ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA MAKALESİ

Evaluation of Basic and Advanced Cardiac Life Support Skills of 6th-Year Medical Students During Emergency Medicine Clerkship

Acil Servis Stajı Sırasında İntörn Doktorların Temel ve İleri Yaşam Desteği Becerilerinin Değerlendirilmesi

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ÖZ

Amaç

Tıp fakültesi eğitiminde öğrencilerin CPR eğitimi sırasında, kardiyak arresti etkili bir şekilde tedavi etmeye hazırlamak için CPR öğrenme deneyimini optimize etmek önemlidir. Çalışmamızın amacı intörn doktorlarda CPR eğitimimizin etkinliğini değerlendirmek ve kalitesini arttırmaktır.

Gereç ve Yöntem

Prospektif olarak 2017 - 2018 tarihleri arasında Acil Servis Stajında CPR eğitimi alan, Pre-Post testi cevaplayan intörn doktorların test skorları karşılaştırıldı. İntörn doktorlara Acil stajına başladıkları ilk gün bilgilendirme toplantısı sırasında önceden hazırlanmış sorularla pre-test ve eğitim sonrası aynı sorularla post-test yapılarak, eğitim kalitesi ve CPR bilgi düzeyleri ve değişimi değerlendirildi.

Bulgular

Çalışma süresince 185 intörn pre-test, 128 intörn post-test ile değerlendirildi. 57 intörn doktor derse katılmadıkları ya da post testi cevaplamadıkları için değerlendirilmeye alınmadı. Eğitim sonrası başarı oranı temel-ileri yaşam desteği, taşikardi-bradikardi ve toplam değerlendirmede belirgin olarak arttı. Bu bölümler içinde en fazla başarı değişimi ileri yaşam desteği sorularında en az başarı değişimi taşikardi-bradikardi sorularında idi.

Sonuç

İntörn doktorlarda temel ve ileri yaşam desteği konusunda 3 saat didaktik ve 1 saat simüle senaryo manken eşliğinde eğitimimiz etkindir.

Anahtar kelimeler: Temel yaşam desteği; ileri yaşam desteği; acil servis

ABSTRACT

Aim

It is important to optimize CPR training so that medical students become capable of treating cardiac arrest effectively. The aim of this study was to evaluate the effectiveness of our CPR training program and to improve the quality of CPR training among 6th-year medical students.

Material and Methods

In this study, the pre-and post-test scores of 6th-year medical students who received CPR training during emergency medicine clerkship between the years 2017 and 2018 were compared prospectively. The students completed the pre-test during the information meeting held on the first day of the clerkship. At the end of the training course, the students took the post-test which was identical to the pre-test. The pre-test and post-test results were compared to evaluate the improvement in the CPR skills of the students and the quality of the CPR training

Results

During the study, 185 participants took the pre-test and 128 participants took the post-test. Fifty-seven participants who failed to attend the course or the post-test were excluded. After the course, the success rates increased significantly in the Basic Life Support (BLS), Advanced Cardiac Life Support (ACLS), and arrhythmia management sections and in the overall evaluation. Among these, the most significant increase in success was in the ACLS section and the least significant increase was in the arrhythmia management section.

Conclusion

The BLS-ACLS course we provided to 6th-year medical students, which consisted of 3-hours of didactic training and 1-hour of scenario-based simulation training, was shown to be effective.

Keywords: Basic life support; advanced cardiac life support; emergency medicine department

Received: September 23, 2019 Accepted: November 10, 2019

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Atıf için/Cited as: *Ozcete E, Uz I, Akarca FK.* Evaluation of Basic and Advanced Cardiac Life Support Skills of 6th-Year Medical Students During Emergency Medicine Clerkship. Anatolian J Emerg Med 2019;2(4); 6-10.

