Experimental Research

Cardiopulmonary resuscitation: Knowledge and Attitude of doctors from Lahore

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ABSTRACT

Objective: The objective of study was to assess the knowledge and attitude of doctors from Lahore regarding CPR as per American Heart Association (AHA) guidelines.

Methods: The researchers visited various hospitals and filled e-questionnaires by interviewing respondents. The study was conducted at Jinnah Hospital Lahore, Mayo Hospital Lahore, Punjab Institute of Cardiology Lahore, Sir Ganga Ram Hospital Lahore, Services Hospital Lahore and Mid City Hospital. Data were analyzed using statistical package for social sciences (SPSS) 23 version. Knowledge was assessed based on the scores, with those scoring 10 or more being considered to have good knowledge while those having score less than 10 were considered to have poor knowledge. P values < 0.05 were considered statistically significant.

Results: Out of 792 participants, 68 refused to take part in the study. The total respondents were 724 with the response rate of 91%. The knowledge regarding cardiopulmonary resuscitation of 601 (83%) respondents was poor with only 123 (17%) doctors having good knowledge. The doctors who received formal CPR training had better knowledge (20.17%) than the doctors who didn’t get any training regarding CPR (4.69%). Anesthesiologists scored better among all specialties. The overall attitude of the doctors towards CPR was positive with 93.8% of the respondents willing to do CPR.

Conclusion: The overall knowledge of the doctors regarding CPR is not satisfactory. A practical and functional approach is needed to improve this situation. However, the attitude of the doctors towards CPR is positive.

1. Introduction

Cardiopulmonary Resuscitation – an emergency lifesaving procedure which is performed when the heart stops beating. Cardiopulmonary resuscitation (CPR) is described by American Heart Association (AHA) as a part of the “chain of survival”. It has been recognized that the chances of survival of patients with cardiac arrest is doubled or tripled following cardiac arrest is cardiopulmonary resuscitation (CPR). To perform high-quality CPR, timely recognition of arrest and initiation of chest compressions along with the correct depth and rate of compressions as well as allowing adequate chest recoil is essential. Inadequacy in any step of CPR due to lack of knowledge or skill is associated with poor return of spontaneous circulation and decreased survival rate [2]. Proper resuscitation with defibrillation as early as possible and proper post–cardiac arrest care are necessary to improve survival rate and neurologic outcomes for patients with the cardiac arrest [4].

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Diseases of cardiovascular system (CVS) are the leading cause of deaths by non-communicable diseases, causing up to 80% of deaths worldwide [5]. The estimated annual incidence in the United States for out-of-hospital cardiac arrest (OHCA) treated by emergency medical services (EMS) is 184,383 [6]. In Europe, 350,000 people lose their lives each year because of out-of-hospital sudden cardiac arrest (OHCA) [7]. There has been a steady increase in these numbers over the years.

Adequate awareness, knowledge and skills of basic life support and cardiopulmonary resuscitation are necessary to ensure that life saving measures can be adequately delivered in case of emergency. Sound knowledge is expected from healthcare professionals since their working environment makes it very likely that they will come face to face with such a situation. Basic Life Support training course has been recommended for health care professionals since 1966 especially those who are involved in the code teams [8].

It has been reported that despite its importance many doctors are not able to perform CPR effectively [9]. Studies have been done globally to assess the knowledge and the attitude of the medical professionals but the results are not satisfactory. Studies from Turkey, Greece, Nigeria, Saudi Arabia, India and Nepal point to a lack of proper awareness and knowledge regarding CPR among health care professionals [8-20].

The deaths due to coronary heart diseases (CHD) in Pakistan have reached about 200,000 per year that is 410/100,000 of the population [21]. In Pakistan, although there is not enough data available but some researches which have been conducted in Islamabad, Karachi and Rawalpindi show lack of knowledge and awareness among doctors regarding CPR [9,15,22,23] Although no such study has been done in Lahore.

Moreover, attitude of the person present at the time of CPR is important. Attitude is affected by the perceptions and the beliefs according to the culture and the customs. Attitude towards CPR differs in aspects of age of the patient, nature and stage of disease. It has found that percentage of people reluctant to do CPR on women is more than the people reluctant to do CPR on the men [15]. Similarly, attitude of the person towards self regarding CPR can be different than the attitude towards others regarding CPR. All these factors influence the outcomes of cardiopulmonary resuscitation.

