ASSESSMENT OF KNOWLEDGE OF BASIC LIFE SUPPORT AMONG CARDIOLOGY PHYSICIANS AT A TERTIARY CARE CARDIAC HOSPITAL

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Contribution
All the authors contributed significantly to the research that resulted in the submitted manuscript.

All authors declare no conflict of interest.

ABSTRACT

Objective: This study was conducted to assess the knowledge of basic life support among cardiology physicians from different categories.

Methodology: This pilot prospective cross-sectional study was conducted at National Institute of Cardiovascular Diseases, Karachi. from January 2008 to March, 2009. A total of 120 cardiology physician (postgraduate adult cardiology, trainee resident medical officer (TRMO) adult cardiology, TRMO cardiac surgery, postgraduate cardiac surgery and postgraduate anaesthesia) were included. The knowledge was assessed by administering a 27 item questionnaire to the participants in a group of up to 5 at a time. An average score of 60% was considered as cutoff for adequate result. Data was analyzed with SPSS version 11.

Results: The average age of the 120 participants was 32.40 ± 3.87. 102 (85%) were male with a male to female ratio was 5.66:1. The average of correct responses of participant doctors to all 27 questions was 39.55%. It was 40.77% for postgraduates adult cardiology, 34.33% for trainee RMO adult cardiology, 55% for postgraduates cardiac surgery, 37% for trainee RMO cardiac surgery and 51% for postgraduates cardiac anesthesia. The average of correct responses to all 27 questions was 43.37% for all postgraduates (n=72) taken together and 34.11% for all trainee RMOs (n=48).

Conclusion: The findings indicate that these participants had a low background knowledge and its retention regarding BLS. Overall, knowledge was not significantly different with respect to gender, category of doctors and their previous BLS attendance.

Key Words: Basic Life Support, Assessment, Cardiology Doctors

INTRODUCTION

Early records from Egyptian mythology and the Bible suggest that mouth-to-mouth and mouth-to-nose respiration were among the earliest resuscitative efforts using artificial respiration.[1,2]

The technique has also been used for many centuries by midwives in attempts to revive apparently stillborn infants.[3] One of the first authenticated cases of recovery following artificial respiration using the mouth-to-mouth technique was the resuscitation of a suffocated miner by Tossach in 1744.[3] Over time, resuscitation skills have evolved into a proper protocol, which involves cardiopulmonary resuscitation (CPR) commonly known as Basic Life Support (BLS). However BLS involves techniques other than CPR as well but these two are used interchangeably.

Invented in 1960, CPR is a simple but effective procedure that allows almost anyone to sustain life in the early critical minutes after cardiac and respiratory arrest. Since atherosclerotic heart disease is the overall leading cause of death and trauma is the leading cause of death among those aged 1-44 years it is crucial that such efforts be maintained.[4] Thus this combination of no breathing and circulation causes generalized ischaemia, which in cases of brain allows a narrow window of ten minutes only. That is if anything has to be done it has to be done within ten minutes because after that survival is impossible. This awareness has placed a growing demand on physicians for expertise in resuscitation.[5] Most of these patients suffer arrest due to ventricular fibrillation or pulseless ventricular tachycardia. The most important determinant of survival among these patients is prompt and effective delivery of basic life support by first bystander.[6-8] Now a days basic life support includes not only cardiopulmonary resuscitation(CPR) but also defibrillation by using automated external defibrillator.

The following things are important in Basic Cardiac Life Support:[9-11]

1. Recognition of signs of sudden cardiac arrest (SCA), heart attack, stroke and foreign body airway obstruction.

2. Cardiopulmonary resuscitation (CPR).

3. Defibrillation with an automated external defibrillator (AED).

For every minute without CPR, survival decreases 7% to 10% in patient of SCA due to ventricular fibrillation.[12] In situations of imminent life threat, decision-making should be prompt. Therefore, knowledge and training in resuscitation are of the utmost importance for professionals working in emergency services.

