

Evaluating Cardiopulmonary Resuscitation Skills and Knowledge in Medical and Dental Students of Islamabad and Abbottabad, Pakistan

Nighat Parveen¹, Sofia Jadoon², Muhammad Adnan Iqbal³, Sadia Rashid⁴, Muhammad Rizwan⁵, Umar Farooq Khan⁶

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ABSTRACT

Objectives: Cardiopulmonary Arrest, a medical emergency is considered as leading cause of sudden death throughout the globe. It is an unpredicted, sudden stoppage of breathing and/ or circulation of a person due to certain causes. Cardiopulmonary Resuscitation (CPR) is a technique for reviving of those heart failure individuals and it involves competence of operator, the condition of victim and present resources at that time of emergency. All individuals, specially medical and dental persons must be well learned and ready to deal such health related emergencies at anytime and anywhere. Present study was aimed to assess the level of information and practical ability to do CPR in medical emergency among the medical and dental students.

Materials and Methods: This Cross-sectional study was carried out to assess the level of information and practical ability to do CPR in medical emergency among the students of medical and dental institutes of Islamabad and Abbottabad, Pakistan, during January to March 2024. 280 Students (123 male and 157 female students) from 4th and final year of BDS and MBBS were chosen randomly. Information about CPR was collected by objective type paper of 30 questions (20 true false and 10 MCQ's). Each question carried equal one mark with 50% passing marks. Practical ability was evaluated checking performance on the SimMan simulator (the high-fidelity simulator).

Results: Level of assessment comprised of two parts theory paper and practical ability test. In initial paper based theory assessment, out of 280 participants, 197 (70%) students secured less than 50% marks and failed. When practical abilities assessed, 80.7% students could not perform correctly and failed. In practical abilities test, students were unsuccessful due to compression rate error (199), ventilation rate error (196) and failed of wrong hand positioning (213) when asked to perform CPR practically.

Conclusion: Medical emergencies are inevitable and require adequate information and skills to save life. The level of the knowledge and practical abilities among the medical and dental students to do CPR in case of emergency is below the requirements. It is therefore utmost important to plan regular training sessions and dissemination of information to medical and dental students to recover deficiency, improve weakness and enhance their confidence and clinical skills while dealing such emergency.

Keywords: Cardio-pulmonary Arrest, CPR, Heart Failure, Medical Emergencies, Sudden Death

¹Senior Registrar, Department of Physiology, Abbottabad International Medical College, Abbottabad, Pakistan

²Senior Registrar, Department of Anatomy, Abbottabad International Medical College, Abbottabad, Pakistan

³Senior Registrar, Department of Medicine, Gujranwala Medical College, Gujranwala, Pakistan

⁴Professor, Department of Physiology, HBS Medical and Dental College, Islamabad, Pakistan

⁵Professor, Department of Oral Pathology, HBS Medical and Dental College, Islamabad, Pakistan

⁶Assistant Professor, Department of Periodontics, HBS Medical and Dental College, Islamabad, Pakistan

Corresponding author:

Muhammad Rizwan, Professor Oral Pathology, HBS Medical and Dental College, Lehtrar Road, Islamabad, Pakistan.
Email: drrizwaniqbal05@gmail.com.

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INTRODUCTION

Cardiopulmonary Arrest, a medical emergency is considered as leading cause of sudden death throughout the globe. It is an unpredicted, sudden arrest of breathing and/ or circulation of a person, occurs following various causes.^{1-5,7} Every individual including, common man, medical and dental students and specialists must be prepared and trained properly to handle such emergency any time at any place. Life saving actions like Cardiopulmonary resuscitation (CPR) is one of the most evolving and much needed areas of today's medicine contributing towards life saving as well as increasing the survival rates after cardiopulmonary arrest.^{6,9,10} Cardiopulmonary resuscitation remarkably increase the probability of patient's recovery from cardiac arrest.¹¹ Although proper technique of CPR depends on the person attempting it, the patient, and resources present at the scene, but early recognition of arrest and quick action in the form of effective CPR are very crucial at that moment and can be achieved by following Guidelines for CPR and ECC (Emergency Cardiovascular Care) by American Heart Association (AHA) 201.¹²

For nearly half of the century, it has been seen that early provisions of CPR and prompt clinical care have saved several lives in the world, highlighting the importance of the CPR and its timely practice in various hospitals and clinics.¹³ Considering such situation, humanity and professionalism, every medical and dental student and doctor must be well trained and confident enough to deal such emergency and perform effective CPR without hesitation⁷. CPR has been categorized as comprising of Advanced Cardiac Life Support (ACLS) and vital or Basic Life Support (BLS) under current directions clearly indicating that along with basic knowledge of resuscitation methods like mouth to mouth ventilation and observing cardiac pressure during CPR, the medical students must have skills to perform other supportive

rather life saving procedures like use of laryngoscope, an oropharyngeal tube, an Ambu mask, an oxygen-balloon, and certain drugs such as an epinephrine and lidocaine.¹⁴