In this study we assessed the knowledge and attitude about cardiopulmonary resuscitation among the doctors of Lahore. To the best of our knowledge it is the first study in Lahore to evaluate the knowledge and attitude of the doctors.

1.1. Objectives

The objective of our study was to assess the knowledge of respondents regarding the Cardio-pulmonary resuscitation as per American Heart Association guidelines as well as to assess their attitude towards it.

1.1.1. Methodology

It was a cross-sectional study. After Ethical approval from Institutional review board and permission from respective administrations of the various hospitals, the team of researchers visited the hospitals and with the help of electronic devices proceeded to get the proformas filled from various respondents. Informed consent from all respondents was taken.

1.1.2. Study design

Cross-sectional study.

1.1.3. Study Setting

Study was conducted in the five main government teaching hospitals and one private hospital of Lahore. The study was conducted at Jinnah Hospital Lahore, Mayo Hospital Lahore, Punjab Institute of Cardiology Lahore, Sir Ganga Ram Hospital Lahore, Services Hospital Lahore and Mid City Hospital. Permission was requested from the three other main private hospitals of Lahore but was not granted.

1.1.4. Study duration

Study duration was March 2019 to March 2020.

1.1.5. Sample size

Sample size was estimated by using WHO Sample size software. By using the formula of estimating population proportion with specified relative precision at confidence level of 95% with anticipated population proportion of 50% and relative error of 5%, sample size was792. Total respondents were 724 after 68 refusals (response rate was91%)
The knowledge of 601 (83%) respondents was poor and only 123 (17%) doctors had good knowledge (Table 1). The score of ≥10 out of 15 (67%) was considered as good knowledge and the score <10 as poor knowledge. Only three respondents received the full score of 100%. In total 49.7% of population had score below 46%. The doctors who received formal CPR training had better knowledge (20.17%) than the doctors who didn’t get any training regarding CPR (4.69%). Surprisingly, anaesthesiologists had better knowledge (31.25%) than the other specialists even the cardiologists (16.27%) (Table 2). The summarized comparison of the individual questions with is given in table (Table 3).

The overall attitude of the doctors towards CPR is positive. 93.8% of the respondents showed willingness to do CPR and the same percentage of doctors permitted to give CPR on their relatives. However, 87.3% of the respondents allowed self CPR. This shows the change in attitude towards self and the others. The summarized comparison of the individual questions with different characteristics of the respondents along with p values is shown in table (Table 4).

### Table 1

| GOOD KNOWLEDGE | NUMBER | PERCENTAGE |
|----------------|--------|------------|
| NO             | 601    | 83%        |
| YES            | 123    | 17%        |

### Table 2

| VARIABLE | KNOWLEDGE REGARDING CPR | p VALUE |
|----------|-------------------------|---------|
| GOOD     | POOR                    |         |
| BY GENDER |                          |         |
| MALE     | 75                      | 368     | 1.000  |
| FEMALE   | 48                      | 233     |         |
| ATTENDED FORMAL CPR TRAINING |          |         |
| NO       | 7                       | 142     | 0.0001 |
| YES      | 116                     | 459     |         |
| BY AGE   |                          |         |
| LESS THAN THIRTY |          | 60       | 466     | 0.000  |
| EQUAL TO AND GREATER THAN THIRTY |          | 63       | 135     |         |
| BY HOSPITALS |                        |         |
| JINNAH HOSPITAL |          | 16       | 134     | 0.000  |
| MAYO HOSPITAL |          | 11       | 142     |         |
| MID CITY HOSPITAL |           | 6        | 14      |         |
| PIC       | 9                       | 43      |         |
| SERVICES HOSPITAL |          | 17       | 141     |         |
| SIR GANGA RAM HOSPITAL |           | 59       | 99      |         |
| OTHERS    | 5                       | 28      |         |
| BY SPECIALITY |                       |         |
| ANAESTHESIA |          | 5        | 11      |         |
| CARDIOLOGY |          | 7        | 36      |         |
| GYN N OBS | 5                       | 35      |         |
| MEDICINE AND ALLIED |        | 53       | 260     |         |
| SURGERY AND ALLIED |     | 53       | 259     |         |
| DESIGNATION |                       |         |
| ASSOCIATE PROFESSOR |        | 6        | 16      |         |
| ASSISTANT PROFESSOR |          | 4        | 5       |         |
| CONSULTANT |                        | 7        | 22      |         |
| HOUSE OFFICER |                      | 17       | 221     |         |
| MEDICAL OFFICERS |                | 22       | 61      |         |
| PG1       | 8                       | 122     |         |
| PG2       | 13                      | 55      |         |
| PG3       | 22                      | 41      |         |
| PG4       | 24                      | 58      |         |

