RESEARCH ARTICLES

Recevied/ Geliş Tarihi: 17/08/2023
Accepted/ Kabul Tarihi: 05/10/2023
Availaible Online/Yayın tarihi: 12/12/2023

Aydın Dental Journal - Volume **9** Issue **3** - December **2023** (21-30)

Aydın Dental Journal

Journal homepage: http://dergipark.ulakbim.gov.tr/adj

DOI: 10.17932/IAU.DENTAL.2015.009/dental_v09i3009

How Competent are Dentists in the Management of Medical Emergencies?

Diş Hekimleri Tıbbi Acil Durumların Yönetiminde Ne Kadar Yeterlidir?

Adeviyye Karaca[1*], Mustafa Keşaplı[1]

ABSTRACT

Objectives: To evaluate dentists' knowledge and experience about life-threatening medical emergencies they may encounter in daily practice and question the competency of using relevant equipment.

Material and Methods: The study included a 15-question multiple-choice test aimed to evaluate dentists' medical practice based on current cardiopulmonary resuscitation (CPR) guidelines, and a 29-question survey to identify the causes of incompetence detected. The data were collected through face-to-face interviews or e-mail.

Results: In total, 475 dentists were contacted for the survey and, 363 agreed to participate. For the theoric questions, the mean score of the participants was 47.1+-15.9 (median (IQR): 46.2). The relationship between CPR training and the total score was significant (p: 0.00). There was no significant relationship between working experience and the score obtained (p: 0.14). Of respondents, 22.3% reported feeling competent in CPR, 78.8% believed dentists should know CPR, 17.9% reported being knowledgeable in automated external defibrillator (AED) use, 23.4% reported feeling competent in managing chest pain, 37.7% reported feeling competent in managing anaphylaxis, 47.9% stated that their emergency drugs and equipment were regularly checked.

Conclusions: Dentists in Turkey need to be adequately prepared for medical emergencies. Pre- and post-graduate education may not sufficient, and CPR and medical emergencies training should be repeated after graduation to ensure that knowledge and skills are maintained. In addition, it is necessary to include an AED device, to be competent in the indications of all equipment and drugs, to provide training for the personnel, and to develop and regularly monitor emergency planning.

Keywords: *automated external defibrillators, cardiopulmonary resuscitation, dentistry, emergency care*

ÖZET

Amaç: Diş hekimlerinin günlük pratikte karşılaşabilecekleri hayatı tehdit eden tıbbi acil durumlar hakkında bilgi ve deneyimlerini değerlendirmek ve ilgili ekipmanları kullanma yeterliliğini sorgulamaktır.

Gereç ve Yöntemler: Çalışma, mevcut kardiyopulmoner resüsitasyon (KPR) kılavuzlarına dayalı olarak diş hekimlerinin tıbbi uygulamalarını incelemeyi amaçlayan 15 soruluk çoktan seçmeli bir test ve tespit edilen yetersizliğin nedenlerini belirlemeyi amaçlayan 29 soruluk bir anketi içermektedir. Veriler yüz yüze görüşme veya e-posta yoluyla toplanmıştır.

Bulgular: Anket için toplam 475 diş hekimi ile iletişime geçildi ve 363'ü katılmayı kabul etti. Teorik sorular için katılımcıların ortalama puanı 47,1+-15,9'dur (medyan (IQR): 46,2). KPR eğitimi ile toplam puan arasındaki ilişki anlamlıydı (p: 0.00). İş deneyimi ile alınan puan arasında anlamlı bir ilişki yoktu (p: 0.14). Yanıt verenlerin %22,3'ü KPR'de yetkin hissettiğini, %78,8'i diş hekimlerinin KPR'yi bilmesi gerektiğine inandığını, %17,9'u otomatik harici defibrilatör (OED) kullanımı konusunda bilgili olduğunu, %23,4'ü göğüs ağrısını yönetmede yetkin hissettiğini, %37,7'sinin anaflaksi yönetmede yetkin hissettiğini bildirdi. %47,9'u acil durum ilaçlarının ve ekipmanlarının düzenli olarak kontrol edildiğini belirtti.