A local study showed that in-hospital cardiopulmonary resuscitation was associated with better clinical outcome as compared to out-side the hospital. One of the reason may be lack of trained BLS providers in our country.[13] It has a combination of skills including mouth-to-mouth breathing to support ventilation and chest compression to normalize blood circulation to the brain and vital organs. Knowledge of BLS and practice of simple CPR techniques ensures the survival of the patient long enough till experienced medical help arrives and in most cases is itself sufficient for survival.[14,15]

BLS requires nothing as far as resources are concerned and its importance is undeniable. Proper practice of the techniques and maneuvers enables a person to effectively resuscitate a victim. Ideally everyone should know BLS and CPR but its awareness to medical personnel should be a pre-requisite for entering into this field. Newly qualified doctors are expected to take part in resuscitation from their first day.[9]

In Pakistan very little data is present which addresses the awareness of the medical personnel including students, doctors and paramedical staff regarding this highly effective and easy maneuver. Furthermore the awareness should not only be limited to the medical personnel but also to the general population.

The rationale of the study was related to cardiology doctors who were evaluated about their knowledge of basic life support. Cardiology doctors, if provide prompt and effective CPR and defibrillation according to recent guidelines, can increase patients survival significantly for in hospital cardiac arrest. Our study was an innovative and initial step to assess awareness and knowledge of basic life support among cardiology doctors.

The objective was to assess the knowledge of basic cardiac life support among cardiology doctors who are involved day and night with patients suffering from acute coronary syndrome.

METHODOLOGY

This pilot prospective cross-sectional study was conducted at National Institute of Cardiovascular Diseases, Karachi, from January 2008 to March, 2009. A total of 120 cardiology physician (postgraduate adult cardiology, trainee resident medical officer (TRMO) adult cardiology, TRMO cardiac surgery, postgraduate cardiac surgery and postgraduate anaesthesia) were included. The knowledge was assessed by administering a 27 item questionnaire to the participants in a group of up to 5 at a time. An average score of 60% was considered as cutoff for adequate result.

Our study is unique in the sense that such a study exclusively on cardiology physicians have not been seen in literature to the best of my knowledge. After explanation of the purposes of the study and reading of the Written Consent

Form, the eligible physicians agreed to respond to a specific questionnaire from which information on the variables of interest was be collected. This questionnaire included: a) age, gender, medical specialty, attendance or not to BLS courses, b) cognitive assessment with 27 objective questions on CPR. The questionnaire was prepared according to recent guidelines of American College of Cardiology on BLS.[9] Sixty percent was taken as cutoff for adequate score.[16]

Average score all participants was calculated for each question, for all questions as a whole, for male and female participants and also for each category of participants.

The questionnaire was applied to each physician by principal investigator.

Data were analyzed as regards of the following variables: age, gender, medical specialty, attendance or not to BLS courses. Data was analyzed on statistical package for social sciences (SPSS) version 11. Relevant descriptive statistics, frequency and percentages were computed for qualitative variables. Mean and standard deviation were computed for age of the participants. Male to female ratio of physicians were presented for gender distribution. P-value of <0.05 was considered to have statistical significance. Variable frequencies and percentages were presented for the responses of questionnaire regarding BLS knowledge.

RESULTS

A total of 120 doctors were included in the study. The mean age of our participant doctors was 32.40±3.87.102(85%) of these 102(85%) were male with a male to female ratio was 5.66:1. The study was carried out at national institute of cardiovascular diseases Karachi, Pakistan. We studied doctors from different subspecialty and wards of cardiology like postgraduates adult cardiology 58(48.33%), trainee RMO adult cardiology (38.33%), postgraduate surgery 08(6.66%), postgraduate anesthesia 06(5%), and trainee RMO cardiac surgery 02(1.7 %). Overall, postgraduates were 72(60%) and trainee RMO were 48(40%). The average of correct responses of participant doctors to all 27 questions was 39.55%. It was 40.77% for postgraduates adult cardiology, 34.33% for trainee RMO adult cardiology, 55% for postgraduates cardiac surgery, 37% for trainee RMO cardiac surgery and 51% for postgraduates cardiac anesthesia. The average of correct responses to all 27 questions was 43.37% for all postgraduates (n=72) taken together and 34.11% for all trainee RMOs(n=48)(P-value=>0.05). Eighty five percent of participants attended the workshops on BLS at least once while only few had attended the BLS workshop only twice or thrice.

