

Dentists' Attitudes Toward Up-To-Date Cardiopulmonary Resuscitation Guidelines

Melih Yüksel¹, Veysi Eryiğit², Ulaş Karaaslan², Caner Sağlam³

¹Department of Emergency Medicine, Balıkesir University Faculty of Medicine, Balıkesir, Turkey

²Department of Emergency Medicine, Balıkesir State Hospital, Balıkesir, Turkey

³Department of Emergency Medicine, Gazi Yaşargil Training and Research Hospital, Diyarbakır, Turkey

Abstract

Aim: During dental treatment, it is possible to encounter cases of cardiac arrest, although their incidence is rare. Thus, it is necessary for dentists to be well prepared for medical emergencies (ME). The purpose of this study is to examine dentists' theoretical and practical knowledge of up-to-date cardiopulmonary resuscitation (CPR) guidelines and to investigate what can be done to correct the deficiencies detected.

Materials and Methods: Data were gathered using a questionnaire consisting of multiple choice questions covering the current CPR issues. It was completed by the dentists through face-to-face interactions or e-mail between 01.09.2014 and 31.12.2014

Results: A total of 90 dentists, 75 of whom worked in public sectors (83.3%) and 15 of whom were in private practice (16.7%). The average distribution of the correct answers of the participants working in public sector was 33.93 ± 17.54 , whereas it was 24.33 ± 17.51 for the participants in private practice. The mean score of the participants who stated that they participated in CPR courses after graduating from dental schools was 38.06 ± 19.82 ($n=31$, 34.4%), whereas the mean score of the participants who did not attend CPR courses was 29.32 ± 16.01 ($n=59$, 65.6%). A statistical significant difference between values was found ($p=0.026$).

Conclusion: The participants' level of information about CPR was lower than expected. It is strongly recommended that the syllabus related to CPR in the dental faculties should be revised and dentists' participation in CPR courses after graduation should be promoted. (*Eurasian J Emerg Med* 2015; 14: 177-82)

Keywords: Emergency medicine, dentist, cardiopulmonary resuscitation, basic life support

Introduction

Cardiopulmonary arrest (CPA) is a sudden and an unexpected stop in patients' breathing and/or circulation for no reason. On the other hand, cardiopulmonary resuscitation (CPR) includes all the practices and efforts for bringing a person who is in cardiac arrest back to life.

For the past 50 years or so, early recognition and activation, immediate CPR, defibrillation, and the basic principles of accessing urgent medical care have saved hundreds of thousands of people's lives worldwide. These examples show the importance of resuscitation researches and application of those practices in clinics (1). In the current guidelines, CPR is examined under two sub-headings including basic life support (BLS) and advanced cardiac life support (ACLS), which are subsequent and inseparable.

During dental treatment, it was reported that cases of cardiac arrest were seen on some occasions, although they were rare (2-4). The health practitioners including dentists must be well prepared for medically urgent situations (5-8). The aim of this study is to examine dentists' medical practices of the current CPR guidelines and to recognize the precautions that should be followed to correct the deficiencies identified.

Materials and Methods

This study includes dentists working in public sectors and those in private practice in Turkey. Moreover, the study involves a multiple choice test that aims to investigate dentists' medical practices based on the current CPR guidelines and a questionnaire, the purpose of which is to identify the reasons of deficiencies detected during appli-

Correspondence to: Melih Yüksel e-mail: melihdr@gmail.com

Received: 18.02.2015

Accepted: 17.06.2015

©Copyright 2015 by Emergency Physicians Association of Turkey - Available online at www.eajem.com
DOI: 10.5152/eajem.2015.25991



cation. The data were collected between 01.09.2014 and 31.12.2014 via face-to-face interactions or e-mail. For this study, an approval from the Ethical Review Board of the Balıkesir University Faculty of Medicine was obtained.

Researchers administered a multiple choice test that aimed to identify dentists' medical practices with regard to the current CPR guidelines. By examining up-to-date CPR guidelines and by identifying changes, researchers prepared a test including 20 multiple choice questions that aimed to investigate the extent of information that the dentists had about CPR and how they practiced it (Appendix 1). Researchers also prepared a questionnaire consisting of 14 questions that aimed to discover the underlying reasons of deficiencies identified and to identify the steps that can be taken to prevent them (Appendix 2).

