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Effect of basic life support training on the knowledge and skills of first aid of first year medical students

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ABSTRACT

Objective: To determine the timing of first aid training in the medical school curriculum and the training method with the 8-hour first aid training given to the first-grade students of the faculty of medicine.

Method: The study was conducted prospectively with 168 first year medical students at Faculty of Medicine, Maltepe University in October 2019. An 8-hour course plan consisting of theoretical and practical applications was prepared. Theoretical courses included cardiopulmonary resuscitation, basic life supports, epileptic seizures, heatstroke, aspiration, and drowning issues, while practical applications included cardiopulmonary resuscitation techniques, basic life support scenarios, Heimlich's Maneuver and the coma position. Students were sent a link consisting of 17 questions created with Google forms at the beginning and the end of the course. Learned knowledge was measured with the posttest, and pre-and post-training results were compared.

Results: A significant increase was found in the rate of correct answers compared to the pre-training period. Even the rate of correct post-test answers increased significantly in all questions; the increase in the questions related to the subjects supported by practical applications was more remarkable. It was found that more incorrect answers were given to questions about environmental injuries.

Conclusions: It is possible to improve the public recognition of first aid, even with one day of theoretical and practical training. Thus, adding first aid practical courses to the first-year medical school curriculum and raising awareness at an earlier age will play an essential role in medical education.

KEYWORDS: Medical education; First aid; Basic life support; Medical school curriculum

1. Introduction

Out-of-hospital cardiopulmonary arrest and its low survival rates are some of the most critical health problems worldwide. In its lexical sense, first aid means "first help or emergency care performed for a person who is injured or suddenly becomes ill". The American Heart Association (AHA) defines first aid as life-saving interventions without using any medical equipment[1]. A first aid provider should recognize and evaluate the need for first aid, provide care using appropriate competencies, and seek additional help when necessary[2]. In recent guidelines released by AHA, early recognition of arrest, early and effective cardiopulmonary resuscitation (CPR), and defibrillation were especially emphasized as the most essential steps of first aid in saving lives. First aid can be performed by anyone anywhere. It is also known that people who have not received first aid training are often obliged to do it. In AHA 2019 "Basic Life Supports in Adult", it is stated that despite the advances in technology and techniques, the survival rate of sudden

Significance

The paper emphasizes the importance of early cardiopulmonary resuscitation. Training of non-health workers will increase survival in out-of-hospital arrests. Our study revealed that one day education provides a significant level of awareness and knowledge about basic life support. Introduction of first aid in the primary education would significantly contribute to the knowledge and skills of medical students and save lives.

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cardiac deaths in the last 50 years is still low^[3].

Although the medical education of developed countries is similar, there is no recommendation about the timing of Basic Life Support (BLS) training. As there are different practices in each country, different institutions have their unique practices as well. Traditionally basic life support is taught as “theoretical lectures and practical applications on mannequins” but still no consensus on curriculum proposal^[4]. This study aims to determine the timing of the first aid subjects in the medical school curriculum and the training method with the 8-hour first aid training given to the first-grade students of the faculty of medicine.

2. Participants and methods

2.1. Ethical approval

The study was performed prospectively in October 2019 at Maltepe University Faculty of Medicine. Approval was obtained from the Maltepe University Clinical Research Ethics Committee (2019/900/68).

2.2. Participants and courses

First-year medical students from Faculty of Medicine, Maltepe University were included in the study, and none of them had received basic life support training previously. A two-stage, 8-hour course plan consisting of theoretical lectures, and practical applications was prepared. The course was planned and implemented by 3 lecturers who were experts in the field and had at least 5 years of experience. Theoretical courses included cardiopulmonary resuscitation, basic life supports, epileptic seizures, heatstroke, aspiration, and drowning issues, while practical applications included cardiopulmonary resuscitation techniques, basic life support scenarios, Heimlich’s Maneuver and the coma position.