The average correct responses of all categories of participants from question 1 to 27 are shown in Table 1 while

comparison of male and female candidates have been shown in Table 2.

DISCUSSION

All health care professional should have sound cardiopulmonary resuscitation knowledge and skill in order to improve survival among cardiac arrest victims. This is especially important for cardiology doctors.[16] To improve survival through early administration of resuscitative efforts, potential barriers to participation in resuscitative efforts must be considered. Several barriers have been identified by the American Heart Association, and include that the steps required for CPR are complex and difficult, or are forgotten shortly after training has been completed.[17] In this study, we included 120 doctors. Out of these most(85%) were male. Most of the doctors belonged to adult cardiology postgraduates and trainee RMO's. The average response of all doctors to questions 1 to 27 was 39.55% only. This low score indicate that there is a need to train our cardiology doctors in knowledge and skills and these doctors should have refresher courses on regular basis in order to improve retention of knowledge and skills of BLS. It was for educational institutions to consider providing the educational preparation and assessment for CPR/BLS to all health professional programs within the institution. Are the teaching methods in the current education system adequate to rectify the large number of incorrect responses? Before educational institutions can adopt this recommendation further examination and comparison of other health care professionals is needed on a large scale. Added to the above recommendation should be the exploration of teaching/training and assessment methods of CPR/BLS across other health care professional education providers. It would appear the results of this study indicate the most poorly answered or lowest knowledge areas were the questions such as, steps of CPR (0-66%), survival rates after CPR(20%), chain of survival(15%), compression rates(26%), defibrillation (13%), checking responsiveness (40%), checking airway in CPR(33%), bag and mask ventilation(35%), checking pulse(05%), CPR in non-adult victims(23%), knowledge about defibrillation (23%), and knowledge about automated external defibrillator (30%), giving rescue breaths in CPR(05%). The most accurately answered areas were the questions such as, knowledge about cardiopulmonary resuscitation (90%), knowledge about primary ABCD survey (76%), knowledge about two rescuer's response in CPR(83%), knowledge about checking breathing in CPR(71%), knowledge about effective chest compressions(78%). Postgraduates adult cardiology outranked trainee RMO,s in most areas of the quesionaire. Participants were below the cutoff score of 60% for most of the questions (20 questions) except for above mentioned questions. If this is the case then CPR/BLS training/education should be revisited to ensure changes are

Table 1: Overall Average Correct Responses (%age) of All Categories Of Participants to Questions (n= 120)

Knowledge about	Postgra-duates adult cardiology(58)	Trainee RMO adult cardiology(46)	Postgraduate cardiac surgery(08)	Trainee RMO cardiac surgery(02)	Postgraduate cardiac anesthesia(06)
1. Sudden cardiac arrest	27	21	00	00	00
2. Survival after CPR and defib	20	13	00	00	100
3. Cardiopulmonary resuscitation	96	78	100	100	100
4. Chain of survival in sudden SCA	00	08	100	00	100
5. First step in CPR	41	21	100	00	33
6. Second step in CPR	55	26	100	00	33
7. Third step in CPR	48	47	100	00\	00
8. Fourth step in CPR	51	60	100	00	00
9. Step after rescue breath	62	60	00	00	66
10. Defibrillation	10	13	100	100	33
11. Primary ABCD survey	75	55	100	100	100
12. Checking responsiveness	34	43	100	00	00
13. Two rescuers response in CPR	82	78	100	100	100
14. Checking airway in CPR	41	26	00	00	66
15. Checking breathing in CPR	75	56	100	100	100
16. Giving rescue breaths inCPR	03	09	00	00	00
17. Rescue breath	58	39	00	00	66
18. Bag and mask device	37	30	00	100	66
19. Checking pulse in SCA	03	04	00	100	00
20. Chest compressions	27	17	100	00	00
21. Effective chest compressions	82	65	100	100	100
22. Technique of chest compressions	48	47	100	100	66
23. What to do if SCA develops	24	21	00	00	66
24. CPR in non-adult victims	17	34	00	100	00
25. Defibrillation	34	08	00	00	100
26. Defibrillation shock	34	09	00	00	100
27. Automated external defibrillation	17	39	100	00	00