Statistical analysis

In the study, IBM Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA), version 22.0, was used for analyzing the data. The answers of the questions asked during the questionnaire were entered as true or false. The sum of the correct answers were calculated and completed to 100. In this manner, the rate of correct answers was found. First, Fisher's exact test was used for comparing groups with categorical variables. Second, independent sample t test and Mann-Whitney U test were used for comparing the two groups according to parametric assumptions based on the comparison of constant data of the groups. Finally, statistical analysis of Kruskal-Wallis H test was applied while comparing more than two groups. A p value of <0.05 was considered to be statistically significant.

Results

Ninety dentists, of whom 75 worked in public sectors (83.3%) and 15 were in private practice (16.7%), participated in our study; 53 of the participants were male (58.9%) and 37 were female (41.1%). Thirty-eight of the participants (42.2%) were aged between 34 and 43 years. The average distribution of the correct answers of the participants working in a public sector was 33.93 ± 17.54 , whereas it was 24.33 ± 17.51 for the participants working in private practice ($p > 0.05$) (Table 1). When the average distribution of the rate of the correct answers according to the length of working time was examined, a dentist working for 1–5 years ($n=15$, 16.7%) scored 34.67 ± 15.17 . On the other hand, a dentist who had a working time of more than 16 years ($n=39$, 43.3%) scored 28.85 ± 18.15 . No statistical difference existed between the groups ($p=0.247$). Participants who claimed to have used CPR before ($n=5$, 5.6%) scored 38 ± 11.51 , whereas participants stating that they never used CPR ($n=85$, 94.4%) had a score of 32 ± 18.1 ($p=0.362$). The mean score of the participants stating that

Table 1. The average distribution of dentists' correct answers according to their institutions

	n	%	Mean \pm SD	Min-Max	p
Public	75	83.3	33.93 ± 17.54	0–75	0.074*
Private	15	16.7	24.33 ± 17.51	0–55	
Total	90	100.0	32.33 ± 17.8	0–75	

*Analysis of Mann-Whitney U test. SD: standard deviation; Min: minimum; Max: maximum

they received theoretical CPR training ($n=72$, 80%) was 34.17 ± 16.95 , whereas that of the participants claiming that they got practical training ($n=72$, 80%) was 34.86 ± 15.79 . Moreover, the mean score of the participants who stated that theoretical and practical CPR training were inadequate at the faculties of dentistry ($n=66$, 73.3%) was 30.68 ± 16.41 (Table 2). It was found that the participants who declared that they enrolled for a CPR course after graduating from dental school ($n=31$, 34.4%) had a mean score of 38.06 ± 19.82 , whereas the mean score of the participants claiming that they did not attend any CPR courses ($n=59$, 65.6%) was 29.32 ± 16.01 . There was a statistically significant difference between the scores ($p=0.026$). Eighty of the participants found CPR course to be important, and 61 of them (67.8%) claimed that CPR course should be conducted at least once a year (Table 3).

Discussion

To date, the guideline published by American Heart Association (AHA) in 2010 has been the most comprehensive and up-to-date guideline for resuscitation. The guideline was based on 2010 International Consensus on Cardiopulmonary Resuscitation (9). According to this guideline published in 2010, the application of BLS was divided into two, as being a health practitioner and not. Particularly, there are various studies assessing the health practitioners' knowledge and skills of the current BLS and first aid (10). In the literature, there have been some studies evaluating dentists' points of view regarding BLS and various matters regarding urgent situations. However, the number of these studies is insufficient.

In dental clinics, there is a possibility of encountering medical emergencies (ME). Nevertheless, the number of ME cases has notably increased with the increasing number of elderly patients having comorbid disorders. The cases reported have generally been syncope, hypertensive crisis, etc. However, in a study conducted in 2000s, 20 cases of death were reported over 10 years. Among the ME cases encountered in dental clinics, the rate of CPA cases was 1.1%–1.4% (11).

In a study involving multiple choice questionnaire and conducted with 182 intern dentists, 34% of participants stated that they encountered ME at least once, 96% of participants declared that courses of BLS were required for dentists, and 56% of them claimed that they had the necessary training for practicing BLS. In this study, it was also suggested that the syllabus related to ME at dental schools needs to be improved (12). In a study conducted by Staffuza et al. (13) including 100 dentists, 87% of the participants stated that they received BLS training; on the other hand, 43% of them declared that they had necessary qualifications for practicing BLS. The percentage of the participants expressing that they received BLS training during dental school was 69%, whereas 37% of the participants took the course during postgraduate education. In the same study, it was suggested that dentists' knowledge and practices of ME should be improved (13).