### Table 3

| Questions | Correct | Incorrect |
|-----------|---------|-----------|
| What is the location of hands for CPR in an adult? | 484 (66.9%) | 240 (33.1%) |
| What is the depth of chest compression in adult? | 347 (47.9%) | 377 (52.1%) |
| What is the rate of chest compression in adult per minute? | 352 (48.6%) | 372 (51.4%) |
| How many mouth breaths do you have to give per minute during CPR in adults? | 109 (15.1%) | 615 (84.9%) |
| What is the compression-ventilation ratio in an adult? | 599 (82.7%) | 125 (17.4%) |
| Where is the ‘2 thumb-encircling hands technique recommended when 2 or more rescuers are present’ used? | 362 (50%) | 362 (50%) |
| What is the position of fingers in infants during CPR? | 347 (47.9%) | 377 (52.1%) |
| What is the depth of chest compression in infant? | 207 (28.6%) | 517 (71.4%) |
| What is the rate of chest compressions in children per minute? | 338 (46.7%) | 386 (53.3%) |
| What is the preferred mode for rescue breathing in infants? | 188 (26%) | 536 (74%) |
| What is the compression-ventilation ratio in infants with 2 or more rescuers? | 384 (53%) | 340 (47%) |
| What CPR in basic life support stands for? | 714 (98.6%) | 10 (1.4%) |
| What is the method for opening airway during CPR in a suspected case of HEAD INJURY? | 263 (36.3%) | 461 (63.7%) |
| What should a rescuer give to potentially reduce the risk of gastric inflation? | 75 (10.4%) | 649 (89.6%) |
| Is CCR (cardio cerebral resuscitation) better than CPR? | 55 (7.6%) | 669 (92.4%) |

### 3. Discussion

CPR is the first step and the last hope for the survival of the pulseless and the breathless person. Timely, effective and high quality CPR can be lifesaving. Each step of CPR should be done properly to improve the outcome of this emergency procedure. Given the nature of their profession, healthcare professionals often need to respond and deliver CPR. However there appear to be problems with the retention of knowledge and skills. Almost all the studies that have been done all over the globe showed awareness of the proper steps of CPR as compared to other fields (p < 0.0001). The anaesthesiologists had the highest score (mean score 80.1) as compared to other fields (p = 0.0001). Surprisingly, anaesthesiologists had better knowledge (31.25%) than the other specialists even the cardiologists (16.27%) (Table 2). The summarized comparison of the individual questions with different characteristics of the respondents along with p values is shown in table (Table 4).

When we stratified the results for variables we found that specialty, designation and previous formal training played significant role in the knowledge of the participants.

We found that anaesthesiologist were significantly more likely to be aware of the proper steps of CPR as compared to other fields (p < 0.0001). The anaesthesiologists had the highest score (mean score >8). While the gynaecologists and cardiologists had mean score of 7 and 6.5 respectively. However, the doctors in medicine and surgery had the same mean score (6.9). Similar results were also observed by other researchers [24].

The doctors who received formal CPR training had better scores than doctors without formal training. Studies that had been done in Karachi [9] India [14] Nepal [15]and others [16,27] also showed the better scores for the trained doctors than the untrained ones. This indicates the importance of BLS courses and workshops in improving the outcomes of CPR. It has been demonstrated that there is a decay of skills which starts 6 months after the course [25] while significant improvement has been shown with refresher course [26].

It has been seen that previous experience of doing CPR has a positive effect on the median score as compared to those having no practical experience. The exact cause of this is not clear. A number of researchers [15,17,28] observed this and we also noted that those having a previous experience of performing CPR scored higher, although a large number didn’t perform too well even after previous exposure.

The designation of the respondent was significantly correlated with the knowledge scores obtained (p < 0.0001). The relation between designation and good score was directly proportional, except a dip in the middle of Mayo hospital.

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information on the page:

- The document contains a table titled "Table 4: Attitude of respondents to CPR." The table includes columns for different scenarios and responses, with data such as percentages and numbers.

- The content discusses the attitudes of different groups towards CPR, including consultants, postgraduate doctors, and others.

- The text mentions that high-quality chest compressions are vital parts of the chain of survival.

