EVALUATION OF CARDIOPULMONARY RESUSCITATION SKILLS OF DENTAL STUDENTS & HOUSE OFFICERS

[1]MUSTAFA SAJID,[2]MUHAMMAD JAMIL,[3]REEMA KOUSER, [4]SHARINA NAZ,[5]MOHSIN JAVEED

ABSTRACT

Cardiopulmonary arrest (CPA) is a sudden and an unexpected halt in patients' breathing and/or circulation for multiple reasons.[1] Cardiopulmonary resuscitation (CPR) can double or triple the likelihood of survival after cardiac arrest.[6]

The aim of this study was to examine dentists' medical practices of the current CPR guidelines and to recognize the precautions that should be followed to correct the deficiencies identified. Two groups of participants were invited to participate. In group A 3rd year BDS students were taken and in group B dental house surgeons were selected at Dental Section of Multan Medical and Dental College, Multan. CPR knowledge was assessed by written objective paper. Practical skills were assessed by SimMan(high-fidelity simulator). In the MCQs ,there was no significant difference in the performance of students and house officers (P value>0.01) because eight out of thirty students achieved the passing criteria in group A and ten out of thirty passed in group B. Not a single candidate passed the practical session in either group. It can be concluded from this study that dental students dental house officers have poor level of training and knowledge on medical emergencies and cardiopulmonary resuscitation.

Key Words: *Cardiopulmonary arrest (CPA), Basic Life Support(BLS),Medical Emergency (ME) Cardiopulmonary Resuscitation (CPR).*

INTRODUCTION

Cardiopulmonary arrest (CPA) is a sudden and an unexpected stop in patients' breathing and/or circulation for because of multiple reasons.[1] Cardiac arrest continues to be a leading cause of death in many regions of the world.[2-5] Cardiopulmonary resuscitation (CPR) can double or triple the likelihood of survival after cardiac arrest.[6] 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.[7]

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. The health practitioners including dentists must be well prepared for medically urgent situations.[1]

All health professionals, including dentists, must be well trained to attend to and manage medical emergencies. Besides training in basic techniques of resuscitation, such as mouth to mouth ventilation combined with cardiac compression, other procedures can also be useful. Dentists should have at hand and be trained to use a laryngoscope, oropharyngeal tube, Ambu mask, oxygen balloon and drugs, such as epinephrine, lidocaine0.[8]

In dental clinics, there is a possibility of encountering medical emergencies (ME). Nevertheless, the number of medical emergencies cases has notably increased with the increasing number of elderly patients having medical 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%1.

The aim of this study is to examine dentist's medical practices of the current CPR guidelines and to recognize the precautions that should be followed to correct the deficiencies identified.

Cardiopulmonary resuscitation skills are mandatory for every dentist. But unfortunately dentists have

[1] Mustafa Sajid, BDS, FCPS, Assisstant Professor, Multan Medical and Dental College, Multan For Correspondence: House 9-D, Y-Block, Housing Colony, Layyah
Email: mustafa_sajid_@hotmail.com
Cell: 0313-6705216, 0300-0870781

[2] Jamil, BDS, MSC (Bristol), FDSRCS (Edinburg), Associate Professor, Multan Medical and Dental College, Multan Cell: 0333-7615146

[3] Reema Kouser, BDS, MSPH, Assistant Professor, Multan Medical and Dental College, Multan Email: dr_reemz@hotmail.com

[4] Sharina Naz, BDS, FCPS, Assistant Professor, King Khalid University, Abha, Saidi Arabia Multan Medical and Dental College Jahngirabad Multan Cell: 0300-6382817

[5] Mohsin Javaid, BDS, Demonstrator, Multan Medical and Dental College, Multan Email: drmohsinjavaid@hotmail.com
Cell: 0313-6521888

poor knowledge and clinical skills of cardiopulmonary resuscitation. So training sessions and testing systems for cardiopulmonary resuscitation should be implemented regular basis for dentists.

