

ORIGINAL ARTICLE

Assessment of the Effectiveness of Basic Life Support Training for Dental Faculty Residents

Diş Hekimliği Fakültesi Asistanlarına Verilen Temel Yaşam Desteği Eğitimi Etkinliğinin Değerlendirilmesi

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ABSTRACT

Aim: Cardiac arrest (CA) is a leading cause of mortality worldwide, with survival outcomes heavily dependent on prompt recognition and intervention. Basic Life Support (BLS) training is critical for equipping healthcare professionals with the skills necessary to manage such emergencies effectively. Tailored BLS training is essential in dentistry, where emergencies like CA, though rare, can have severe consequences. This study evaluated the effectiveness of a structured BLS training program for dental residents at Selçuk University Faculty of Dentistry, incorporating theoretical, practical, and video-based instruction components.

Methods: A total of 151 volunteer dental residents participated in a structured BLS training program conducted between May 14-17, 2024. Training included theoretical lectures, hands-on practice on mannequins, and a preparatory video covering BLS interventions for adults, children, and infants. Knowledge acquisition was measured using pre-tests, post-tests, and a retention test one month after training. Participants' demographic data and prior BLS experience were also evaluated.

Results: Participants demonstrated significant improvement in knowledge immediately after training, with retention remaining above pre-test levels one month later. In analyzing the number of participants answering the questions correctly in the post-training tests, $p < 0.001$ was found for 10 out of 12 questions. Those watching the preparatory video scored significantly higher in post-training and retention tests than those who did not, highlighting the supportive role of the videos. Most participants (91.8%) reported never performing BLS in real-life scenarios, underscoring the need for recurring hands-on training to address gaps in practical readiness.

Conclusion: This study shows that structured BLS training effectively improves knowledge acquisition and retention in dental residents. Preparatory videos aid learning. To sustain knowledge and readiness, periodic refreshers, advanced simulation technologies, and standardized BLS curricula are recommended. Incorporating BLS training into dental education helps professionals respond confidently in emergencies, enhancing patient's safety outcomes.

Keywords: Basic life support, dental education, knowledge retention

Öz

Amaç: Kardiyak arrest (KA), hayatta kalma sonuçlarının büyük ölçüde hızlı tanıma ve müdahaleye bağlı olduğu dünya çapında önde gelen bir ölüm nedenidir. Temel Yaşam Desteği (TYD) eğitimi, sağlık çalışanlarını bu tür acil durumları etkili bir şekilde yönetmek için gerekli becerilerle donatmak için kritik öneme sahiptir. Bireysel TYD eğitimi, KA gibi acil durumların nadir de olsa ciddi sonuçlara yol açabildiği diş hekimliğinde esastır. Bu çalışmada, Selçuk Üniversitesi Diş Hekimliği Fakültesi'ndeki diş hekimliği asistanları için teorik, pratik ve video tabanlı eğitim bileşenlerini içeren yapılandırılmış bir TYD eğitim programının etkinliği değerlendirildi.

Gereç ve Yöntemler: 14-17 Mayıs 2024 tarihleri arasında yürütülen yapılandırılmış bir TYD eğitim programına toplam 151 gönüllü diş hekimliği asistanı katıldı. Eğitim, teorik dersler, mankenler üzerinde uygulamalı pratik ve yetişkinler, çocuklar ve bebekler için TYD müdahalelerini kapsayan bir hazırlık videosu içeriyordu. Bilgi edinimi, ön testler, son testler ve eğitimden bir ay sonra yapılan bir tutma testi kullanılarak ölçüldü. Katılımcıların demografik verileri ve önceki BLS deneyimleri de değerlendirildi.

