmonary resuscitation in nurses (21). Hojjati et al. (2013) also showed that in-service training courses increase the knowledge and job skills of staffs, and create behavioral changes in learners, which increases patient satisfaction and improves the quality of care (18). Karlsson (2023) in a study revealed that necessary knowledge and skills of neonatal nurses play an important role in the success rate of cardiopulmonary resuscitation in infants (14). In Billner's (2022) study, neonatal cardiopulmonary resuscitation training, in addition to increasing knowledge and skills, motivated nurses to participate in the process of neonatal cardiopulmonary resuscitation (22). Yang SY (2022) examined the effect of virtual reality program training on the knowledge and performance of nursing students in regard to resuscitation of newborns, and showed that training had an effective role in increasing the knowledge and efficiency of nursing students (1). In Castera's study (2022), simulated training and repetition of training processes improved the performance and increased the knowledge of nurses in neonatal cardiopulmonary resuscitation (15). The results of Darvishpoor's study (2016) showed that cardiopulmonary resuscitation training based on educational models increases the skills and attitudes of nurses (23). Mbinda (2022) showed that the implementation of neonatal cardiopulmonary resuscitation training programs based on the needs of learners plays an important role in increasing the effectiveness of CPR (16). Meanwhile, the use of empowerment and training models play a special role in the promotion of nursing services (24, 25). An educational program is considered valuable when it shows the effects of education on changing the behavior and performance of learners with reliable and documented evidence (18). Therefore, it can be said that teaching neonatal CPR helps nurses to choose the correct action and perform it skillfully. Therefore, choosing the method of neonatal cardiopulmonary resuscitation training plays an important role in increasing the knowledge and skills of nurses as the first caregivers to newborns (10). Also, the use of standardized care models and guidelines play an effective role in increasing the quality of nursing care (26). Since standard training can increase the knowledge of nurses in the field of basic and advanced cardiopulmonary resuscitation, we recommend regular workshops and training courses to be held theoretically and practically to increase the knowledge of skills of nurses in neonatal CPR (27). One of the limitations of this study was its small size and the absence of a control group for comparison. We suggest future studies to evaluate the effectiveness of these trainings in a longer period of time in order to evaluate the long terms effect of intervention.

Conclusion

Considering the effectiveness of training on increasing the knowledge and skill of neonatal nurses relating cardiopulmonary resuscitation,

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and since cardiopulmonary resuscitation is one of the most important and necessary skills in neonatal ward, more training and retraining courses should be held for nurses in this regard. We also suggest combined teaching methods and models to be used for more effective teaching of neonatal CPR.

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Conflict of interest

No conflict of interest was observed in the implementation of this research.

References:

1. Yang SY, Oh YH. The effects of neonatal resuscitation gamification program using immersive virtual reality: A quasi-experimental study. Nurse education today. 2022;117:105464.
2. Olaniyi AA, Ncama BP, Amod H. Mapping Evidence of Neonatal Resuscitation Training on the Practices of Unskilled Birth Attendants in Low-Resource Countries: Protocol for a Scoping Review. JMIR research protocols. 2021;10(3):e18935.
3. Samieerad F, Talebi F, Mohitabadim Z, Barikani A. Comparison the Effect of two Educational Methods of Neonatal Resuscitation on The Knowledge and Practice of Clinical Staff Working in Kowsar Hospital in 2013. gums-rme. 2013;5(2):32-8.
4. Parikh P, Samraj R, Ogbeifun H, Sumbel L, Brimager K, Alhendy M, et al. Simulation-Based Training in High-Quality Cardiopulmonary Resuscitation Among Neonatal Intensive Care Unit Providers. Frontiers in pediatrics. 2022;10:808992.
5. Sintayehu Y, Desalew A, Geda B, Shiferaw K, Tiruye G, Mulatu T, et al. Knowledge of Basic Neonatal Resuscitation and Associated Factors Among Midwives and Nurses in Public Health Institutions in Eastern Ethiopia. International journal of general medicine. 2020; 13:225-33.
6. Zhu XY, Wu BQ. [Recognition and discussion of several technical details in neonatal resuscitation training]. Zhongguo dang dai er ke za zhi = Chinese journal of contemporary pediatrics. 2020;22(6):555-60.
7. Chegeni Z, Aliyari S, Pishgooie SAH. The Effect of Basic Cardiopulmonary Resuscitation Training, by the Presentation Method, on the Performance of Soldiers in Military Units. ajaums-mcs. 2018;4(4):227-35.
8. Merchant RM, Topjian AA, Panchal AR, Cheng A, Aziz K, Berg KM, et al. Part 1: Executive Summary: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2020;142(16_suppl_2):S337-s57.
9. Aziz K, Lee CHC, Escobedo MB, Hoover AV, Kamath-Rayne BD, Kapadia VS, et al. Part 5: Neonatal Resuscitation 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Pediatrics. 2021;147(Suppl 1).
10. Eskandari Z, Akrami F. Neonatal resuscitation training for nurses: A literature review. IJCN. 2019;8(1):190-6.
11. shajari H, Hashemipour SMA, Shajari A. Evaluating Knowledge Level of the Medical Students about Children Cardiopulmonary Resuscitation in Aliebne University of Medical Science. SSUJ. 2021;20(1):95-106.
12. Kavosi A. Effect of continuing education competency-based program for emergency nurses on rate CPR successful. IJNV. 2015;4(2):0-.