Sonuç: Türkiye'deki diş hekimleri tıbbi acil durumlar için yeterince hazırlıklı olmayabilir. Mezuniyet öncesi ve sonrası eğitim yeterli olmayıp, bilgi ve becerilerin devamlılığını sağlamak için mezuniyet sonrası KPR ve tıbbi acil durumlar eğitimi tekrarlanmalıdır. Ayrıca OED cihazının bulunması, tüm ekipman ve ilaçların endikasyonlarında yetkin olması, personele eğitim verilmesi, acil durum planlamasının geliştirilmesi ve düzenli olarak izlenmesi gerekmektedir.

Anahtar Kelimeler: *acil bakım, diş hekimliği, kardiyopulmoner resüsitasyon, otomatik harici defibrilatör*

[1] Health Sciences University, Antalya Training and Research Hospital
[*] **Corresponding Author:** Resident Dr. Adeviyye Karaca, **e-mail:** ade.aksoy@gmail.com, **ORCID:** 0000-0002-5338-1826

Introductions

Dentists often encounter local or systemic complications due to the invasive procedures they apply in daily practice. Especially, managing life-threatening conditions such as cardiopulmonary arrest and anaphylaxis can be difficult. Although these complications occur rarely, they pose a significant source of stress for dentists due to the possible outcomes. Many studies have shown that mortality and morbidity decrease when such life-threatening emergencies are promptly and effectively intervened. While mortality is 2.5% in patients who undergo resuscitation immediately after cardiac arrest, it increases to 8.2% when delayed.[1]

Dentist must undergo regular training to ensure that life-threatening situations can be successfully managed. There are different types of educational practices and approaches toward the management of medical emergencies in dentistry faculties all over the world. The American Heart Association (AHA) and the European Resuscitation Council (ERC), which set the guidelines for resuscitation worldwide and are the most widely accepted, recommend that dentists take basic and advanced life support courses regularly each year.[1,2]

Among different countries, there is no standard approach to emergency medical supplies that should be available in the working areas of dentists. There are different applications regarding the necessity of having automatic external defibrillators (AED), which are extremely easy to use and significantly reduce mortality, especially in cardiac arrest management.

It's important to assess dentists' knowledge and skills, as well as their competencies in necessary equipment and management. For this reason, the aim of current survey study was to evaluate the knowledge and experience of dentists about life-threatening medical emergencies that they may encounter in daily practice and to question the competency of using relevant equipment in all aspects.

Materials and Methods

Study approval was obtained from the Health Sciences University Antalya Training and Research Hospital Clinical Practices Ethics Committee (Approval no: 2018-177). The survey was developed by experienced emergency medicine specialists and dentists and pre-tested among 50 dentists prior to the study to assess intelligibility and ambiguity, who were later excluded from the study. We did not calculate the power analysis. Instead, tried to reach as many dentists as we could. The study included 475 dentists working in public and private practice in Turkey. The participants were informed about the scope of the study, and they were explained that their participation was completely confidential and that they could withdraw from the study at any time. After their written consent was obtained, they voluntarily participated in the survey. The data were collected through face-to-face interviews or e-mail throughout 2019.

The study included a 15-question multiple-choice test aimed at examining dentists' medical practice based on current cardiopulmonary resuscitation (CPR) guidelines, and a 29-question survey aimed at identifying the causes of incompetence detected because of the application. 46 questions were proportioned as the maximum score that the participants would receive was 100 and the minimum score was 0. The survey consisted of 46 questions in total:

- Questions 1-3 were about age, gender, and work experience.

- Questions 4-10 measured knowledge in basic life support based on the 2020 AHA guidelines.

- Questions 11 through 16 measured knowledge in advanced life support based on the 2020 AHA guidelines.

- Questions 17-46 included open-ended questions to measure competency and knowledge in identifying CPR, competency in medical emergencies and the ability to have and use medical emergency equipment, competency to manage specific medical emergencies, and evaluation of anamnesis and vital signs. Through these questions, it was aimed to discover the underlying causes of incompetency and to determine the steps that can be taken to prevent it.

The study data were analyzed using MedCalc and Statistical Package for Social Sciences 23.0 programs. Numerical data were expressed as mean±standard deviation and median (interquartile range (IQR)), whereas frequency data were expressed as percentages. For numerical data, the Mann-Whitney U test was used to compare two groups, and the Kruskal-Wallis test was used to compare three or more groups. The multi-well Chi-square test was used to compare three or more groups for frequency data. In the comparison of three or more groups, the Conover test was used

for numerical data as a post- hoc analysis method, and the "Cellwise Residual Analysis" method was used for frequency data.[3] Normality analysis was performed using the Kolmogorov-Smirnov test. All tests were set up bidirectionally and the alpha critical value was accepted as 0.05.