2.3. Questions

At the beginning of the course, a link consisting of 17 questions (Supplementary material) containing information to be explained to the students was created using Google forms. This link was shared with the students participating in the course through the group (WhatsApp) created from the digital database, allowing them to answer the test. Twenty minutes were given for the test, and when the time ended, the connection was closed for use, preventing answering during the day and incorrect results.

At the end of the training, a new link was created with the same questions, and the students were asked to answer the test again. Students who participated in both theoretical and practical applications were included in the study. Answers of students who attended only one part of the course were excluded from the study.

2.4. Statistical analysis

Number Cruncher Statistical System 2007 (Kaysville, Utah, USA) program was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, frequency, rate, minimum, maximum) were used while evaluating the study data. McNemar test and Wilcoxon Signed Ranks test were used to evaluate the applied test questions’ results before and after the training. The significance level of this study was set at $\alpha=0.05$.

3. Results

A total of 168 students completed the pre-and post-training test. A statistically significant increase of correct rate in all questions was noted. The results are presented in Table 1.

While 21.4% ($n=36$) of the students gave correct answers to the 2nd question (How many times should CPR per minute be applied to adults?) before the training, 81.0% ($n=136$) gave the correct answer after the training; Only 11.9% ($n=20$) of the students gave correct answers to the 9th question (Which of the following statements about the CPR that the first aider will apply when encountering an elderly victim is correct?) before the training, 64.3% ($n=108$) gave the correct answer after the training; 34.5% ($n=58$) of the students gave correct answers to the 12th question (In which area is the Heimlich’s Maneuver applied in adults?) before the training, whereas 81.5% ($n=137$) gave the correct answer after the training; 35.7% ($n=60$) of the students gave correct answers to the test’s 14th question (Which of the following first aid information is incorrect?) before the training, and 88.1% ($n=148$) gave the correct answer after the training; 34.5% ($n=58$) of the students gave correct answers to the 15th question (Which of the following is not one of the maneuvers used in the case of foreign body aspiration?) before the training, 85.1% ($n=143$) gave the correct answer after the training. It was determined that an increase in the number of correct answers given to the questions about CPR and application method (Questions 2, 9, 12, 14), foreign body aspiration after the training was higher than the other questions, and it was found to be statistically significant ($P=0.001$ and $P<0.01$, respectively).

While the pre-training total test scores of the students were 5.56 ± 1.88 . The post-training average was 12.44 ± 1.87 . The increase in the total post-training test results compared to pre-training was statistically significant ($Z=11.275$, $P=0.001$).

4. Discussion

The quality of cardiopulmonary resuscitation performed is of vital importance, and it has been found that even among healthcare professionals, an efficient resuscitation cannot always be performed^[2]. It was learned that all but one of the students

Table 1. Evaluation of post-training test results compared to pre-training.