addressed in these objective content areas to ensure accuracy and retention. Apart from the need to arrange refresher courses, there is also a need to arrange these courses according to recent guidelines from American College of Cardiology/American Heart Association.[18] Postgraduates adult cardiology outranked trainee RMO,s in most areas of the quesionaire. A study conducted in kirseyaka hospital, Turkey, assessed knowledge of basic life support among physicians employed in emergency department included 53 physicians (43 male and 10 females). This study showed mean level of knowledge of 45.4 percent on a scale of 0-100.[19] The mean score of knowledge of 39.55% in our study show only slight difference but this was statistically insignificant. A study conducted in Brazil studied 305 physicians who responded to a questionnaire. Eighty three(27.2%) had attended the course on CPR and had a mean score of 14.3% compared with 215(70.5%) physicians who had not attended not attended the course and whose mean score was 10.5.%. the mean score of 65 cardiologists(21.5%) was 14.1%. This study, compared to our study, showed lower score of both physicians and cardiologists. In our study, theoretical

knowledge on CPR was not higher among cardiologists who had attended the BLS course, as opposed to those who had not attended the ATLS course. Postgraduates adult cardiology demonstrated a higher theoretical knowledge on the care of CA patients when compared to physicians from other categories of doctors.[20] Another study conducted in Nigeria evaluated the knowledge of 69 doctors from laboratory, clinical and family medicine.[15] The mean score from the whole group was low 5.84 on a scale of 0-10. This study also showed that there was inadequate knowledge in CPR amongst doctors of all caders. Prior training enhanced knowledge of BLS in this study.

LIMITATIONS

The pilot study provided insight into knowledge and retention of knowledge of CPR/BLS of cardiology doctors. The findings indicate that these participants had a lower background knowledge and its retention regarding BLS. Overall, knowledge was not significantly different with respect to gender, category of doctors and their previous BLS attendance.

Table 2: Overall Average Correct Responses (%age) of All Male and Female Participants Separately to Questions 1 to 27 (n= 120)

Knowledge about	All male (n=102) participants (%)	All female (n=18) participants (%)	P-value
1. Sudden cardiac arrest	19	33	>0.05
2. Survival after CPR and Defibrillation	21	11	>0.05
3. cardiopulmonary resuscitation	90	88	>0.05
4. Chain of survival in sudden SCA	04	00	>0.05
5. First step in CPR	37	33	>0.05
6. Second step in CPR	45	44	>0.05
7. Third step in CPR	49	44	>0.05
8. Fourth step in CPR	45	55	>0.05
9. Step after rescue breath	60	33	>0.05
10. Defibrillation	13	11	>0.05
11. Primary ABCD survey	76	77	>0.05
12. Checking responsiveness	39	44	>0.05
13. Two rescuers response in CPR	80	100	>0.05
14. Checking airway in CPR	35	22	>0.05
15. Checking breathing in CPR	72	66	>0.05
16. Giving rescue breaths in CPR	05	00	>0.05
17. Rescue breath	47	44	>0.05
18. Bag and mask device	35	33	>0.05
19. Checking pulse in SCA	03	02	>0.05
20. Chest compressions	27	22	>0.05
21. Effective chest compressions	78	77	>0.05
22. Technique of chest compressions	49	77	>0.05
23. What to do if SCA develops	27	00	>0.05
24. CPR in non-adult victims	25	11	>0.05
25. Defibrillation	25	00	>0.05
26. Defibrillation shock	27	11	>0.05
27. Automated external defibrillation	29	33	>0.05
Overall average	40	36	>0.05

CONCLUSION

The pilot study provided insight into knowledge and retention of knowledge of CPR/BLS of cardiology doctors. The findings indicate that these participants had a lower background knowledge and its retention regarding BLS. Overall, knowledge was not significantly different with respect to gender, category of doctors and their previous BLS attendance.