Results

In total, 475 dentists were contacted to answer the survey questions. Of these, 363 people agreed to participate in the survey. The rate of participation was 76.4%. All the respondents filled out the forms completely and were included in the study. Of the participants, 156 (43%) were male and 207 (57%) were female. The mean age of the participants was 37.6 +-10.4 and they had a maximum experience of 10-20 years (n=104, 28.7%) (Table 1).

Table 1. Demographic characteristics of the participants

	Age (year)	Gender		Professional experience			
	Mean	Female	Male	1-5 years	5-10 years	10-20 years	>20 years
Number (n)	37.64	207	156	84	81	104	94
Percent (%)		57	43	23.1	22.3	28.7	25.9

For the questions assessing efficacy in basic and advanced life support, the mean score of the participants was 47.1+-15.9 (median (IQR): 46.2 (38.5-53.9), IQR: 25%-75%). The theoretical questions and the answer rates were shown in Table 2. In terms of the relationship between gender and total score, the median total score was 46.2 (46.2-46.2) for women and 46.2 (46.2-53.9) for men, and there was no difference between genders (p: 0.78). The maximum number of correct answers was 12, and only two (0.6%) answered all questions correctly. The most correctly answered question was regarding the lying position that should be applied to the unconscious patient (81% correct response rate).

Table 2. The theoretical questions asked to the participants and the distribution of the answers given

Questions	Answers	Number (n)	Percent (%)
How should the state of consciousness be controlled?	Ask if the patient is okay in a loud voice and gently shake the patient	233	64.2
	Look at the eyes	43	11.8
	Shine a light on the eyes	87	24
	Hold a mirror to the face	0	0
Which position is given to an unconscious patient with pulse and respiration?	Recovery position	294	81
	Lay on back	53	14.6
	Head up position	15	4.1
	Face down position	1	0.3
What should be the compression/ventilation ratio in an adult patient?	Place your ears on the thorax	37	10.2
	The look-listen-feel method	241	66.4
	Hold a mirror to patient's face	57	15.7
	Listen to the sounds the patient makes	28	7.7
	15/2	101	27.8
	30/2	192	52.9
	10/3	27	7.4
	15/5	43	11.8
How many times per minute should compressions be applied?	60/minute	164	45.2
	80/minute	37	10.2
	90/minute	70	19.3
	100-120/minute	92	25.3

Which is incorrect for an automated external defibrillator (AED)?	It is easy to use, it has been developed for the use of individuals who are not healthcare professionals.	143	39.4
	It automatically analyzes the heart rhythm and recommends shock if necessary.	55	15.2
	By pressing the button, the shock is applied at any time desired.	122	33.6
	Especially when applied early, it increases the chance of survival at a high rate.	43	11.8
Which of the following arteries is most easily evaluated for heart rate?	Brachial artery	43	11.8
	Carotid artery	253	69.7
	Axillary artery	18	5
	Radial artery	49	13.5
During basic life support, what is the maximum recommended time for pulse control in seconds?	5	93	25.6
	10	171	47.1
	15	80	22
	20	19	5.2
What is the first drug to be used in cardiac arrest?	Adrenalin	286	78.8
	Atropine	46	12.7
	Lidocaine	3	0.8
	Nitroglycerine	28	7.7
Which of the following is not a basic material required to maintain the airway?	Oral airway	18	5
	Bag-valv-mask	17	4.7
	Face mask	217	59.8
	Endotracheal tube	111	30.6
What is the dose of adrenaline that should be used intramuscularly during anaphylaxis in an adult patient?	1 mg	140	38.6
	0.5 mg	98	27
	2 mg	63	17.4
	1.5 mg	62	17.1
Which of the following is not a priority during anaphylaxis?	Administering oxygen	51	14
	Administering Adrenalin	66	18.2
	Airway control	9	2.5
	To measure blood pressure	237	65.3

AED: Automated external defibrillator

Evaluation of the relationship between the length of experience and the total score obtained from correct answers showed that the median value of all four groups was 46.2, whereas IQR values were 42.3-53.9 for those with 1-5 years of work experience, 36.5-53.9 for those with 5-10 years of work experience, 38.5-61.6 for those with 20 years of work experience and 30.8-53.9 for those with more than 20 years of work experience, with no significant relationship between experience and the score obtained (p: 0.14).