It is understood from the studies mentioned above that various ME cases may be encountered in dental clinics. Those may include a wide range of situations from hypertensive crisis, syncope, and angina pectoris to CPA cases. Dentists are called as health professionals; thus, it is necessary for them to have the skills and knowledge to deal with ME. However, when the results of the study were considered, it was clearly seen that most of the dentists did not have the required qualifications to be able to deal with a ME.

Table 2. The average distribution of dentists' correct answers according to their education, experience, and working time

		n	%	Mean±SD	Min-Max	p
Working Time	1–5	15	16.7	34.67±15.17	15–70	0.247 ^{&}
	6–10	16	17.8	30.63±16.72	0–50	
	11–15	20	22.2	38.75±18.98	10–75	
	16–	39	43.3	28.85±18.15	0–70	
CPR Theoretical training	Yes	72	80.0	34.17±16.95	0–75	0.064 [#]
	No	18	20.0	25±19.7	0–65	
CPR Practical training	Yes	36	40.0	34.86±15.79	0–75	0.274 [*]
	No	54	60.0	30.65±18.98	0–75	
CPR Training at the Faculties of Dentistry	Both practical and theoretical classes are inadequate	66	73.3	30.68±16.41	0–70	0.783 ^{&}
	Theoretical classes are adequate but practical classes are not	15	16.7	37.67±22.35	0–75	
	Both practical and theoretical classes are adequate	5	5.6	34±13.87	20–50	
	Both practical and theoretical classes are relatively adequate	4	4.4	37.5±27.23	15–75	
Previously Practicing CPR	Yes	5	5.6	38±11.51	25–50	0.362 [#]
	No	85	94.4	32±18.1	0–75	
Postgraduate participation in CPR courses	Yes	31	34.4	38.06±19.82	0–75	0.026 [*]
	No	59	65.6	29.32±16.01	0–70	

*Analysis of independent Sample t test, [#]Mann–Whitney U test. [&]Analysis of Kruskal–Wallis H test; SD: standard deviation, Min: minimum; Max: maximum; CPR: cardiopulmonary resuscitation

Table 3. Data about CPR course

		n	%
Where did you take CPR course?	At the hospital I work	13	14.4
	With the help of the organization of Provincial Directorate of Health or Association of Public Hospital	5	5.6
	By means of labor organizations or associations	13	14.4
	None	59	65.6
How many times did you attend CPR courses?	1–5 times	31	34.4
	None	59	65.6
Is CPR course required?	Yes	80	88.9
	No	10	11.1
How often should CPR courses be taken?	At least once a year	61	67.8
	Once in every 3 years	18	20
	Once in every 5 years	4	4.4
	No answer	7	7.8

CPR: cardiopulmonary resuscitation

Ninety dentists, 75 of whom worked in a public sector (83.3%) and 15 of whom were in private practice (16.7%), participated in our study. There used to be an imbalance between participants working in a public sector or in private practice. The reason for this situation was that the dentists working in private practice were mostly un-

willing to participate as opposed to the dentists working in a public sector. Although there was no clear statistical difference between dentists working in private practice and in public sectors, the mean scores of dentists working in a public sector were higher than those working in private practice. We believe that the probable reason for

this is that the participants in a public sector might have attended an easier CPR training than those in private practice due to their institutional policy. Moreover, most of the dentists working in a public sector could be regarded as young, while the participants working in private practice were mostly older. In this regard, we have a notion that the duration of time passed after graduation may be an explanation for the difference between scores. The dentists working for 1–5 years ($n=15$, 16%) had a score of 34.67 ± 15.17 , whereas the dentists working for more than 16 years ($n=39$, 43.3%) had a score of 28.85 ± 18.15 . Thus, it was understood that the knowledge of young dentists was better than the knowledge of those who graduated from dental schools several years ago. Nevertheless, the revelation that mean scores for both groups were 32.33 ± 17.8 leads to many problems. Unfortunately, all of the participants' level of information was considerably below than that expected. CPR is an urgent medical situation that all health professionals should know about both legally and ethically. It may yield better results if the faculties of dentistry in our country devote more time and revise the curriculum.

Medical emergencies covers a wide range of subjects mentioned above. The topic of our study is limited to CPR. The level of dentists' approaches to emergencies is not fully known to us. With the help of various studies conducted in the future in our country, it will be possible to acquire the required data and use it to improve the quality of education.