Bulgular: Katılımcılar, eğitimden hemen sonra bilgilerinde önemli bir gelişme gösterdiler ve tutma bir ay sonra test öncesi seviyelerin üzerinde kaldı. Eğitim sonrası testlerde soruları doğru cevaplayan katılımcı sayısı analizinde, 12 sorudan 10'u için $p < 0.001$ bulundu. Hazırlık videosunu izleyenler, eğitim sonrası ve kalıcılık testlerinde izlemeyenlere göre önemli ölçüde daha yüksek puan aldılar ve bu da videonun destekleyici rolünü vurguladı. Katılımcıların çoğu (%91,8), gerçek yaşam senaryolarında asla TYD yapmadıklarını bildirdi ve bu da pratik hazırlıktaki boşlukları gidermek için tekrarlayan uygulamalı eğitime ihtiyaç olduğunu vurguladı.

Sonuçlar: Bu çalışma, yapılandırılmış TYD eğitiminin diş hekimliği asistanlarının bilgi edinimi ve bu bilginin kalıcılığını etkili bir şekilde artırdığını göstermiştir. Hazırlık videolarının öğrenme sürecine katkıda bulunduğu sonucu ile bilgi ve hazırlığın sürdürülebilirliği için periyodik yenilemeler, gelişmiş simülasyon teknolojilerinin kullanımı ve standartlaştırılmış TYD müfredatlarının uygulanması önermekteyiz. Diş hekimliği asistan eğitimine TYD eğitiminin dahil edilmesinin, profesyonellerin acil durumlara güvenle yanıt vermesine olanak sağlayarak hasta güvenliği ve sonuçlarının iyileştirilmesine katkıda bulunacağına inanıyoruz.

Anahtar Kelimeler: Bilgi tutma, diş hekimliği eğitimi, temel yaşam desteği.

Introduction

Cardiac arrest (CA) is the cessation of the heart's four minutes, so immediate medical attention is critical ability to pump blood effectively. It is one of the (2). The first 10 minutes after CA are crucial, often leading causes of death worldwide (1). CA reduces called the "Golden 10." Quick action during this time blood flow, increasing the risk of brain damage within significantly increases survival chances (3). Only 10% of

people experiencing CA outside a hospital survive, and 20% suffer neurological or moderate damage (4). Survival outcomes hinge on prompt diagnosis and intervention, involving essential actions. Basic Life Support (BLS) is the primary practice providing sufficient blood to the tissues by pumping blood from the heart after the heart(5). Cardiopulmonary resuscitation (CPR), the use of the savior respiratory and automatic external defibrillator (AED), combines skills such as chest compression and artificial respiration to maintain blood circulation to the patient's vital organs (6).

Individuals faced with situations requiring BLS must possess adequate knowledge and be prepared to implement quick and accurate first aid. BLS is an essential skill for all healthcare professionals, as it does not require specialized equipment or medication and should be understood by everyone in the field (7). BLS is a vital skill for healthcare professionals, enabling them to respond effectively in emergencies and potentially save lives.

Maintaining BLS competency and retention among dental residents is especially crucial, as they often work in unique clinical environments where emergencies can occur. The most critical medical emergency for a dentist is CA. Although unusual, deaths are reported to CA during dental treatment in dentistry (8, 9). For this reason, as a health professional, dentists should be able to recognize CA and apply BLS. Using the automatic external defibrillator (OED) and the BLS training containing cardiopulmonary resuscitation (CPR) is one of the basic skills necessary for managing emergencies in dentistry. Prior research has demonstrated the importance of structured, theory-and-practice-based BLS training programs to improve participants' knowledge, skills, and long-term retention.

This study aims to evaluate the effectiveness of a structured BLS training program provided to Selçuk University Faculty of Dentistry residents. The program utilizes theoretical and practical components, complemented by a pre-training video, to measure immediate knowledge acquisition and retention one month after training.