There was no relationship between the total score obtained and age (Correlation coefficient: -0.109, p: 0.03).

The evaluation of the relationship between previous CPR training and the total score showed a significant relationship between those who answered yes, no and indecisive (p:0.00). The post-hoc analysis between the groups showed that the major difference was between those who received CPR training and those who did not (Table 3).

Table 3. The relationship between CPR training and feeling competent

	Feeling Competent		
	Yes	**No**	**I don't know/ Undecided**
CPR training: Yes	59 (%26.5)	82 (%36.8)	82 (%36.8)
CPR training: No	7 (%7.2)	85 (%87.6)	5 (%5.2)
CPR training: I don't know/undecided	15 (%34.9)	18 (%41.9)	10 (%23.3)

CPR: Cardiopulmonary resuscitation

There was no significant relationship between previous CPR experience and the total score (p: 0.45, median: 46.2, IQR: 38.5-61.6 for those who said yes, IQR: 38.5-61.6 for those who said no, IQR: 44.2-53.9 for those who said they were indecisive/don't know). On the other hand, evaluation of the relationship between previous CPR training and feeling competent revealed a significant difference (p: 0.00), (Table 4).

Table 4. Dentists' answers and distribution ratios regarding their competence, knowledge, skills and experience in CPR

QUESTIONS	YES (n, %)	NO (n, %)	I DON'T KNOW/ UNDECIDED (n, %)
CPR NEED RECOGNITION, EXPERIENCE, KNOWLEDGE AND COMPETENCIES			
Have you encountered a case of cardiac arrest anywhere?	67 (%18.5)	280 (%77.1)	16 (%4.4)
Have you encountered a case of cardiac arrest in your daily work area?	95 (%26.2)	260 (%71.6)	8 (%2.2)
Can you evaluate a person who has had cardiac arrest?	102 (%28.1)	162 (%44.6)	99 (%27.3)
Is gasping (agonal) breathing an adequate form of breathing?	14 (%3.9)	180 (%49.6)	169 (%46.6)
Have you ever had a cardiopulmonary resuscitation (CPR) training?	223 (%61.4)	97 (26.7)	43 (%11.8)
Did you have any training on CPR in your university education?	158 (%43.5)	170 (%46.8)	35 (%9.6)
Have you ever performed CPR?	44 (%12.1)	294 (%81)	25 (%6.9)
When performing CPR, should the thorax be allowed to relax?	182 (%50.1)	93 (%25.6)	88 (%24.2)
Do you think a dentist should know CPR?	286 (%78.8)	39 (%10.7)	38 (%10.5)
Do you consider yourself competent and sufficient in CPR?	81 (%22.3)	185 (%51)	97 (%26.7)
Can you perform CPR if needed outside the area you work in? (in public places, shopping malls, airplanes, etc.)	129 (%35.5)	148 (%40.8)	86 (%23.7)
Are you familiar with the use of an automated external defibrillator (OED)?	65 (%17.9)	238 (%65.6)	60 (%16.5)
What should be the compression/ventilation ratio in an adult patient?	15/2	101	27.8
PREPARING FOR MEDICAL EMERGENCIES			
Do your staff members have CPR training?	60 (%16.5)	255 (%70.2)	48 (%13.2)
Are emergency medications and supplies checked regularly in your clinic?	174 (%47.9)	70 (%19.3)	119 (%32.9)
Is there an emergency medical emergency application scheme and assignment for all personnel in your clinic?	76 (%20.9)	222 (%61.2)	65 (%17.9)
Do you feel competent about the use of medicines and materials in the emergency kit?	93 (%25.6)	165 (%45.5)	105 (%28.9)
PRACTICAL SKILLS AND COMPETENCIES IN EMERGENCIES			
Do you have any knowledge of automatic external defibrillator (OED)?	120 (%33,1)	200 (%55,1)	43 (%11,8)
Can you apply an oral airway?	81 (%22.3)	194 (%53.4)	88 (%24.2)
Have you ever establish an intravenous line before?	123 (%33.9)	213 (%58.7)	27 (%7.4)
Can you establish an intravenous line in an emergency?	152 (%41.9)	128 (%35.3)	83 (%22.9)
Do you consider yourself sufficient in blood pressure measurement?	254 (%70)	56 (%15.4)	53 (%14.6)
If necessary, can you ventilate the patient with the bag-valve-mask?	127 (%35)	146 (%40.2)	90 (%24.8)
Do you have any idea for what purpose the pulse oximeter is used?	247 (%68)	74 (%20.4)	42 (%11.6)