The mean scores of dentists encountering CPR cases before were found to be higher than those of dentists who did not. Thus, the dentists who encountered CPR cases relatively often may have more up-to-date information. The scores of the dentists stating that they received theoretical CPR training during dental schools were higher than those of dentists who did not. Moreover, this situation was similar to practical CPR training. Thus, it is possible to say that the participants receiving more qualified CPR training applied these skills during emergencies in a better manner.

Most of the participants ($n=66$, 73.3%) found practical and theoretical trainings for CPR in the faculties of dentistry inadequate. It was strange that 20% of 90% participants stated that they did not receive any theoretical CPR courses, and 60% of the participants claimed that they did not receive any practical CPR training; 73.3% of them considered that the theoretical and practical CPR trainings during dental schools were not enough. When the results of this study are considered, it is obvious that the syllabus of the faculties of dentistry should be improved and all the necessary precautions must be taken immediately.

Several dentists considered that receiving a CPR course after graduation was required, and most of them stated that this course should be taken at least once a year. The mean scores of the dentists attending CPR courses after graduating from dental schools were found to be higher than those of the dentists who did not ($p=0.026$). In this case, it was obvious that the dentists were enthusiastic about improving the level of their CPR knowledge and wanted those courses to be organized more often. However, the rate of participation in CPR trainings after graduation was found to be low. We hope that CPR course organizers should take the low rate of attendance, despite the high level of enthusiasm, into consideration while designing courses. It is necessary for dentists to follow those courses designed by miscellaneous institutions and associations with great interest. The most crucial point was that the scores of dentists receiving CPR training

after graduation were higher than those of the dentists who did not. With regard to this result, it is obligatory for dentists to receive CPR courses after or during dental schools.

Study limitations

There are some limitations of this study. The most significant limitation is the imbalance between the number of dentists working in a public sector and in private practice. Moreover, the dentists working in private practice put up a strong resistance to participate in the study. Answering questions in the survey via e-mail might be a limitation of the study.

Conclusion

It is probable to encounter ME cases in dental clinics. The level of information that the dentists had about CPR was found to be lower than expected targets. Moreover, dentists considered that not only theoretical but also practical trainings in the faculties of dentistry were inadequate. They also found it necessary to take courses after graduation. The syllabus of CPR in dental schools needs to be revised, and dentists' participation in courses should be fostered. Additional comprehensive studies are needed and having more detailed information is recommended.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Balikesir University Faculty of Medicine.

Informed Consent: Since the paper is a survey article and the data was collected under a voluntary basis, there has been no need for an approval form.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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

References

- Travers AH, Rea TD, Bobrow BJ, Edelson DP, Berg RA, Sayre MR, et al. Part 4: CPR overview: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation 2010; 122(Suppl 3): S676-84. [CrossRef]
- Brahms D. Death in the dentist's chair. Lancet 1989; 2: 991-2. [CrossRef]
- Hunter PL. Cardiac arrest in the dental surgery. Br Dent J 1991; 170: 284. [CrossRef]
- McCarthy FM. Emergencias en odontología. Buenos Aires: WB Saunders 1972; 281-92.
- Chapman PJ. A questionnaire survey of dentists regarding knowledge and perceived competence in resuscitation and occurrence of resuscitation emergencies. Aust Dent J 1995; 40: 98-113. [CrossRef]
- Hussain I, Matthews RW, Scully C. Cardiopulmonary resuscitation skills of dental personnel. Br Dent J 1992; 173: 173-4. [CrossRef]
- Chate RA. Evaluation of a dental practice cardiopulmonary resuscitation training scheme. Br Dent J 1996; 181: 416-20. [CrossRef]
- Chapman PJ. Medical emergencies in dental practice and choice of emergency drugs and equipment: a survey of Australian dentists. Aust Dent J 1997; 42: 103-8. [CrossRef]
- Hazinski MF, Nolan JP, Billi JE, Böttiger BW, Bossaert L, de Caen AR, et al. Part 1: Executive summary: 2010 International Consensus on Cardio-

- pulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Circulation* 2010; 122(Suppl 2): S250-75. [CrossRef]
10. Demirtaş Y, Yolcu Ş, Eryiğit V, Mahsanlar Y, Değerli V, Parlak İ. Residents practical applications of updated cardiopulmonary resuscitation guidelines. *İzmir Eğitim ve Araştırma Hastanesi Tıp Dergisi* 2014; 18: 43-50.
 11. Carvalho RM, Costa LR, Marcelo VC. Brazilian dental students' perceptions about medical emergencies: a qualitative explorative study. *J Dent Educ* 2008; 72: 1343-9.
 12. Elanchezhiyan S, Elavarasu S, Vennila K, Renulkadavi R, Mahabob MN, Sentilkumar B, et al. Awareness of dental office medical emergencies among dental interns in southern India: an analytical study. *J Dent Educ* 2013; 77: 364-9.
 13. Stafuzza TC, Carrara CF, Oliveria FV, Santos CF, Oliveria TM. Evaluation of the dentists' knowledge on medical urgency and emergency. *Braz Oral Res* 2014; 28: 1-5. [CrossRef]