METHODOLOGY

According to American Heart Association CPR is defined as "In case of cardiac arrest to the patient with no breathing and no pulse, a rescuer should begin with 30 chest compressions followed by 2 breaths is termed as cardiopulmonary resuscitation."[9] Two groups of participants were invited to participate. In group A 3rd year BDS students were taken and in group B house surgeons of BDS students were selected at dental section of Multan Medical and Dental College, Multan. Participants were selected randomly. Study design is randomized control trail. CPR knowledge was assessed by written objective paper. Practical skills was assessed by SimMan (high-fidelity simulator). Objective paper contained eighteen true false and seven were multiple choice questions. Questions were completed in 20 Minutes. Each question carried one mark and 50% marks were considered as passing marks. Topics tested are shown in Table 1.

The SimMan (a high-fidelity simulator) practical tested the ability of candidate to perform CPR. Special attention was paid to initial assessment, ventilation, volume and rate, force, rate and rhythm of compression. According to American heart association 2015 guide lines following criteria of CPR was assessed;

- Check for responsiveness is No breathing or only gasping (ie, no normal breathing) and no definite pulse felt within 10 seconds (Breathing and pulse check can be performed simultaneously in less than 10 seconds)

- Two hands should be on the lower half of the breastbone (sternum)

- Compression rate is modified to a range of 100 to 120/min.

- Compression depth for adults is modified to at least 2 inches (5 cm) but should not exceed 2.4 inches (6 cm).

- To allow full chest wall recoil after each compression, rescuers must avoid leaning on the chest between compressions.

- The rescuer is to initiate chest compressions before giving rescue breaths (C-A-B rather than A-B-C) to reduce delay to first compression. The single rescuer should begin CPR with 30 chest compressions followed by 2 breaths.

- For patients with ongoing CPR and an advanced airway in place, a simplified ventilation rate of 1 breath every 6 seconds (10 breaths per minute) is recommended.

RESULTS

In the MCQs, there was no significant difference in the performance of students and house officers (P value >0.01) because eight out of thirty students achieved the passing criteria in group A and ten out of thirty passed in group B.

In practical test each participant was expected to spend an initial 10-15 seconds assessing the patient consciousness, clearing airway, checking breathing and palpating the carotid pulse. Twenty five in group A and twenty in group B failed to assess the patient initially Twenty seven students in group A and twenty one students in group B failed to achieve adequate compression rate per minute. Twenty three in group A and twenty one students in group B failed due to placement of wrong hand position for chest compressions. Twenty two students in group A and twenty one students in group B failed due to inadequate ventilation rate. Not a single candidate passed the practical session in either groups.

TABLE 1: MCQS TEST PATTERN

Topics	No. of Questions
General CPR theory	10
Ventilation	5
Management of Ventricular fibrillation	3
Management of Asystole	3
Ventricular extrasystole	2
Electromechanical dissociation	1
Drugs/Dose	1

TABLE 2: RESULT OF OBJECTIVE PAPER

Group	Achieving 50% marks
A	8(26.6%)
B	10(33.3%)

TABLE 3: RESULTS OF CPR PERFORMANCE ASSESSMENT

	Group A N=30	Group B N=30
Failure in initial assessment	25(83%)	20(67%)
Failure due to compression rate error	27((90%)	21(70%)
Failure due to ventilation rate error	22(73%)	21(70%)
Failure due to wrong hand position	23(76%)	21(70%)
No of successful students	0	0

DISCUSSION

It is understood from the study mentioned above that various medical emergency 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 medical emergency.

We studied the retention of basic life support skills in undergraduate medical students, undergoing our standard training protocol. Almost all students failed the exam as in the study of Pim A. de Ruijter.[10] Skills to adequately check vital signs and start CPR when appropriate were preserved longer.[11] As described in the introduction section, several studies show that practical skills in resuscitation decrease rapidly.[12] In our study, most students adequately assess vital signs but failed to maintain sufficient chest compression depth and ventilation volumes; we believe this delay in practical skills is caused by the lack of opportunities for practice.[10]

Although the observed differences between students and house officers in this study may be confounded by prior simulation experience. The fact remains that despite training, candidates are unprepared for resuscitation emergencies.