KNOWLEDGE AND COMPETENCY TO MANAGE MEDICAL PROBLEMS THAT MAY BE ENCOUNTERED IN DAILY PRACTICE			
Do you consider yourself competent in anaphylaxis management?	137 (%37.7)	151 (%41.6)	75 (%20.7)
Can you effectively use the adrenaline autoinjector in anaphylaxis?	174 (%47.9)	111 (%30.6)	78 (%21.5)
Do you consider yourself sufficient in terms of managing an asthma attack?	69 (%19)	217 (%59.8)	77 (%21.2)
Would you analyze the risk factors of systemic diseases in the first examination and change your treatment plan accordingly?	277 (%76.3)	80 (%22)	6 (%1.7)
Do you use additional measures to reduce patients' stress? (music, movies, suggestions, etc.)	250 (%68.9)	101 (%27.8)	12 (%3.3)
Do you have any additional medication or supplies for possible uncontrollable bleeding?	245 (%67.5)	55 (%15.2)	63 (%17.4)

n: Number, CPR: Cardiopulmonary resuscitation, AED: Automated external defibrillator

The number of physicians who previously encountered a cardiac arrest case was 67 (18.5%), while the number of those who encountered a cardiac arrest case in the working environment was 95 (26.2%). 102 physicians (28.1%) expressed feeling competent to handle cardiac arrest. 22.3% (n=81) of the participants reported feeling competent in CPR, 61.4% (n=223) reported having previously received CPR training, and 12.1% (n=44) reported having previously applied CPR. While 78.8% (n=286) of the participants believed that dentists should know CPR, 10.7% (n=39) believed that CPR competence was unnecessary.

While 47.9% (n=174) of the respondents stated that their emergency drugs and equipment were regularly checked in the working environment, only 20.9% (n=76) reported that there were protocols and assignments for emergency medical applications in the working environment. 17.9% (n=65) of the participants reported being knowledgeable in AED use, 22.3% (n=81) reported that they can use an oral airway, 33.9% (n=123) reported previous experience in establishing vascular access, 70% (n=254) reported being able to measure blood pressure, 23.4% (n=85) reported feeling competent in managing a patient with chest pain and 37.7% (n=137) reported feeling competent in managing anaphylaxis. 174 participants (47.9%) reported feeling competent to use an adrenaline autoinjector, 69 (19%) reported feeling competent to manage asthma attacks, 127 (35%) reported being able to apply balloon-valve-mask, and 93 (25.6%) reported feeling competent to use the medication and equipment in the emergency kit. 277 (76.3%) reported identifying risk factors for systemic diseases and changing the treatment plan accordingly, 250 (68.9%) reported using additional methods (music, movies, indoctrination, etc.) to reduce the patient's stress, 245 (67.5%) reported keeping additional medication and equipment ready for possible uncontrollable bleeding. All answers and distribution ratios regarding the proficiency, knowledge, skills and experience of dentists in CPR are shown in Table 4.

Discussion

Today, dentists are at increased risk of encountering life-threatening cardiopulmonary arrest and other medical emergencies. Training on CPR and other emergencies is provided in the regular curriculum of the faculty of dentistry. However, since most faculties do not have practical or simulative model training, practical emergency medicine internships, the learned information is often not put into practice.[4] AHA and ERC recommend regular annual basic and advanced life support courses for dentists.[1,3]

As shown in the studies evaluating the incidence of cardiac arrest encounters among dentists, 0.002 cases/physician/year were noted in England, 0.011 in America, and 0.2% in Brazil.[4,5] The incidence of cardiac arrest encounters in the workplace was reported as 4% in Iran, 4.3% in Kuwait, and 23.3% in Oman.[4,6,7] According to the studies conducted in Turkey, Canpolat et al. reported the rate of cardiac arrest encounters as 2.6% in the workplace, while Ekici reported a rate of 1.3%.5,[8] In this study, the incidence of cardiac arrest encounters in the workplace was 26.2%. In the literature, a significant difference is observed between the incidence of cardiac arrest encounters in European, American, and Asian countries. On the other hand, we determined an even higher rate in current study. We think believe that the significant difference found in this study stems from the fact that the participants took part in the emergency medicine rotation during their studies at the university and considered it as a workplace, that they encountered more cardiac arrest

there, and that the participants generally worked in hospitals with emergency services. In addition, the studies conducted by Azad et al. and Khami et al. concluded that dentists could not correctly identify real emergencies and their characteristics.[9,10] Considering the publications in the literature showing that dentists cannot adequately identify emergency situations emergencies. Also considering that nearly half of the participants (44.6%) in this study reported not feeling competent in identifying cardiac arrest. It can be said that the participants may not be able to recognize cases of cardiac arrest, and therefore the incidence of cardiac arrest encounters is high.