- There is a mention of a study conducted in Pakistan, showing that 62% of doctors would allow CPR on themselves, while 12% would follow the patient's DNR orders.

- The document highlights the importance of bystander CPR and the need for further training.

- A conclusion is drawn about the overall knowledge and attitude of doctors regarding CPR, emphasizing the need for continuous education and training.

- The text also includes a table with data on marital status and whether CPR is done ever done.

- The document ends with a statement about the registration of the study and the ethical approval process.

4. Conclusion

The overall knowledge of the doctors regarding CPR is not satisfactory. A practical and functional approach is needed to improve the persisting condition. However, the attitude of the doctors towards CPR is positive.

4.1. Limitations

Most of the data collection was done by the medical students who were at times faced with difficulty in data collection. Further, 3 hospitals refused permission to conduct the research on their premises. The questionnaire was designed to test the knowledge of the respondents however due to limitation of resources skills couldn’t be tested. It might be likely that they may be lacking as well.

Please state any sources of funding for your research

NIL.

Ethical approval

YES. Ethical approval from INSTITUTIONAL REVIEW BOARD of Services Institute of Medical Sciences, Lahore taken via letter no IRB/2019/514/SIMS.

Consent

Yes. Consent was taken from all participants.

Author contribution

Iqbal A, Nisar I, Arshad I, Butt UI were involved in the Study Design; Data acquisition, analysis, and interpretation and Drafting of paper. Umar M, Ayyaz M, Farooka MW were involved in the study design and drafting and revision of paper All authors give approval of the version to be published and agree to be accountable for all aspects of the work.

Registration of research studies

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):
No experiment on humans was done in the conduction of this research.

Guarantor

Mahmood Ayyaz.

Declaration of competing interest

NIL.

References

[1] R. Okonta, B. Okoh. Theoretical knowledge of cardiopulmonary resuscitation among clinical medical students in the University of Port Harcourt, Nigeria. Afr. J. Med. Health Sci. 14 (1) (2015) 42–46.

[2] https://www.heart.org.

[3] https://suddencardiacdeath.org.

[4] Catharine A Bon, Cardiopulmonary resuscitation (CPR), Available from, https://emedicine.medscape.com/article/1344081-overview, Sep 18, 2018.

[5] J-P. Veronee, L. Wallis, R. Allgaier, R. Botha, Cardiopulmonary resuscitation by Emergency Medical Services in South Africa: barriers to achieving high quality performance, Afr. J. Emerg. Med. 8 (1) (2018) 6–11.

[6] E.J. Benjamin, M.J. Blaha, S.E. Chiuve, M. Cushman, S.R. Das, R. Deo, S.D. de Ferranti, J. Floyy, M. Fornage, C. Gillespie, et al., On behalf of the American heart association statistics committee and stroke statistics subcommittee. Heart disease and stroke statistics–2017 update: a report from the American heart association [published corrections appear in circulation, Circulation 135 (2017) e196, https://doi.org/10.1161/CIR.0000000000000485, 2017; 135:e646]. Circulation. 2017; 135:e146–e603.

[7] Ş. Özğölün, M. Akao, V. Hancı, C. Aygün, B. Kuvaki, Evaluation of public awareness, knowledge and attitudes about cardiopulmonary resuscitation: report of lamir, Türkij journal of anaesthesiology and reanimation 43 (6) (2015) 396–405.

[8] Shahabe A. Saquib, Hassan M. Al-Harthi, Anas A. Khoshhal, Adel A. Shaher, Abdulsalam B. Al-Shammari, AbdulAhad Khan, Tahani A. Al-Qahtani, Imran Khalid, Knowledge and attitude about basic life support and emergency medical services amongst healthcare interns in university hospitals: a cross-sectional study, 2019, Emergency Medicine International (2019), 9342892, 8 pages.

[9] Majid A, Jamali M, Ashrafi M, et al. (March 06, 2019) knowledge and attitude towards cardiopulmonary resuscitation among doctors of a tertiary care hospital in Mangalore City, India, World J. Emerg. Med. 8 (2) (2017) 131–135.

[10] Shifa International Hospitals Ltd, Cardiac Diseases in Pakistan, Available from, https://www.shifa.com.pk/chronic-disease-pakistan.

[11] Q. Zamir, A. Nadeem, A.H. Rizvi, Awareness of cardiopulmonary resuscitation in medical-students and doctors in Rawalpindi-Islamabad, Pakistan, JPMA (J Pak Med Assoc) 62 (12) (2012) 1361–1364.