Introduction

Sudden cardiac arrest is one of the leading causes of death (1). Cardiopulmonary resuscitation (CPR) is a life-saving procedure in cardiac arrest (2). Studies conducted have documented that the life support skills of medical students are inadequate (3-12). To date, numerous studies have shown that improved CPR quality increases survival rates in cardiac arrest patients (13-15). Although the European Resuscitation Council (ERC) and the American Heart Association (AHA) publish CPR guidelines and update these guidelines on a regular basis, even qualified hospital personnel do not fully adhere to advanced cardiovascular life support (ACLS) protocols (16). This drawback may result in a failure to achieve the return of spontaneous circulation in patients with cardiac arrest (17). It is important to optimize CPR training so that medical students become capable of treating cardiac arrest effectively (18). The findings of our study will help improve the quality of CPR training in 6th-year medical students. The aim of this study was to evaluate the effectiveness of our CPR training program and to improve the quality of CPR training among 6th-year medical students.

Material and Methods

At our faculty of medicine, medical students attend the emergency medicine clerkship only on the 6th year (undergraduate). The duration of the emergency medicine clerkship is one month. The students receive theoretical and practical training during the clerkship. Both the theoretical and practical training are provided by instructors with at least 5 years of experience. Theoretical training consists of lectures on Basic life support (BLS), defibrillator use, arrhythmia management, and Advanced Cardiac Life Support (ACLS). The lectures are prepared according to the current guidelines (AHA, ERC). Practical training consists of BLS-ACLS scenarios performed on manikins. The theoretical and practical training are given on the same day.

In this study received 6th-year medical students who CPR training during emergency medicine clerkship between the years 2017 and 2018. It is be the pre-and post-test scores were compared prospectively. The test consisted of multiple choice, true-false, and matching questions on BLS, ACLS, and arrhythmia management. For multiple-choice questions, each correct answer was scored 1 point. For true-false and matching questions, each correct answer was scored +1 point and each incorrect answer was scored -1 point. If the number of incorrect answers exceeded that of the correct answers, the total score was calculated as zero points.

Participants who did not receive CPR training during the emergency medicine clerkship, participants other than 6th-year medical students, and those who were late to the CPR training course were excluded from the study.

The students completed the pre-test during the information meeting held on the first day of the clerkship. At the end of the training course, the students took the post-test which was identical to the pre-test. The pre-test and post-test results were compared to evaluate the improvement in the CPR skills of the students and the quality of the CPR training.

The test consisted of a total of 15 questions. The first section consisted of 5 questions on BLS and was worth a total of 11 points. The second section (questions 6-13) dealt with ACLS and was worth a total of 40 points. The third section (questions 14-15) was on arrhythmia management and was worth a total of 21 points. Thus, the overall score ranged between 0-72 points. Participants who scored over 6 points in the BLS section, over 20 points in the ACLS section, and over 11 points in the arrhythmia management section were deemed successful. In total, success was defined as an overall score of 36 and above.

All statistical analyses were performed using the SPSS statistical software (SPSS for Windows, version 18.0; SPSS, Inc., Chicago, IL, USA). Descriptive statistics (mean, minimum, maximum), standard deviation, and frequency tables were used to analyze the data. Continuous variables were expressed as mean±standard deviation and percentages. Chi-square analysis was used to compare the two groups and the Student's t-test was used to determine the significance between the mean values.

Results

During the study, 185 participants took the pre-test and 128 participants took the post-test. The test results were compared in two separate groups (pretest and posttest group).

Participants who received 6 points in the BLS Section, 20 points in the ACLS section and 11 points in the Arrhythmia Management section were considered successful. In total, success was defined as an overall score of 36 and above.

The post-test group were successful 96.1% in the BLS section, 95.3% in the ACLS section, and 18% in the Arrhythmia Management section. The overall success rate in the Post test group was 83.6%. (Table 1)

After the course, the success rates increased significantly in the BLS, ACLS, and arrhythmia management sections and in the overall evaluation. Among these, the most significant increase in success was in the ACLS section and the least significant increase was in the arrhythmia management section. (Table 2)

Discussion

Health care workers are expected to follow current BLS/ACLS guidelines when resuscitating unresponsive patients or patients with cardiac arrest. The main goal of

Groups	Pre-test (N:185)	Post-test (N:128)	Odds Ratio	95% Confidence Interval	P-value
BLS (Basic Life Support)					
Successful	74 (40%)	123 (96.1%)	36.9	14.3 - 94.5	0.000
Unsuccessful	111 (60%)	5 (3.9%)			
ACLS (Advanced Cardiac Life Support)					
Successful	12 (6.5%)	122 (95.3%)	293.1	107 - 802.4	0.000
Unsuccessful	173 (93.5%)	6 (4.7%)			
Arrhythmia management					
Successful	6 (3.2%)	23 (18%)	6.5	2.5 ± 16.5	0.000
Unsuccessful	179 (96.8%)	105 (82%)			
Total					
Successful	3 (1.6%)	107(83.6%)	309.1	90 - 1060	0.000
Unsuccessful	182 (98.4%)	21 (16.4%)			

Table 1. Comparison of pre-test and post-test success

medical training in emergency medicine is to provide medical students with the necessary knowledge and skills to ensure high-quality cardiopulmonary resuscitation (CPR)(19).