Studies evaluating the competency of dentists to identify patients with cardiac arrest have shown that the rate of those who could not identify cardiac arrest was 41.29% in Poland, 54.4% in Brazil, and 49% in Slovenia, while only 34.2% of the participants reported feeling competent in identifying cardiac arrest in the study of Ekici.[4,8] Although we believe that practical applications will yield higher accuracy in evaluating CPR competence, surveys clearly reveal the deficiency in this regard.

Insufficient identification of gasping type breathing, which is one of the breathing patterns emphasized in the last two international CPR guidelines, and not knowing the importance of allowing the chest to relax during compression is a major deficiency and leads to inadequacy in making and applying CPR decisions at the initial stage.[1] We could not find an available study that specifically investigated these two parameters, so we were unable to comment on it.

In this study, dentists should know CPR shows the importance they attach to this matter. The study of Smereka et al. determined that 24.82% of dentists received CPR training, and half of the participants who received CPR training only received it at university.[4] A study which is conducted in India reported that less than half of the participants received CPR training at university and after graduation.[4] In the study of Singh et al., 75.9% of the participants were found to have received CPR training.[8] On the other hand, according to a study conducted in Britain, 93.9% of dentists received CPR training at university and 98.9% after graduation, which is a significant rate.[4] In the study conducted by Ekici in Turkey, it was reported that 73.7% received CPR training.[8] Considering the importance given to the matter by dentists, both university and post-graduate CPR training should be repeated at regular intervals.

A review of the international studies evaluating the competence of dentists in CPR showed that the rate of participants who did not feel competent in CPR was 41.29% in Poland, 54.4% in Brazil, and 49% in Slovenia.[2,4] In Turkey, Komerik et al. reported the rate of dentists feeling competent in CPR as 56%, while in this study, 22.3% of the participants reported feeling competent in CPR.[11] Evaluation of the studies indicates that most dentists do not feel competent in identifying cardiac arrest and performing CPR. Although we believe that practical applications will yield higher accuracy in evaluating CPR competence, surveys clearly show the deficiency in this regard.

In the evaluation of the questions about practices that measure the level of theoretical knowledge about CPR, and which are classified as Class 1 suggestions in the literature[1],[2]

1. In the evaluation of the state of consciousness, Jamalpour et al. reported the rate of correct answers as 25%, while Canpolat et al. reported a rate of 63.6%.5

2. In the literature, the rate of correct answers to the question of how respiratory control should be performed was 40.3% and 28.8%, respectively.[12,13]

3. The rate of correct answers to the question of what should be the heart massage/artificial respiration ratio in an adult patient was found as 56%, 71.4%, and 42.4% in the literature.[4,10,12] In this study, almost half of the participants did not know the compression/respiration ratio. Almost half of the participants did not know the compression/ventilation ratio.

4. The rate of correct answers to the question of how many chest compressions should be applied per minute was reported as, 27.6%, 28.8%, and 44.2% in the literature.[8,10] In the current study, this rate is low.

5. The rate of correct answers to the question of which drug to be used primarily during cardiac arrest was reported as 67%, 51.3% in the literature.[5,8]

In conclusion, theoretical knowledge and practices recommended by the international guidelines on CPR as Class 1 were very low.

In the study conducted by Jamalpour et al. among Iranian dentists, it was shown that 39% of the participants could not answer any question correctly.[5] In the study of Irfan et al., 58.3% of the participants scored less than 50%.12 In the study of Ekici, the results were more satisfactory, and the

participants were accepted to possess theoretical knowledge since 44.7% answered more than half of the questions correctly.[8] In studies conducted in Brazil, Iran, and Kuwait, the rate of correct answers for theoretical questions was 46%, 37%, and 36%, respectively.[4,6,8] In this study, the rate of correct answers to theoretical questions was determined as 47.1%, which is significantly higher than in other studies. Many studies in the literature have reported a positive correlation between previous CPR training after graduation and theoretical knowledge.[12] Likewise, a significant relationship was found between having received CPR training and a total score.