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13. Akbari Farmad s, Khoshnoodi far M, Rezaee M, Farajpour A. The effect of simulation-based cardiopulmonary resuscitation training on knowledge and clinical skills of nurses in Baharloo Hospital. Educational Development of Judishapur. 2021;12(2):511-20.
14. Karlsson L, Gustafsson U, Thernström Blomqvist Y, Wallström L, Broström A. Neonatal Resuscitation: A Critical Incident Technique Study Exploring Pediatric Registered Nurses' Experiences and Actions. Advances in neonatal care : official journal of the National Association of Neonatal Nurses. 2023;23(3):220-8.
15. Castera M, Gray MM, Gest C, Motz P, Sawyer T, Umoren R. Telecoaching Improves Positive Pressure Ventilation Performance During Simulated Neonatal Resuscitations. Telemedicine reports. 2022;3(1):55-61.
16. Mbinda MA, Moshi FV. Identifying factors associated with neonatal resuscitation skills among nurses and midwives in Tanzania, sub-Saharan Africa. SAGE open medicine. 2022; 10:20503121221100991.
17. Ghorbandoost R, Zeinabadi HR, Shabani Shafiabadi M, Mohammadi Z. Evaluation of in-service training course of nurses and midwives (Neonatal resuscitation) using kirkpatrick 's model ". Gums-rme. 2020;12(3):4-11.
18. Hojjati H, Mehralizadeh Yl, Farhadirad H, Alostany S, Aghamolaei M. Assessing the effectiveness of training outcome based on Kirkpatrick model: case study. IJNV. 2013;2(3):35-42.
19. Valipour Eskandarkolaii E, Hekmatipour N, Hojjati H. The Effect of Spiritual Self-Care Training on the Severity of Insomnia of Diabetic Adolescents. CMJA. 2023;13(1):28-35.
20. Parsai M, Sahbaei F, Hojjati H. Effect of implementing an extended parallel process model on adherence to a medication regimen of the type 2 diabetic elderly. mubabol-cjhaa. 2020;5(2):56-65.
21. Golfiroozi S, Sheikhnejad F, Kabusi M, esmaelpour H, Latifi N, Noei FR. The Effect of Training on Learning Cardiopulmonary Resuscitation Skills in Emergency Nurses. intjmi. 2022;11(4):122-8.
22. Billner-Garcia RM, Spilker A. Development and Implementation of a Game-Based Neonatal Resuscitation Refresher Training: Effect on Registered Nurse Knowledge, Skills, Motivation, Engagement. Journal for nurses in professional development. 2022.
23. Darvishpoor K, Heshmati H. Evaluation of nurses' knowledge, attitude, and performance in cardiopulmonary resuscitation (CPR) based on PRECEDE model. IJCN. 2016;5(1):18-25.
24. Hania Sajadi GAHH. The Effect of Empowerment Program on Participation of Mothers with Premature Infants Hospitalized in Neonatal Intensive Care Unit. Indian Journal of Forensic Medicine & Toxicology. 2020;14(2):1580-5.
25. Motahari niya H, Hojjati H. The influence of education on anxiety in mothers of children with surgery. jpenir. 2019;5(4):49-55.
26. Mehrangiz G, Fatemeh M, Maryam Z, Raziye M, Maryam K, Aminreza A, et al. The Effect of Implementing Pain Control Guidelines on the Pain of Patients Admitted to the Intensive Care Unit. Journal of Pharmaceutical Negative Results. 2022:344-8.
27. Nemati F, Tabatabaee A, Salehi Z, Mohammadnejad E. The effect of CardioPulmonary Cerebral Resuscitation (CPCR) on nurses' knowledge and performance: Literature Review. IJCN. 2021;10(1):142-9.

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Table & Figure:

Table 1: Comparison of research units before and after the intervention in terms of the score of knowledge of neonatal cardiopulmonary resuscitation

CPR knowledge	Mean ± SD	P-value
Pre-intervention	**11.42±1.82**	**P<0.01**
Post-intervention	**14.62±1.92**	

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