[12] H. Zaheer, Z. Haque, Awareness about BLS (CPR) among medical students: status and requirements, JPMA (J Pak Med Assoc) 59 (1) (2009) 57–59.

[13] P. Howell, I. Tennant, R. Augier, G. Gordon-Strachan, H. Harding-Goldston, Physicians’ knowledge of cardiopulmonary resuscitation guidelines and current certification status at the university hospital of the west indies, Jamaica, W. Indian Med. J. 63 (7) (2014) 739–743, https://doi.org/10.7727/wimj.2013.267.

[14] S. Federico, S. Luciano, L. Erga, Retention of CPR performance in anaesthetists, Resuscitation 68 (2006) 101–108.

[15] S. Cooper, E. Johnston, D. Priscott, Immediate lifesupport training. Impact in a primary care setting? Resuscitation 72 (2007) 92–96.

[16] G. Aranazabal-Alegria, A. Verastegui-Diaz, D.M. Qui zones-Laveriano, L. Y. Quintana-Mendoza, Vilchez-CornejoJ, C.B. Espejo, et al., Factores asociados al conocimiento de la Cardiopulmonar en hospitales del Perú, Rev. Peru. Med. Exp. Salud Publica 29 (2012) 219–224.

[17] S. Chandraarakaran, S. Kumar, S.A. Bhat, Saravanakumar, P.M. Shabbir, V. Chandraarakaran, Awareness of basic life support among medical, dental, nursing students and doctors, Indian J. Anaesth. 54 (2010) 121–126, https://doi.org/10.4103/0019-5049.63850.

[18] M. Nambiar, N.M. Nedungalaparambil, O.P. Aslesh, Is current training in basic and advanced cardiac life support (BLS & ACLS) effective? A study of BLS & ACLS knowledge amongst healthcare professionals of North-Kerala, World J Emerg Med 7 (2016) 263–269, https://doi.org/10.5847/wjemj.1920-8642.2016.04.004.

[19] S. Rozhans, K. Batajoo, R. Pirjani, M. Sharma, Basic life support: knowledge and attitude of medical/paramedical professionals, World J Emerg Med 3 (2012) 141–145, https://doi.org/10.5847/wjemj.1920-8642.2012.02.011.

[20] B. Otsinaike, D. Aderinto, E. Oyebamiji, M. Diya, Evaluation of knowledge of doctors in a Nigerien tertiary hospital of CPR, Niger. Med. Pract. 52 (2007) 16–18, https://doi.org/10.4314/nmp.v52i1.28884.

[21] A.A. Elif, K. Zeynek, Knowledge of basic life support: a pilot study of the Turkish population by Baskent University in Ankara, Resuscitation 58 (2003) 187–192, https://doi.org/10.1016/S0300-9572(03)00316-6.

[22] A. Almesned, A. Almenman, A.M. Alalheth, et al., Basic life supportKnowledge of Spouse and First Degree Relatives of Patients with Coronary Disease2010. 299–302.

[23] L.P. Rappoport, T. Saunders, P.E. Pepe, A.H. Ishr. Layperson training for cardiopulmonary resuscitation: when less is better, Curr. Opin. Crit. Care. 13 (3) (2007) 256–260.

[24] E.A. Kalkan, A. Mirici, Opinions of chest physicians about the Do-Not-Resuscitate (DNR) orders: respect for patient’s autonomy or medical futility? Yozgum Bakım Dery 9 (2) (2018) 34–39.

[25] T.J. Zijlstra, S.J. Leenman-Dekker, H.K.E. Oldenhuis, H.E.P. Bosveld, A. J. Berendsen, Knowledge and preferences regarding cardiopulmonary resuscitation: a survey among older patients, Patient Educ. Counsel. 99 (1) (2016) 160–163.

[26] R.D. Stapleton, W.J. Ehlenbach, R.A. Deyo, J.R. Curtis, Long-term outcomes after in-hospital CPR in older adults with chronic illness, Chest 146 (5) (2014) 1214–1223, https://doi.org/10.1378/chest.13-2110.

[27] K.B. Sondergaard, M. Wissenberg, T.A. Gerds, et al., Bystander cardiopulmonary resuscitation and long-termoutcomes in out-of-hospital cardiac arrest according to location of arrest, Eur. Heart J. 40 (2019) 309–318.