A Medical Emergency (ME) can arise any time in medical centers, dental centers or at any place. Cases of medical emergencies like syncope, hypertensive and hypovolemic shock etc. in old patients having some other clinical problems, has increased. Although cardiac arrest are uncommon, instances were observed many times during medical or dental visits of patients. The health professionals including medical and dental students and Practitioners have to be ready for such emergencies.^{5,9}

CPR skills like other clinical or non-clinical trainings are compulsory and must to know skills for each person specially medical and dental students and doctors. But in routine we experience that most of them don't have proper awareness, knowledge and skills of effective cardio-pulmonary resuscitation.¹⁵

Aim of our study was to assess knowledge and practical skills of CPR among the medical and dental students and highlight their deficiencies in such a vital life saving part of training.

MATERIALS AND METHOD

American Heart Association (AHA) has provided clear guidelines for CPR which are followed throughout the globe and these are "In case of the cardiac arrest to patient with neither breathing nor pulse, the rescuer must commence with thirty compressions of the rib cage followed by 2 breaths".¹³

This was a cross-sectional prospective study, conducted among the students of medical and dental colleges of Islamabad and Abbottabad from January 2024 to March 2024. 280 Students (123 male and 157 female students) were randomly selected from 4th year BDS and 4th and

final year MBBS. All of the selected students have already attended hands on CPR training workshops organized by their colleges during 3rd and 4th years of their course and were aware of both theoretical as well as practical aspects of effective CPR. An objective type paper of 25 minutes, consisting of 30 questions (20 true false and 10 MCQ's) each carrying one mark with 50% passing score, was used to check the awareness and information of students about CPR (Table 1). The practical abilities and techniques for effective CPR were assessed by the SimMan (the high-fidelity simulator) applied test focusing on primary assessment, the rate plus volume, ventilation, force applied, the rhythm and the compression rate following the standard principles of CPR by the American Heart Association 2015, as given below;

Firstly check for the responsiveness, patient just gasping or absence of normal breathing and no pulse, should be done within or less than 10 seconds. Then both hands should be on smaller half of the sternum. The limit of rate of compression should be of 100-120/min. Compression penetration for the adults should be minimum 5 cm (2 inches) and must not exceed 6 cm. The CPR attempting person must elude inclined on chest in between compressions to allow full recoil of chest wall after each compression. Rescuer must start Trunk compressions beforehand, providing saving breaths (C-A-B as a replacement for A-B-C) to lower the interval to 1st compression. The Single rescuer should attempt CPR with 30 chest compressions followed by the two breaths And where CPR is being attempted in the presence of advanced airline available, the proposed rate of a ventilation is 1 breath / 6 sec (10 breaths/ min).

RESULTS

Total of 280 medical and dental students (123 male and 157 female students) participated in the assessment comprising of theory and practical parts. Test pattern of theory assessment paper (MCQ's) used, is demonstrated in the Table 1. In the initial theory assessment, out of 280 students, only 83 (30%) were pass while 197 (70%) were fail (Table 2). When the practical abilities to

perform CPR was assessed, 199 (71%) students got failed in compression rate error, 196 (70%) students failed in ventilation rate error and 213 (76%) students performed wrong hand position and failed (Table 3). And overall results of both theory paper and practical performance are given in Figure 1.

Table 1: Theory Paper Pattern (MCQ's)

Topic	No. of the questions (30)
Theory regarding a CPR	12
Ventilation	6
Managing the fibrillation of ventricle	3
Management of A systole	4
Ventricular extra systole	2
Dosage/Drugs	2
Electro-mechanical dissociation	1

Table 2: Result of Objective Type Theory Paper About CPR

Total No. of Students	PASS (Obtaining 50% or more marks)	FAIL (< 50% marks)
280 (Male=123, Female=157)	83 (30%)	197 (70%)

Table 3: Assessment of Practical activity

Practical Activity	Pass	Fail
Chest compression	81	199
Ventilation rate	84	196
Position during CPR	67	213