Materials and Methods

This study excitedly evaluated the responses of 160 dedicated volunteer dental residents participating in BLS training from May 14-17, 2024. They completed pre-tests, post-tests, and a retention test a month later. The study was approved by the Ethics Committee of the

Selçuk University Faculty of Dentistry (25/04/2024-13). The BLS training was conducted by an anesthesiology and reanimation consultant over four sessions blending theoretical lectures with practical demonstrations. A week before the training, we provided the participants with a video detailing the BLS intervention steps for adults, children, and infants. The structured BLS training program was designed under the latest European Resuscitation Council (ERC) 2021 guidelines and American Heart Association (AHA) 2020 guidelines (10, 11). The videos provided to participants were also aligned with these guidelines to ensure consistency with current best practices. Although viewing the video was optional, it acted as preparatory material. Participants attended a 2-hour theoretical lecture during the training sessions, followed by supervised individual practice of chest compressions on a mannequin.

Data Collection Instruments were a Participant Information Form for collecting demographic and baseline characteristics and a BLS Knowledge Form, given as a pre-test, right after training (post-test), and again one month later (retention test). Figures 1 and 2. Before the training, participants completed a pre-test to assess baseline knowledge. Post-training knowledge was measured immediately after the session and again one month later to evaluate retention.

Age:	
Sex (Male or female):	
Did you receive Basic Life Support Training during your undergraduate education at the Faculty of Dentistry? (Yes or No)	
Have you ever experienced an incident that required Basic Life Support or First Aid? (Yes or No)	
Have you ever administered Basic Life Support /First Aid to someone? (Yes or No)	
Did your residency training include a rotation in the Department of Emergency Medicine at a medical school? (Yes or No)	
Have you watched the BLS video shared with you? (Yes or No)	

Figure 1. Participant Information Form

1.	Basic life support is a rescue attempt that trained individuals can perform without the support of medication and equipment.	YES	NO
2.	When you see someone collapse, the first thing you should do is go to them and say, "Are you okay?"	YES	NO
3.	In the ABC of first aid, B stands for respiratory examination.	YES	NO
4.	The most important cause of airway obstruction in an unconscious patient is the teeth blocking the airway.	YES	NO
5.	If the patient is unconscious but ABC is normal during the first examination, the patient is placed in the recovery position.	YES	NO
6.	The respiratory examination of a patient who has collapsed should last < 10 seconds.	YES	NO
7.	In effective breast compression, the depth of the pressure should be 5-6 cm.	YES	NO
8.	Effective chest compressions should be performed at a rate of 60-90 compressions per minute.	YES	NO
9.	Cardiopulmonary resuscitation 30 chest compression/ 2 -curtain is breathing in adults.	YES	NO
10.	Basic Life Support Algorithm includes Ambu and Oxygen support.	YES	NO
11.	Chest compression in children is made at a depth of up to 1/3 of the chest front-back diameter.	YES	NO
12.	Basic life support practices in the case of witnessing cardiopulmonary arrests in < 8-year-old children are the same as adults.	YES	NO

*Please respond by marking the checkboxes for 'Yes' or 'No' to indicate the accuracy of the following information.

Figure 2. BLS (Basic Life Support) Knowledge Form

Statistical Analysis

The data obtained from the research was analyzed using the Statistical Package for Social Sciences for Windows (SPSS), version 21.0. Descriptive statistics were used to evaluate the sociodemographic data. The repeated measurement scores of the BLS Information Form were assessed using the Friedman test, and post hoc pairwise comparisons were conducted with the McNemar test, where the variables were distributed binomially. A $p < 0.05$ value was accepted as the statistical significance.

Results

Following data collection, the values underwent statistical analysis and were tabulated.

The responses provided by the participants in the Participant Information Form are presented in Table 1. The mean age of the sample was 27.56 (SD: 2.11), and 71.3 % of the participants were female. Most residents reported having not experienced a situation requiring BLS at 88.1%. 68.7% of participants (n=110)

received BLS or First Aid training during their dental undergraduate education, while 31.3% (n=50) did not. However, only 8.2% (n=13) had administered BLS or First Aid, whereas 91.8% (n=147) had never done so. When asked about watching the provided BLS video, only 35% (n=56) of the participants confirmed viewing it, while the remaining 65% (n=104) had not. A very small proportion of participants (5.7%, n=9) reported that they had previously received BLS training during their emergency department rotation at the Faculty of Medicine, and they were excluded from the study. Ultimately, 151 volunteers participated in the study after completing all pre-and post-tests.

