Original Article

Self-Training Video Module versus Instructor Taught Pediatric Basic Life Support According to Peyton Model: Report of an Experience

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Abstract

Background: Bystander cardiopulmonary resuscitation is an important predictor of out-of-hospital arrest prognosis in the pediatric population. The purpose of this study was to assess the effectiveness of two educational methods, a video module and Peyton model with manikin, in parent's education.

Materials and Methods: We enrolled 140 subjects, 70 in each group. We assess their knowledge, attitude, and practice about pediatric basic life support (BLS) before and after two different types of educational interventions.

Results: Mean attitude, knowledge, and practice score were significantly higher after educational intervention in both groups. Knowledge and total practice score were significantly higher in the Peyton group compared with DVD group ($P = 0.02$ and 0.000, respectively). The rate of totally correct chest compression was 53% in Peyton/manikin group versus 24% in DVD/lecture group and the difference was meaningful statistically ($P = 0.0003$).

Conclusion: Any educational intervention has a significant effect on the Iranian parent's knowledge and practice about child BLS, but education through manikin can increase this impact.

Keywords: Basic cardiac life support, education, parents, pediatric, training program

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Introduction

Each year 7037 children experience out-of-hospital cardiopulmonary arrest with a survival rate of 6.4%.[1,2] The most common causes of cardiopulmonary arrest in childhood are sudden infant death syndrome, trauma, and pulmonary diseases.[3] The younger the child, the higher his or her permanent neurological complications and mortality rate after cardiopulmonary arrest.[4]

Time is the most important factor affecting survival.[5] If basic life support (BLS) starts within the first 4 min of a cardiac arrest, survival reach to 43%, and each 1 min delay, reduces the chance of success by 7%–10%.[5] Witnessed arrest status in children is associated with better survival.[6,7] Most cases of arrest in children occur at home and witnessed by parents.[8] Hence, educated parents will be able to initiate resuscitation in a timely manner, theoretically.

According to studies after public training, the rate of cardiopulmonary resuscitation (CPR) increased from 22% to 74% so the American Academy of Pediatrics recommends resuscitation training for any people in the community including parents and children.[9,10] A well-designed educational session enables parents of high-risk neonates and child to leave the hospital, more confident.[11]

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Pediatrician should set up these education and monitor it in the society.[12] There are obstacles to its implementation in society such as lack of suitable educational spaces, lack of the opportunity for parents, lack of awareness of preferred methods for peer education of BLS, the wages of the educator, and lack of motivation for learning in public.[13,14] Easy access to training materials may be the most important factor in their generalization.[15] Workshops and face-to-face tutorials, still have their fans. Today, web-based methods of education are more acceptable because they are more flexible, less time-consuming, and less costly.[16,17]

CPR of a child is not routinely taught in Iran. However, we expecting parents to know and perform BLS in the case of arrest or foreign body aspiration. According to clinical experiences, Iranian parents' awareness of BLS is somewhat unacceptable. Most parents are mistaken in the face of a life-threatening condition. They usually act on what they have heard. Their breast-to-breast knowledge is often incorrect and also harmful for the injured kid.

In this study, we decided to start an educational trial program for Iranian parents. The results of this study will be a beacon for this dark path.

Materials and Methods

This is a cross-sectional and experimental study. We enrolled 140 parents in our study. They were the parents of children who were hospitalized in our emergency department and general pediatric ward. We invited every parent to be involved in our education. At first, we complete the Peyton/manikin group of 70 parents, and then we recruited another 70 parents in the DVD/lecture training group. There were no exclusion criteria other than unwillingness of them to train or no enough time to participate in the project.

The site of education was a class in the hospital dedicated to teaching pediatric residents. The training was offered to groups of three to five parents, each time. Peyton group or Group 1 in our study, train according to Peyton method, that is a known route to educate a procedure in the medicine. In this method at first, the teacher performs the skill in real-time without any comment. Then, he/she performs every step of a procedure slowly with an added explanation. He/she try to divide a procedure into smaller subsections. In the next step, called comprehension step, parents try to describe each step when the teacher performs. Finally, student narrates and executes the procedure step by step. Manikin has inflatable lungs and compressible chest.

For the DVD/lecture group, a 20 min educational film about the importance of knowing BLS and resuscitation was shown. Explanations were added to the film when needed. Additional training on dealing with foreign body aspiration at different age groups was also provided by the instructor. Video was composed of the following sections: motivational conversation of a couple about an accident that happened to their child, indications for CPR, correct technique of mouth-to-mouth breathing and chest compression, and dealing with foreign body aspiration in an infant.

Correct chest compression and management of foreign body aspiration were the main outcomes that we expected to achieve after education. Improving participants' knowledge and attitude toward BLS was our next goal.