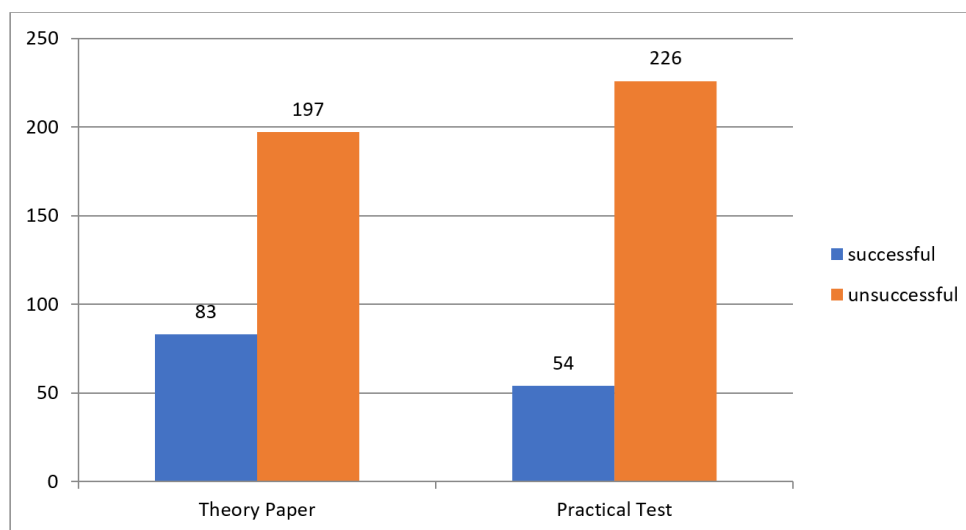


Figure 1: Results of Theory and Practical Assessments

DISCUSSION

Doctor and dental surgeons may face several medical emergencies like syncope, hypertensive crisis, angina pectoris and cardio-pulmonary arrest during their practice.¹⁶ Being an important part of healthcare system, it is obligatory for medical doctors and dentists to have sound awareness, information and abilities to handle such medical emergency.^{7,8,15} Every healthcare person should be well informed and well trained for BLS as adequate knowledge and proper techniques are vital for successful resuscitation and saving life in emergency.¹⁷⁻²² When assessed the basic life care proficiency in students, similar to the findings by Pim A. de Ruijter, our data also shows majority of unsuccessful participants in delivering basic life care information even after getting suitable training and knowledge.^{23,24}

In our study it can be seen that only 30% medical and dental students passed theory exam and also majority of them lack required training and practical abilities to deal with emergency, findings are similar to other studies.^{14,16} Rescuer's abilities to check the vital signs and start CPR quickly are very important for saving the life of a victim. In our study, most of the students evaluated the vital signs efficiently, but they took longer to start CPR practically and were unsuccessful in preserving required chest compression depth & the ventilation volumes indicating some lacking in hand-on training as seen in other studies.²²⁻²⁴

In our research, only about 30% participants succeeded in maintaining the chest compression & the ventilation

rate which was similar to the results showed by Mohammed Z (26.7% successful) in a study.⁵ According to some researchers, CPR performance may be affected in emergency situation under stress and could be challenging for inexperienced persons like medical and dental students to perform swiftly and accurately as also seen in our research data.²⁸

We can identify from our study that there is deficiency among the medical and dental students regarding BLS training program. CPR as a vital tool in emergency, should be included in the curriculum of medical and dental students. Where Regular teaching sessions and hands on training for the BLS / CPR should be provided as part of credit hours and must be properly assessed on annual or biannual intervals for students to recall their information, knowledge and practical skills.²⁹

CONCLUSION

Medical emergencies are inevitable and require adequate information and skills to save life. The level of the knowledge and practical abilities among the medical and dental students to do CPR in case of emergency is below the requirements. It is therefore utmost important to plan correctly to recover deficiency and improve weakness.

DISCLAIMER

None to declare.

CONFLICT OF INTEREST

There is no conflict of interest among the authors.

ETHICAL STATEMENT

This study was conducted and submitted for publication after taking approval from ethical review board of HBS Medical & Dental College, EC-31/15/12/2023

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AUTHORS CONTRIBUTION

Conception and design of the study: M. Rizwan, S. Rashid, S. Jadoon

Project administration: N. Parveen, U.F. Khan, S. Rashid, S. Jadoon

Analysis and interpretation of data: M.A. Iqbal, N. Parveen, U.F. Khan, M. Rizwan

Drafting of the manuscript: M. Rizwan, S. Rashid, S. Jadoon, U.F. Khan

Critical review of the manuscript: M.A. Iqbal, N. Parveen, M. Rizwan

Approval of the final version of the manuscript to be published: N. Parveen, S. Jadoon, M.A. Iqbal, S. Rashid, M. Rizwan, U.F. Khan

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