Question	Pre-training, n(%)	Post-training, n(%)	χ^2	P
Question 1: What is "drug-free intervention to save lives" called?				
Incorrect	94 (56.0)	49 (29.2)	-6.708	0.001
Correct	74 (44.0)	119 (70.8)		
Question 2: How many times should CPR per minute be applied to adults?				
Incorrect	132 (78.6)	32 (19.0)	-10.000	0.001
Correct	36 (21.4)	136 (81.0)		
Question 3: Which is not one of the mildest conditions associated with heat?				
Incorrect	92 (54.8)	25 (14.9)	-8.185	0.001
Correct	76 (45.2)	143 (85.1)		
Question 4: Which of the following is not one of the cooling methods applied to heat emergencies?				
Incorrect	107 (63.7)	57 (33.9)	-7.071	0.001
Correct	61 (36.3)	111 (66.1)		
Question 5: Which should be the first aid given to a person with airway obstruction, coughing, and difficulty in talking and seeking help?				
Incorrect	136 (81.0)	79 (47.0)	-7.550	0.001
Correct	32 (19.0)	89 (53.0)		
Question 6: Which of the following is correct about the epilepsy attack?				
Incorrect	45 (26.8)	20 (11.9)	-5.000	0.001
Correct	123 (73.2)	148 (88.1)		
Question 7: Which is incorrect about first aid in case of drowning?				
Incorrect	107 (63.7)	30 (17.9)	-8.775	0.001
Correct	61 (36.3)	138 (82.1)		
Question 8: Which of the following is not seen in heat exhaustion?				
Incorrect	113 (67.3)	41 (24.4)	-8.485	0.001
Correct	55 (32.7)	127 (75.6)		
Question 9: Which of the following is correct about the first aider's CPR?				
Incorrect	148 (88.1)	60 (35.7)	-9.276	0.001
Correct	20 (11.9)	108 (64.3)		
Question 10: Which of the following is not seen during an epileptic attack?				
Incorrect	136 (81.0)	72 (42.9)	-8.000	0.001
Correct	32 (19.0)	96 (57.1)		
Question 11: Which one is not among the first aid rules to be applied during the seizure?				
Incorrect	140 (83.3)	79 (47.0)	-7.810	0.001
Correct	28 (16.7)	89 (53.0)		
Question 12: In which area is the Heimlich's Maneuver applied in adults?				
Incorrect	110 (65.5)	29 (17.3)	-9.000	0.001
Correct	58 (34.5)	139 (82.7)		
Question 13: Which of the following is not one of the symptoms of heatstroke?				
Incorrect	129 (76.8)	63 (37.5)	-8.124	0.001
Correct	39 (23.2)	105 (62.5)		
Question 14: Which of the following first aid information is incorrect?				
Incorrect	108 (64.3)	20 (11.9)	-9.381	0.001
Correct	60 (35.7)	148 (88.1)		
Question 15: Which one is not one of the maneuvers used in foreign body aspiration?				
Incorrect	110 (65.5)	25 (14.9)	-9.220	0.001
Correct	58 (34.5)	143 (85.1)		
Question 16: Which one is incorrect about partial obstruction?				
Incorrect	95 (56.5)	31 (18.5)	-8.000	0.001
Correct	73 (43.5)	137 (81.5)		
Question 17: Which one is incorrect about drowning?				
Incorrect	119 (70.8)	54 (32.1)	-8.062	0.001
Correct	49 (29.2)	114 (67.9)		

participating in our study had not received first aid training before, and their current knowledge was based on films and social media.

In a review by Suarez *et al.* basic life support, training methods were mentioned, and it was stated that the most frequently used method was in the form of pretest-training-posttest as in

our study[5]. The rate of correct post-test answers increased significantly in all questions, and it was determined that the increase in number of correct answers given to the especially questions about cardiopulmonary resuscitation practical application. Aspiration was higher than the other questions. It

was noteworthy that these questions' common feature was those related to issues supported by the practical application (CPR and application method, foreign body aspiration).

The students participating in our study consisted of a group representing the young segment of the population who have just graduated from high school, and our findings revealed their knowledge and experience level in first aid interventions are low. It was observed that they mostly gained this information from social media, news programs and high school classes. Our study revealed that it is possible to raise a significant level of awareness, even with one day of theoretical and practical training. In a similar study, the rate of people who knew where the cardiac compressions should be located was 44.2%, while in our study similar rates were found. Nevertheless, it was observed that the answers were given about the interventions to be performed on the patient with epilepsy, and the basic first aid steps included similar mistakes known in the society, such as making someone smell cologne or onion[6].

Heat stroke and frostbite are called environmental injuries, and they are more common in homeless people, drug addicts and those working in the field. Frostbite and heat stroke can progress rapidly from simple symptoms to life-threatening situations, and outstanding results can be obtained with early intervention[7,8]. Correct answers in the pretest to the question about heat stroke were 36.2%. The rate of those who answered the question about epilepsy correctly was 73.2%. We think that this is due to the more frequent encounters with situations such as epileptic seizures, sudden cardiac arrest, and the information transmitted by hearsays and information learned through social media.

