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ABSTRACT

THE IMPACT OF TELEMEDICINE NURSES TRAINING ON THE IN-HOSPITAL PEDIATRIC CARDIOPULMONARY RESUSCITATION QUALITY

Introduction

In the cases of the in-hospital cardiac arrest of infant, nurses are often the first responders and in theory, they should be prepared to perform basic cardiopulmonary resuscitation (PBLS). However, in order for the best results such as the return of spontaneous circulation (ROSC) and the least complications, CPR should be performed with the highest efficiency and the team should be trained very well.

The first section describes the history of this dissertation and the difficulties with research, as a result of the unexpected change in the global epidemic situation related to the COVID-19 pandemic. The following sections describe the role of the nurse as the first responder, the pathophysiology of sudden cardiac arrest in infants, and basic issues of cardiopulmonary resuscitation in infants. The next part of this section contains the description and analysis of the available methods of training in cardiopulmonary resuscitation, and (first of all) introduces in detail the concept of telemedicine and one of its components - the distance training of medical personnel.

Purpose

The main purpose of the study was to evaluate the effectiveness of the online interactive telemedicine training in cardiopulmonary resuscitation performed by the nurses in infants.

Materials and methods

The study was conducted in a group of professionally active nurses, students of the Master Studies in Nursing at two universities - the University of Rzeszów (n=85, October 2019 – March 2020) and the Medical University of Warsaw (n=102, October 2021 – January 2022). The study was divided into two stages. Stage I of the study was an assessment of the effectiveness of CPR before the booster training performed with the use of a phantom representing an infant (Laerdal Resusci Baby QCPR Airway Head, Laerdal Medical AS, Norway) and a recording tablet (Laerdal SimPad Plus ze Skill

Reporter, Laerdal Medical AS, Taiwan). The interactive telemedicine training gave the participants an opportunity to ask questions and focused on those elements of resuscitation, which were the most problematic. Due to the epidemic situation, the study in Rzeszow couldn't be completed. The study was started anew a year and a half later at the Medical University in Warsaw, and the reassessment of the effectiveness of CPR, was carried out only among participants from Warsaw (n=68).

Results

It has shown in Stage I that the nurses' preparation for providing CPR in infants varied from one participant to another and most often – was less than perfect. The participants of the study had problems with both: high-quality breaths and chest compressions.

After the interactive online telemedicine training, both the effectiveness of ventilation and the quality of chest compressions were improved. Efficacy of resuscitation, assessed by the effectiveness of chest compressions, the effectiveness of lung ventilation, and the compression fraction with maintained blood flow (overall efficacy score) increased from 42 [30.5-66.5]% pre-training to 70 [41.5-86]% post-training.

The individual elements contributing to the quality of resuscitation have also improved. It was found that after the training:

a. Overall compression efficiency has improved from 23.5[5-61]% pre-training to 64.5[19-84.5]% post-training,

b. The rate of compressions followed by normal chest recoil (relaxation) improved from 30 [6.5-79]% pre-training to 81.5 [14-98]%,

c. The percentage of successful breaths has improved from 78 [71-87]% before training to 86.5 [81-89.5]% after training

d. The percentage of failed breaths has decreased to 0 after training.

e. After the training, most of the breaths were performed correctly - with the correct tidal volume.

Conclusion

In conclusion, interactive telemedicine training is an effective method of improving the quality of cardiopulmonary resuscitation in infants provided by nurses.