The rate of AED possession was found to be 4.4%.9 Although we cannot prove the accuracy of the answers with practical application, it is clear that dentists have insufficient information about the AED.

Although cardiac arrest is the most important medical emergency that requires the fastest intervention, anaphylaxis progression is another emergency that dentists must be competent to manage, as it has the potential to rapidly degenerate into cardiac arrest. In the study of Smereka et al., only 44.86% of the participants felt competent in anaphylactic shock, which was reported as 20.8% in the study of Girdler and Smith.[4] Although 37.7% of the participants in this study reported feeling competent in managing anaphylaxis, the rate of correct answers to the question about adrenaline dosing in anaphylaxis was 27%, resulting in inconsistency. In the study of Kishimoto et al., the competency to diagnose and treat anaphylaxis improved dramatically after the participants took part in training programs.[15] In light of this information, we believe that it will be highly beneficial to include these subjects in the undergraduate curriculum and continue practical training such as anaphylaxis management and adrenaline autoinjector use.

In the study of Komerik et al., only 26% of the participants reported feeling competent to intervene in angina, while in the study of Arsati et al., 79.7% of the participants stated that they did not feel competent in the management of myocardial infarction.[4,11] As demonstrated both by the literature and current study, dentists also have limited competence and knowledge about important medical emergencies such as anaphylaxis and chest pain other than cardiac arrest.

In the section on competence in interventional procedures, dentists in the study of Arsati et al. found themselves competent in intramuscular and subcutaneous injections, but insufficient in establishing vascular access.[4] In the study of Canpolat et al., it was found that 71.4% of the participants had not attempted to establish intravenous access before, and the rate of those who thought that they could establish vascular access was 28.6%.5 In the study of Ekici, 30.3% of the participants stated that they could insert an oropharyngeal airway, 35.5% could use a bag-valve-mask, and 25% could insert vascular access.[8] In this study, the rate of oral airway insertion, vascular access insertion, blood pressure arterial (TA) measurement, and bag-valve-mask application were found to be similar. In the study of Tanzawa et al., it was determined that 22% of the participants could use pulse oximetry, which was 68% in the study of Ekici.[8,16] This information clearly reveals that dentists are not competent in interventional procedures and that these skills should be developed with practical training.

Providing training for the personnel in the same team, medication-equipment control, emergency protocol, and assignment are as important as the theoretical and practical training of the physician in the prevention of fatal medical emergencies. According to the 33rd Article of the Regulation on Private Health Institutions Providing Oral and Dental Health Services published in the Official Gazette dated 03.02.2015 and numbered 29256 in Turkey, an emergency kit, oxygen tube, and mask and cuffed sphygmomanometer (adult and child size) should be available in all dentist outpatient clinics, while the seventh annex of the same article specifies the equipment that should be available in the emergency kit. In the study of Stafuzza et al., it was stated that only 28% of the participants could use emergency medical supplies, while in the study of Alhamad et al., 33% of the participants felt incompetent in using medication and medical equipment.[4,17] Despite the legal requirement of specified equipment and medicine, it is a serious contradiction that the competence of dentists is rather low. On the other hand, in the study conducted by Al Hassan et al. in Saudi Arabia, it was found that 54% of the participants had an emergency protocol and only 11% of them practiced it periodically.[18] In the study of Al Ghanam et al., it was stated that 36.1% of the participants had a CPR protocol in their clinics.[7] This study, clearly shows that this issue is not taken very seriously. Although previous studies have clearly revealed the importance of periodic personnel training, creating an emergency

chart, and taking anamnesis in preventing medical emergencies.[4,7,19]

In the study of Al Iryani et al., it was reported that 96% of the dentists received detailed medical anamnesis, which was reported as 44.86% in the study of Smereka et al. and 97.6% in the study of Alkandari et al.[4,19] The importance of taking anamnesis before any kind of medical intervention is undeniable. Apart from this, we believe that applications such as music, movies, etc. can be useful in reducing the pre-procedural stress of patients.

The reason for our lengthy discussion section stems from our desire to examine all the problems that may be encountered in dental practice. Approximately 50 questions in our survey allowed us to thoroughly examine the subject in all its aspects.