Most importantly, both house officers and third year students failed in some of the most critical aspects of CPR. Additionally not a significant number of candidates perform correct CPR on the simulator. Inadequately adhering to AHA guidelines illustrates several key factors. Many studies show that recall of BLS protocol may be difficult under stress, as demonstrated by poor CPR performance in both group. Second, it may be difficult for inexperienced practitioners, such as dental students, to translate proper protocol into actual clinical performance.[13]

Current results show that here is lack of training in basic life support program. We need a continuous courses of basic life support which occurs on annual basis or on six months intervals. Colon A Graham successfully showed a positive training effect in the dental students. It correctly identified those who 'passed' after training, i.e. those were capable of providing effective BLS (71/75, 94.7%). It also correctly identified those who were not considered competent (4/71, 5.3%).[14] So regular training sessions for BLS should be mandatory for dentists to retain the knowledge and clinical skills.

CONCLUSION

It can be concluded from this study that the level of training and level of knowledge on medical emergencies of dental students is below the desirable standard. It is therefore necessary to put proper strategies in place to strengthen their identified areas of weakness.

REFERENCES

1 Yükse lM, Eryiğit V,Karaaslan U, Sağlam C.Dentists' Attitudes Toward Up-To-Date Cardiopulmonary Resuscitation Guidelines. Eurasian J Emerg Med 2015; 14: 177-82.

2 Nishiyama C Long-term Retention of Cardiopulmonary Resuscitation Skills After Shortened Chest Compression–only Training and Conventional Training: A Randomized Controlled Trial. Acad emerg medicine .January 2014; 21(1):47-54.

3 American Heart Association. 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2010;112(Supp 3):S640–946. 2.

4 Rea TD, Eisenberg MS,Becker LJ, Murray JA, Hearne T. Temporal trends in sudden cardiac arrest: a 25-year emergency medical services perspective.Circulation.2003;107:2780-85.

5 Kitamura T, Iwami T, Kawamura T, Nagao K,Tanaka H, Hiraide A.Nationwide public-access defibrillation in Japan. N Engl J Med. 2010;11:994-1004.

6 Dowie R, Campbell H, Donohoe R, Clarke P. 'Event tree' analysis of out-of-hospital cardiac arrest data: confirming the importance of bystander CPR. Resuscitation. 2003;56:173-81.

7 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.

8 Kavari SH, Chohedri AH. Cardiopulmonary Resuscitation: Knowledge And Personal Experience In Iranian Dentists. Pak J Med Sci April 2007;23(2):296-97.

9 American Heart Association. Highlights of the 2015 American Heart Association; Guidelines update for CPR and ECC:1-32. www.heart.org/cpr.

10 Ruijter PAD et al.Retention of first aid and basic life support skills in undergraduate medical students. Med Educ Online 2014;19:1-10.

11 Woollard M, Whitfeild R, Smith A, Colquhoun M, Newcombe RG, Vetteer N, et al. Skill acquisition and retention in automated external defibrillator (AED) use and CPR by lay responders: a prospective study. Resuscitation 2004; 60: 17-28.

12 Madden C. Undergraduate nursing students' acquisition and retention of CPR knowledge and skills. Nurse Educ Today 2006; 26: 218-27.

13 Behrend T et al. Retention of cardiopulmonary resuscitation skills in medical students utilizing a high-fidelity patient simulator. Medical Student Research Journal. 2011;01(1):1-4.

14 Graham CA ,Lewis NF . A scoring system for the assessment of basic life support ability.J.Eur Resc Counl. 2000;43(2):111–14.

CONTRIBUTIONS BY AUTHORS	
1 Mustafa Sajid:	Performed all the procedures and wrote the results and conclusions.
2 Jamil:	Supervised all the procedures and the discussion
3 Reema Kouser:	Helped in conducting and preparation of written test of cardiopulmonary resuscitation
4 Sharina Naz:	Wrote introduction
5 Mohsin Javaid	Wrote materials and methods