Table 1. Responses in Participant Information Form (n, %)

		n	%	
Age	20-25	25	15.6	
	26-30	123	76.8	
	31-35	11	7.0	
	>35	1	0.6	
Sex	Female	114	71.3	
	Male	46	28.7	
Responses to the questions	Did you receive Basic Life Support Training during your undergraduate education at the Faculty of Dentistry?	Yes	110	68.7
		No	50	31.3
	Have you ever experienced an incident that required Basic Life Support or First Aid?	Yes	19	11.9
		No	141	88.1
	Have you ever administered Basic Life Support /First Aid to someone?	Yes	13	8.2
		No	147	91.8
	Did your residency training include a rotation in the Department of Emergency Medicine at a medical school?	Yes	9	5.7
		No	151	94.3
	Have you watched the BLS video shared with you?	Yes	56	35
		No	104	65

The correct response rates for the tests administered before and after the training and for control purposes increased statistically significantly. These results indicate that the training has been advantageous (Table 2). The accuracy rates of participants watching the video are presented in Table 3.

Table 2. The correct responses of all participants.

Note: The percentage values written in bold in the table represent those that cause significant differences

All Participants n=151	Pretest Knowledge (%)	Posttest Knowledge (%)	Retentiontest Knowledge (%)	Knowledge Level Differences p-value
Question 1	94.0	94.7	98.0	0.006
Question 2	88.7	99.3	97.4	<0.001
Question 3	77.5	97.4	96.0	<0.001
Question 4	92.1	97.4	98.7	<0.001
Question 5	43.0	68.2	88.7	<0.001
Question 6	79.5	94.7	98.2	<0.001
Question 7	86.8	98.7	96.0	<0.001

Question 8	69.5	23.8	66.2	<0.001
Question 9	84.8	100.0	92.7	<0.001
Question 10	53.0	41.1	31.8	<0.001
Question 11	89.4	98.0	95.4	<0.001
Question 12	45.7	87.4	84.8	<0.001

Table 3. The correct responses for all videos watched by participants.

Note: The percentage values written in bold in the table represent those that cause significant differences

Video Watched Participants n=56	Prefest Knowledge (%)	Posttest Knowledge (%)	Retentiontest Knowledge (%)	Knowledge Level Differences p-value
Question 1	100.0	100.0	100.0	-
Question 2	96.4	100.0	100.0	0.256
Question 3	89.3	100.0	100.0	0.032
Question 4	98.2	100.0	96.4	0.179
Question 5	87.5	96.4	94.6	0.014
Question 6	89.3	100.0	100.0	<0.001
Question 7	100.0	100.0	100.0	-
Question 8	91.1	94.6	87.5	0.005
Question 9	98.2	100.0	100.0	0.371
Question 10	83.9	94.6	94.6	0.010
Question 11	100.0	100.0	98.2	0.391
Question 12	92.9	100.0	100.0	<0.001

The study participants were divided into two main groups: those viewing the preparatory video and those who did not. The group watching the video comprised 56 participants, while 104 participants did not watch the video. These groups were analyzed separately to determine the video's impact on knowledge acquisition and retention. The statistical differences between the two groups were significant. The group watching the video showed higher knowledge retention and better performance in the post-test and retention test phases ($p < 0.05$). These findings indicate that preparatory video materials play a critical role in enhancing learning outcomes and knowledge retention.