Conclusion

In conclusion, we suppose that dentists in Turkey are not adequately prepared for medical emergencies, pre- and post-graduate education is not sufficient, and regular CPR and medical emergency training should be repeated after graduation to ensure that knowledge and skills are maintained at a competent level. In addition, it is necessary to include an OED device among required materials and medication, to be competent in the indications of all equipment and drugs, to provide training for the personnel in the same team, and to develop and regularly monitor emergency planning. We suppose that regular inspection and accreditation of these by health authorities will significantly decrease mortality and morbidity.

Conflict of interest

None of the authors of this article has any relationship, connection or financial interest in the subject matter or material discussed in the article.

Sources of Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Panchal AR, Bartos JA, Cabañas JG, et al. Part 3: Adult Basic and Advanced Life Support: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. Published online October 20, 2020. doi:10.1161/cir.0000000000000916

2. Soar J. European Resuscitation Council Guidelines 2021: Adult advanced life support. www.cprguidelines.eu. Published March 2021. Accessed April 2021. https://www.cprguidelines.eu/assets/guidelines/RESUS-8903-ALS.pdf

3. Garcia-perez MA, Nunez-anton V. Cellwise Residual Analysis in Two-Way Contingency Tables. Educational and Psychological Measurement. 2003;63(5); 825-839).

4. Smereka J, et al. "Preparedness and attitudes towards medical emergencies in the dental office among Polish dentists." International Dental Journal 69.4 (2019): 321-328.

5. Canpolat, DG, et al. "Diş hekimlerinin kardiyopulmoner resüsitasyon bilgi düzeylerinin değerlendirilmesi." Gaziantep Medical Journal 22.4 (2016): 197-201.

6. Kavari SH, Chohedri AH. Cardiopulmonary resuscitation: Knowledge and personal experience in Iranian dentists. Pak J Med Sci. 2007;23:296-7.

7. Al G, Manal A, and Mohammad K. "Preparedness of Dentists and Dental Clinics for Medical Emergencies in Jordan." Materia Socio-medica 34.1 (2022): 60.

8. Ekici, Ö. Cardiopulmonary Resuscitation Knowledge and Experience Among Dentists in Turkey. Eurasian J Emerg Med. 2020;19(4): 226-31

9. Azad A, Talattof Z, Deilami Z, Zahed M, Karimi A. Knowledge and attitude of general dentists regarding common emergencies in dental offices: A cross-sectional study in Shiraz, Iran.Indian J Dent Res 2018;29:551-555

10. Khami MR, Yazdani R, Afzalimoghaddam M, Razeghi S, Moscowchi A. Medical emergency management among Iranian dentists. J Contemp Dent Pract 2014;15:693-8.

11. Kömerik N. Serbest Diş Hekimleri ve Tıbbi Acil Durumlar. Dental practitioners and medical emergencies. Turkiye Klinikleri J Dental Sci. 2003;9(2):86-92.

12. Irfan B, et al. Current state of knowledge of basic life support in health professionals of the largest city in Pakistan: a cross-sectional study. BMC health services research 19.1 (2019): 1-7.

13. Nogami K, Taniguchi S, Ichiyama T. Rapid deterioration of Basic Life Support skills in dentists with Basic Life Support healthcare provider. Anesth Prog 2016 63: 62–66. © 2019 FDI World Dental Federation.

14. Quality standards for cardiopulmonary resuscitation practice and training. Primary dental care – Quality standards; 2013. Available from: https://www.resus.org.uk/quality-standards/primary-dental-care-quality-standards-for-cpr/. Accessed 29 June 2018.

15. Kishimoto N, Mukai N, Honda Y, Hirata Y, Tanaka M, Momota Y. Simulation training for medical emergencies in the dental setting using an inexpensive software application. Eur J Dent Educ 2017;09:09.

16. Tanzawa T, Futaki K, Kurabayashi H, et al. Medical emergency education using a robot patient in a dental setting. Eur J Dent Educ 2013;17:e114–e119

17. Stafuzza TC, Carrara CF, Oliveria FV, Santos CF, Oliveria TM. Evaluation of the dentists' knowledg eon medical urgency and emergency. Braz Oral Res 2014; 28: 1-5.

18. Al-Hassan M, and Sakher A. Preparedness of dental clinics for medical emergencies in Riyadh, Saudi Arabia. The Saudi dental journal 31.1 (2019): 115-121.

19. Al-Iryani GM, et al. Knowledge and preparedness of dental practitioners on management of medical emergencies in Jazan Province. Open access Macedonian journal of medical sciences 6.2 (2018): 402.