In case the required skills are sustained with frequent training, CPR is simple and effective (20).

There are studies which have concluded that residents and medical students are not equipped with the necessary skills and experience to initiate and perform CPR. For instance, Lighthall et al. have found that residents often lack the necessary skills in initiating CPR and identifying arrhythmias (21). In a study by Promes et al. where residents from different specialties were evaluated, it was found that 64% of the residents had never performed BLS and that 36% of them had never performed CPR (22). Likewise, Wu et al. reported that by the end of the third year, 72% of medical students had never performed CPR and that this rate declined to 68% after the fourth year (23). Similarly, at our institution, medical students do not undergo CPR training until the sixth year. Therefore, an effective training method is of utmost importance to ensure that medical students graduate with the necessary skills to perform CPR.

In recent years, studies have aimed to discover a training method which will equip healthcare providers with the necessary knowledge and skills to perform ACLS without leading to any unfavorable clinical outcomes. Traditional (didactic) medical training (TMT) is an effective training method. On the other hand, simulation-based medical training (SBMT) is gaining popularity, as it provides a safe and supportive educational environment through advances in technology so that students can improve their performance without causing negative clinical outcomes (24-26).

Studies on ACLS training have shown that SBMT is a more effective method than TMT. In these studies, simulation-based ACLS training was provided not only to medical students, but also to residents, nurses, respiratory therapists, and dentistry students (25,26). In contrast to these studies, Kim et al. stated that TMT is a more effective method than SBMT for giving ACLS training to medical students (24). On the other hand, in a study conducted in Korea in 2012, no significant differences were found between SBMT and TMT groups after one month of ACLS training (27).

In our study, the participants received 3 hours of didactic traditional lecture (PowerPoint presentation) followed by one hour of practical training on a manikin. When the training we provided to 6th-year medical students was evaluated according to pre-test and post-test results, success rates were over 90% (96.1% and 95.3% for BLS and ACLS, respectively). We believe that our BLS-ACLS course is effective and adequate in terms of early outcomes. On the other hand, the success rate in arrhythmia management did not improve as much as expected (from 3.2% to 18%). The complicated nature of arrhythmia management may have influenced the success rates. In addition, it may be inferred that medical students should receive more effective training in arrhythmia management before their sixth year of education. We think that the arrhythmia management section of our training course should be revised in order to increase the success rate.

Limitations

The success rates of participants were evaluated according to the pre-test and post-test scores only. Due to the limited duration of training, the practical skills of participants could not be evaluated. Evaluating practical skills on a simulated model will help determine whether the increase in the success rates is related to the improvement

Groups	N	Mean	Std. Deviation	p-value
Basic Life Support				
Pre-test score	185	5.02	1.89	0.000
Post test score	128	8.99	1.62	
Advanced Cardiac Life Support				
Pre-test score	185	10.33	5.52	0.000
Post-test score	128	28.66	5.54	
Arrhythmia management				
Pre-test score	185	2.73	3.15	0.000
Post-test score	128	6.75	4.62	
Total				
Pre-test score	185	18.02	7.07	0.000
Post-test score	128	44.40	9.07	

Table 2. Comparison of mean pre-test and post-test scores

in skills. In our study, the long-term outcomes of training were not evaluated.

Conclusion

The BLS-ACLS course we provided to 6th-year medical students, which consisted of 3-hours of didactic training and 1-hour of scenario-based simulation training, was shown to be effective.

Conflict of interest

All authors have no conflict of interest to disclose.

Financial Disclosure

The authors declared that this study has received no financial support.

Authors' Contribution

All authors were equally involved in the preparation of this article.

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