Discussion

This study evaluated the effectiveness of a structured BLS training program for dental assistants, which combined theoretical lectures, practical exercises, and preparatory video materials. The results showed significant improvement in participants' knowledge immediately after the training and retention one month later, demonstrating the program's effectiveness. These findings highlight the critical role of structured BLS training in equipping dental professionals with basic emergency response skills. The advancements noted in participants' understanding emphasize the

significance of integrating BLS training within dental education. Previous studies have highlighted the importance of this training for healthcare professionals, linking theoretical ideas with practical applications (12).

The research revealed that 91.8% of participants had never applied BLS in real-life scenarios, highlighting a significant deficiency in practical emergency readiness. This observation corresponds with earlier studies showing that healthcare providers, such as dentists, frequently perceive themselves as unprepared to handle emergencies stemming from a lack of hands-on experience. Abdulrahman et al. found that dentists' self-competency in performing CPR was rated poorly, with only 34.5% indicating they were proficient (13). Al-Hamad et al. found that only 45% were efficient (14). Structured and recurring BLS training can address this gap, ensuring that dental practitioners can effectively handle rare but critical emergencies like CA. They must also understand the revision cycle of BLS guidelines, which needs to be highlighted in BLS training.

The video recommended for watching before the training significantly improved the participants' performance on post-training and retention tests. This finding is consistent with existing literature suggesting that video-based learning is a powerful tool for introducing and reinforcing complex skills (15). Using video materials as complementary tools to enhance practical training highlights the value of blended learning approaches. Despite the benefits of video-based learning, it is more effective when used with additional reinforcement methods such as interactive simulations or digital assessment tools. Training incorporating cutting-edge e-learning technologies, including virtual and augmented reality, aims to replicate real-world emergencies and enhance participant engagement has gained popularity in recent times years (16, 17).

Knowledge retention dipped one month post-training but stayed significantly higher than pre-training levels in the study. This aligns with studies indicating that BLS knowledge and skills diminish without ongoing refreshers (18). The study conducted by Anderson and colleagues highlights the effectiveness of short-duration, distributed CPR training on a manikin equipped with real-time visual feedback. Their findings emphasize that such training significantly enhances CPR performance, and they further demonstrate that monthly training sessions yield superior results

compared to training intervals of months 3, 6, or 12 (19). This suggests that frequent and consistent training reinforces CPR skills and ensures better retention and application of proper techniques. Consistent retraining bolsters skill retention and confidence, making it a vital component of a thorough BLS training strategy. Including follow-up evaluations and refreshers in dental assistant training programs can ensure ongoing competence and readiness to manage emergencies.

Additionally, participants' previous BLS training, individual motivation, and familiarity with emergency protocols may affect both short-term and long-term retention of training (20). Although this study did not investigate more personalized variables, nine residents who had rotated in the emergency department and had recently received BLS training were excluded from the analysis.

Integrating BLS training within dental education is more than just an academic requirement; it's a vital necessity. Although possessing the ability to provide BLS is included as a competency within undergraduate dental education under the DUÇEP (The National Core Education Program for Undergraduate Dental Education) framework, it is essential to ensure that BLS training is revisited and updated during postgraduate education considering the latest guidelines and developments in Dentistry Faculties of Türkiye (21). This study underscores the urgent demand for emergency training programs customized for the dental field, including AED usage and CPR in the curriculum, which guarantees that dental professionals are equipped to handle emergencies that could occur during patient care. This study also adds to the growing body of evidence advocating standardized, mandatory BLS training for dental faculty residents (22). By promoting preparation, such training can significantly improve patient outcomes and reduce morbidity and mortality associated with in-office emergencies.

Conclusion

This study emphasizes how a structured BLS education program for dental residents can substantially improve knowledge acquisition and retention. The findings demonstrate the beneficial impact of video-based materials and the importance of hands-on practice for thorough learning. To tackle knowledge retention challenges and ensure dental professionals are adequately prepared for possible emergencies in the office, regular refresher courses, advanced simulation tools, and standardized training protocols should be

implemented.

Conflict of interest

The author reported no potential conflict of interest or any financial or non-financial interest.

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