SUGGESTION

We emphasize the need to carry out refresher BLS courses on regular basis in order to improve knowledge and its retention among cardiology doctors. This study need to be carried out at a larger scale to prove the authenticity of our results.

REFERENCES

1. Baker AB. Artificial respiration, the history of an idea. Med Hist 1971;15:336-46.

2. Fisher JM. Resuscitation greats: the earliest records. Resuscitation 2000;44:79-80.

3. Baskett TF. Robert Woods (1865-1938): the rationale for mouth to-mouth-respiration. Resuscitation 2007;72:8-10.

4. Goldstein DH, Beckwith RK. A survey of resuscitation training in Canadian undergraduate medical programs. CMAJ 1991;145:23-7.

5. Savary-Borioli G. Basic life support: the primary ABC(D) of cardiopulmonary resuscitation. Ther Umsch 1996;53:624-9.

6. Holmberg M, Holmberg S, Herlitz J. Effect of bystander cardiopulmonary resuscitation in out-of-hospital cardiac arrests patients in Sweden. Resuscitation 2000;47:59-70.

7. Caffrey SL, Willoughby PJ, Pepe PE, Becker LB. Public use of automated external defibrillators. N Engl J Med 2002;347:1242-7.

8. Hallstrom AP, Ornato JP, Weisfeldt M. Public-access defibrillator and survival after out-of-hospital cardiac arrest. N Engl J Med 2004;351:637-46.

9. Robert WH, John EB, Vinay MN, William MM, Robert EO, Micheal RS, et al. 2005 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation 2005;112;19-34.

10. Zheng ZJ, Croft JB, Giles WH, Mensah GA. Sudden cardiac death in United States, 1989 to 1998. Circulation 2001;104;2158-63.

11. Reynold MR, Josephson ME. Sudden cardiac death. In: Fuster V, Alexander RW, O'Rourke RA, editors. Hurst's the heart. 11th ed. New York: Mc Graw Hill; 2004. p. 1051-78.

12. MacDonald RD, Mottlay JL, Weinstein C. Impact of prompt defibrillation on cardiac arrest at a major international airport. Prehosp Emerg Care 2002:6:1-5.

13. Ishtiaq O, Iqbal M, Zubair M, Qayyum R, Adil M. Outcome of cardiopulmonary resuscitation - predictors of survival. J Coll Physicians Surg Pak 2008;18:3-7.

14. Steen PA, Kramer-Johansen J. Improving cardiopulmonary resuscitation quality to ensure survival. Curr Opin Crit Care 2008;14:299-304.

15. Oinaike BB, Aderinto AO, Oyebamiji EO, Dairo MD. Evaluation of knowledge of doctors in a Nigerian tertiary care hospital about CPR. Niger Med Pract 2007;52:16-8.

16. Abella BS, Alvarado JP, Myklebust H, Edelson DP, Barry A, O'Hearn N, et al. Quality of cardiopulmonary resuscitation during in-hospital cardiac arrest. JAMA 2005;293:305-10.

17. Lloyd-Jones D, Adams RJ, Brown TM, Carnethon M, Dai S, De Simone G, et al. Heart disease and stroke statistics--2010 update: a report from the American Heart Association. Circulation 2010;121:948-54.

18. Brown TB, Dias JA, Saini D, Shah RC, Cofield SS, Terndrup TE, et al. Relationship between knowledge of cardiopulmonary resuscitation guidelines and performance. Resuscitation 2006;69:253-61.

19. Kimaz S, Soysal S, Cimrin AH, Günay T. Assessment of physicians employed in emergency medical services about their level of knowledge on basic life support, advanced cardiac life support and medicolegal responsibilities. Ulus Travma Acil Cerrahi Derg 2006;12:59-67.

20. Filgueiras Filho NM, Bandeira AC, Delmondes T, Oliveira A, Lima AS, Cruz V, Vilas-Boas F, et al. Assessment of the general knowledge of emergency physicians from the hospitals of the city of Salvador (Brazil) on the care of cardiac arrest patients. Arq Bras Cardiol 2006;87:634-40.