In our study, we showed the positive effect of education on strengthening first aid awareness, which is similar to other studies. In a study[9], it shows that the necessity of first aid training given in the adolescent age group and the information is significantly preserved after 12 months in this age group, similar to our article. In another study conducted with medical school and first year nursing students, it examined the results of face-to-face education and co-education with an online instructor, and showed that there were no significant results. It has been shown that repeating the blended training shortly after the course and 6 months later increases the permanence of the information[10,11]. We also think that the trainings should be repeated at certain intervals in order to increase the permanence of the level of knowledge achieved through training.

Learning first aid is the easiest way of early diagnosis and effective intervention of cardiopulmonary arrest. It has been shown that even short-term training in the posttest performed after the 8-hour course significantly increases the knowledge and skills regarding first aid interventions. The increase in the number of correct answers observed in the posttest for the questions related to the subjects with practical applications was determined more than the ones explained only theoretically and showed the importance of practical applications in training. We suggest adding first aid practical courses to the first-year curriculum and raising awareness by adding courses that may play an essential role in medical education.

Conflict of interest statement

The authors report no conflict of interest.

Authors' contributions

Design and data collection: E.A., N.A. and O.G.; Data analysis and interpretation: A.E. and O.G.; Writing the article: E.A. and N.A.; Critical revision and final submission: O.G..

References

- [1] Pellegrino JL, Charlton NP, Carlson JN, Flores GE, Goolsby CA, et al. 2020 American Heart Association and American Red Cross Guidelines for First Aid. *Circulation* 2020; **142**: e287-e303.
- [2] Zideman DA, de Buck EDJ, Singletary EM, Cassan P, Chalkias AF, Evans TR, et al. European resuscitation council guidelines for resuscitation 2015 section 9. *Resuscitation* 2015; **95**: 278-287.
- [3] Pozner CN. Adult basic life support (BLS) for health care providers. [Online] Available from: <https://www.uptodate.com/contents/basic-life-support-bls-in-adults>. [Accessed on March 30th 2021].
- [4] Veloso SG, Pereira GS, Vasconcelos NN, Senger MH, de Faria RMD. Learning by teaching basic life support: a non-randomized controlled trial with medical students. *BMC Med Educ* 2019; **19**(1): 67.
- [5] García-Suárez M, Méndez-Martínez C, Martínez-Isasi S, Gómez-Salgado J, Fernández-García D. Basic life support training methods for health science students: A systematic review. *Int J Environ Res Public Health* 2019; **16**(5): 768.
- [6] Altundi ST, Aslan FG. Assessment of first aid knowledge level of university Students. *Sakarya Tip Dergisi* 2017; **7**(3): 125-130.
- [7] Kaheimo T, Bessen HA, Waters TA. Environmental injuries. In: Tintinalli JE (ed). *Tintinalli's emergency medicine*. 7th Edition. China: McGraw Hill Medical; 2011. p. 1331-1344.
- [8] Westrol MS, Koneru S, McIntyre N, Caruso AT, Arshad FH, Merlin MA. Music genre as a predictor of resource utilization at outdoor music concerts. *Prehosp Disaster Med* 2017; **32**(3): 289-296.
- [9] Reveruzzi B, Buckley L, Sheehan M. First aid training in secondary schools: A comparative study and implementation considerations. *J Safety Res* 2020; **75**: 32-40.
- [10] Castillo J, Gallart A, Rodríguez E, Castillo J, Gomar C. Basic life support and external defibrillation competences after instruction and at 6 months comparing face-to-face and blended training. *Nurse Educ Today* 2018; **65**: 232-238.
- [11] Hsieh PY, Lin HY, Chang CH, Chang YC, Cheng HP, Wang CY, et al. Effects of situational simulation and online first-aid training programs for nurses in general medical wards: A prospective study. *Nurse Educ Today* 2021; **96**: 104621.