Appendix 1. Basic life support questions asked to the dentists

1. Should be your goal for the cycles/ventilation rate and chest compression depth while intervening alone to adult victims with cardiopulmonary arrest before advanced airway compression is made?
A) 30 compressions, 2 ventilations, and 5 cm depth
B) 15 compressions, 1 ventilation, and at least 5 cm depth
C) 30 compressions, 2 ventilations, and at least 5 cm depth
D) 15 compressions 2 ventilations, and at least 5 cm depth
2. Which of the following is recommended in the current guidelines regarding basic life support?
A) Checking whether the patient breathes or not by using "Look, Listen, Feel" method
B) Punching the heart before starting CPR
C) Applying at least 100 chest compressions per minute
D) Giving two rescue breaths immediately before starting chest compressions
3. What should compression/ventilation ratio be for adult patients who are given cardiopulmonary resuscitation after advanced airway compression is provided?
A) 30 compression and 2 ventilations
B) 15 compressions and 3 ventilations
C) At least 100 compressions and 3 ventilations per minute
D) At least 100 compressions and 1 ventilation in every 6–8 seconds
4. Which artery should health care workers use while checking the pulse of unconscious patients?
A) Radial artery
B) Dorsalis pedis
C) Carotid artery
D) Tibialis posterior
5. Which of the following is correct about chest compression and depth?
A) Chest compression is at least 100 times and depth is 3 cm per minute
B) Chest compression is at least 100 times and depth is 5 cm per minute
C) Chest compression is 100 times at most and depth is at least 4 cm per minute
D) Chest compression is 100 times at most and depth is at least 5 cm per minute
6. What do you do first to understand the medical situation on encountering a person lying still on the street?
A) I check his/her consciousness.
B) I check the pulse
C) I check whether he/she breathes
D) I call 112

Appendix 1. Basic life support questions asked to the dentists (continued)

7. While walking in the street you realized that a person lying still on the street has no pulse and does not breathe. You are the only one at the scene. What do you do first?
A) I perform CPR
B) I give rescue breathes
C) I call 112
D) I raise his/her legs
8. Imagine you see a person lying still on the beach and learn that he/she drowned while swimming. You realize he has no pulse and does not breathe, and you are the only one at the place; what do you do first?
A) I call 112 after conducting CPR for 2 minutes
B) I call 112 first
C) I give rescue breathes
D) I give a massage to the stomach
9. Which of the following is excluded from the Basic Life Support manual published in 2010, although it was included in the previous guidelines?
A) At least 100 times chest compressions in adults per minute
B) Look-Listen-Feel application for respiratory control
C) At least chest compression at a depth of 5 cm for an adult
D) Activation of the emergency medical system
10. You are in a clinic and a nurse tells you that a patient is getting worse. You realize that the patient has no pulse and does not breathe. What is the order of the things that you are supposed to do?
A) I tell the nurse to activate blue code or 112, and I start CPR
B) I want the patient to be monitored immediately and ECG to be taken
C) I give 2 rescue breathes first and continue pulse control
D) I tell the nurse to activate blue code or 112, and I administer adrenaline

CPR: cardiopulmonary resuscitation; ECG: electrocardiography

Appendix 2. Demographic and clinical information about the dentists

1. How old are you?
2. What is your gender?
3. What institution do you work for?
4. How long have you been working as a dentist?
5. Did you have any theoretical training about CPR while studying at the Faculty of Dentistry?
6. Did you have any practical (applied) training about CPR while studying at the Faculty of Dentistry?
7. Please tick the nearest option to your opinion regarding CPR training at the Faculty of Dentistry
8. Have you ever perform CPR before?
9. Where did you perform CPR?
10. Have you attended a CPR course after graduating from the Faculty of Dentistry
11. If your answer is "yes," where did you take that course?
12. How many times have you participated in a CPR course after graduating from the Faculty of Dentistry?
13. As a dentist, do you think CPR courses are required?
14. How often must CPR courses be given to the dentists?

CPR: cardiopulmonary resuscitation