Data collection

Before and immediately after education, a questionnaire was completed by parents. The used questionnaire was designed in four parts including ten attitude assessment questions, ten knowledge assessment questions, and two case scenarios about foreign body management in a 3-year-old kid and the correct orders of BLS in an unconscious child. The validity of the questionnaire was approved based on the expert opinions. Its reliability was tested in 30 parents apart from the study group and was considered acceptable with Cronbach alfa 0.89.

Statistical analysis

The obtained data were entered into the Statistical Package for Social Sciences (SPSS) version 24 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were reported as mean ± standard deviation and qualitative data as frequency distribution (percentage). Independent *t*-test, Chi-square was used to analyze the data. $P < 0.05$ was considered as significance threshold. Because our data did not follow the normal distribution, we use nonparametric tests such as Mann–Whitney, and Wilcoxon signed-rank test to analyze our data.

Results

We enrolled 140 parents in our study. About 80% of all participants (112 cases) were female because they mainly involved in the care of their hospitalized child. Before the study, we talked to the parents about the design and aims of our study and we asked them to complete the consent form if they are desired to participate in the study.

The level of academic education, age, and score of attitude, knowledge, and practice before educational intervention were not significantly different in the two study groups. 73% of our parents were the caregivers of under-five children. Only 26% of parents know the correct approach to the foreign body aspiration and the rest of them do traditional incorrect way in these circumstances. About 26% of parents did not know the emergency number of our country.

Only 34% of parents learn the correct location to detect a central pulse in different age child. 51% of trainees believed in their ability to resuscitate your or another child after educational modalities. Overall 39% of the trainees perform an exact complete chest compression in terms of number, speed, depth, and recoil regardless of the type of training.

Mean attitude, knowledge, and practice score were significantly higher after educational intervention in both groups. The mean attitude score was not higher in the Peyton group ($P = 0.05$), but

knowledge and total practice score were significantly higher in the Peyton group compared with DVD group ($P = 0.02$ and 0.000, respectively).

The total practice score was not significantly different in females and males but educational level affects this score significantly.

The rate of totally correct chest compression was 53% in Peyton/manikin group versus 24% in DVD/lecture group and the difference was meaningful statistically ($P = 0.0003$). The rate of correct artificial breathing was 55% versus 41% and was not significantly higher in Payton/manikin group ($P = 0.09$).

Discussion

We designed this study to experience public education in the field of pediatric BLS. Studies show that parents can learn CPR easily; however, some of them may need more support.[18] If parents start an effective resuscitation at the right time, the baby prognosis will be better.[18]

Ninety percent of childhood arrests occur at home and the American academy of pediatrics, emphasizes the role of parents in the child life chain.[19] Unfortunately, public CPR education is restricted to adult CPR and the sentences such as "parents should learn pediatric CPR" or "infant CPR is different" only adds the fear of parents.[19,20] While child resuscitation is not fundamentally different from adult CPR. In one study in New Zealand, 64% of parents have a history of CPR education but more than 62% of them were anxious about child CPR.[21] These data are somehow in line with the findings of our study. By comparing our results to the previous reports, we showed that parents that were trained based on Peyton/manikin method had higher success rates of CPR compared to other methods.

According to Chia and Lian study, knowledge about BLS is weak among parents but previous educational experiences may help parents to know and act better in emergencies.[22]

Because resuscitation is a psychomotor skill, any educational modalities that can involve the trainee in an action like manikin use or DVD may be effective potentially.[23] Researchers are trying to find the best way to teach these skills to parents.

Parents older than 35 years probably learn less.[22] High school education or higher can learn and do better and they can use internet-based educational materials to renew their knowledge.[22] This was in line with our findings.

The most important barriers of parents to learning CPR were no chance to learn, no time to learn, fear of performing CPR in public, fear of taking responsibility, lack of self-confidence, and fear from the risk of infection transmission during mouth-to-mouth breath.[19] The results of our study were the same as previous studies.

Dracup *et al*. show that video training is less effective than instructor taught CPR class.[24] Their finding was in contrast to the results of the most other studies in this era. They perceived the cause to be impaired learners focus on performance during watching video.[24]

Pierick suggests an educational kit including DVD and manikin as a better idea because the parents can refresh their knowledge as they felt the need.[19]

In one study in New Zealand, 64% of parents have a history of CPR education but more than 62% of them were anxious about child CPR.[21] We have demonstrated that the Iranian parent's knowledge about BLS is very low. They were wrong in dealing with foreign body aspiration and an unconscious child. They did not believe in their role in CPR and afraid to do it. Because of our limitations like as lack of financial resources and educational spaces, we prefer to do this training through a simple video module for a large group learner. However, our study confirmed that if we want the desired result, we have to bear the cost.

Conclusion

This study is the first well-designed program to evaluate the practicality of two CPR training methods to the parents in Iran. We also indicated that parents that were trained based on Peyton/manikin method had higher success rates of CPR compared to other methods.

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Conflicts of interest

There are no conflicts of interest.

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