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RETENTION OF KNOWLEDGE AND SKILLS OF BASIC LIFE SUPPORT AMONG HEALTH CARE PROVIDERS TRAINED IN TERTIARY CARE HOSPITAL

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Date Received: October 24, 2013
Date Revised: December 20,2013
Date Accepted: December 30,2013

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

All authors declare no conflict of interest.

ABSTRACT

Objective: The study assesses the retention of knowledge and skills of basic life support training, among health care providers (HCP) who attended the Basic Life Support (BLS) course.

Methodology: This cross-sectional study was conducted at tertiary care Cardiac Hospital, Karachi. The sample was taken from among the BLS trained staff of the hospital. Data was collected using the accredited American Heart Association's Critical Skill Checklist for skills, and a self prepared questionnaire including the demographic information of the medical/paramedical staff, and the personal experience/attitude and knowledge of BLS based on 2010 AHA guidelines.

Results: After excluding incomplete questionnaire, the data from 106 responders calculated. There people analyzed were, 4 clinical faculty members (3.8%). Post graduate students were 36(34.3%). House officers were 6 in numbers (5.7%). Nurses were 46(43.8%). Other health assistants were 13(12.4%). Results indicate that the retention of knowledge and skills were adequate in most parameters, but it was found that retention of knowledge and skill was better in doctors as compared to paramedical staff. Depending upon the place of work, those working in Emergency Room or were frequently were required to do CPR in CCU or wards were better off with the skills and knowledge of BLS.

Conclusion: The average health personnel in our hospital found to have adequate skills in CPR/BLS. But to remain knowledgeable and be ready for prompt action at time of sudden cardiac arrest, their reflexes should be more alert. This can be achieved by more frequent update courses.

Key Words: Knowledge, Retention, Training, Skills, Basic Life Support

INTRODUCTION

Studies showed that early and effective cardiopulmonary resuscitation improves the chances of survival in cardiac arrest victims. But the knowledge and skills of health care providers (HCP) vary.[1-4] Survival after cardiopulmonary arrest is usually low and depends on early intervention i.e. quality of cardiopulmonary resuscitation (CPR) and time to defibrillation.[5] Basic Life Support, a key component of the chain of survival, decreases the arrest, CPR interval and increases the rate of hospital discharge. Ideally, all adults in the community should be trained for basic life support, and all health care providers must be aware of the chain of survival, including the sequences of basic life support before they join the profession and if not before then they should become proficient as soon as they enter the profession.[6,7]

Several publications have highlighted the deficiencies in CPR quality for both out of hospital and in hospital cardiac arrest.[8-12] But the knowledge and skills of HCP's vary.[13-17] BLS knowledge and skills tend to degrade after sometime and regular training and practice as an update course is recommended.[13,18]

Paramedics and nurses are often the first responders in case of in-hospital cardiac arrest. BLS proficiency includes the use of an automated external defibrillator (AED) and it is therefore expected that nurses trained in BLS would be able to use the device.[19]

This study was conducted at a Tertiary Care Cardiac Hospital in Karachi, Pakistan. Here, the training for Basic Life Support started in October 2011. Participants for the study were HCP who attended the BLS course and trained for BLS. The aim was to explore the level of knowledge and attitude towards BLS among medical / paramedical staff in the National Institute of Cardiovascular Diseases, Karachi.

METHODOLOGY

This cross-sectional study was conducted at tertiary care Cardiac Hospital, (NICVD) Karachi. The study subjects were medical/paramedical staff who were trained in the hospital during last one year. Those unwilling to participate and returned incomplete questionnaire were excluded from the study. A questionnaire was prepared by authors which consist of, demography and professional designation of the participants and questions were designed to assess the knowledge of participants. Skills of Basic Life Support were checked using the American Heart Association's accredited checklist for 1-rescuer adult CPR. The validity of the questionnaire was determined by piloting in a small group of 10 subjects, before it was finalized for the study. After appropriate changes made in the questionnaire after the piloting, ethical approval was obtained. The study was approved by the hospital ethical committee. Written informed consent was obtained before the respondents were given the questionnaire. The author went to the various departments of the hospital and distributed the questionnaire to the subjects, and collected the questionnaire as they were completed.

The collected data was analyzed by Statistical Analysis for Social Sciences (SPSS) version 20. Categorical Variables were presented as frequencies and percentages.

RESULTS

150 questionnaire were distributed to the participants, When returned, 115 were complete, but 09 questionnaires were found incomplete, and were excluded from the study. Among 106 responders, 4 were clinical faculty members, 36 post graduate students, 6 house officers, 46 nurse and 13 were paramedics. The duration of clinical experience was divided between <1 year, 1-5 years, 5-10 years, and >10 years. This turn out to be 12(11.9%), 58(55.2%), 14(13.3 %) and 20(19.0%) participants respectively. The participants performed according to the 2010 AHA guidelines, as they were being trained, i.e. They checked response of the patient by shouting and shaking his shoulders. Then scanned chest for movement of breaths, if there is any, at least for 5 seconds. Next step is to call for help and activate emergency response system (Emergency Medical System, EMS), asking somebody in the onlookers to go activate Emergency response System. Again they checked for circulation by placing tips of 2 fingers on the carotid pulse, on the side near you, for at least 5 seconds but no more than 10 seconds. If no pulse is palpable then immediately start chest compression at a rate of 100 compressions per minute and a depth of at least 2 inches in adults in the centre of the chest.[7,10] The previous training in BLS was categorized as <6 months, and >6 months. 77 participants (73.3%) were trained beyond 6 months and 23 participants (21.9%) had training of BLS less than 6 months in the same facility. 4 participants were not sure about the time period passed after the training, but they were sure it was under 2 years.

Regarding general questions of questionnaire, 73.4% answered that general public should be trained in BLS, 83.8% answered willingness to perform CPR and 60% showed willingness for mouth to mouth breathing without hesitancy as shown in Table 1.

About 65% were frequent performer of CPR during their working hours in hospital, 85% of participant answered recognition of cardiac arrest by checking having no pulse and no breathing and 65% answered checking response of patient by shouting and shaking shoulders of the victim (Table 2).

Table 3 shows skills of responders to perform CPR. Carotid

artery for checking pulse of patients in cardiac arrest was correctly answered by 87.6% of participants. Proper location of hand placement at the lower half of the sternum is vital for performing effective chest compression and was answered correctly by 53.3% and 59% answered correctly the depth of chest compression as 2 inches in adults.

Table 4 shows knowledge for how many breaths after how many chest compressions? this was answered correctly by 84.8% of participants. Opening the airway by head tild and chain left was reported correctly by 77.1%. Number of breaths given in each cycle is 2 was correctly answered by 87.6% of participants .

Table 5 summarizes the overall questions of the questionnaire as answered by the participant. 80% of participants knew the abbreviation CPR. 'What is the most important determinant of

Table 1: Shows the General Questions of Questionnaire Answered by Participants

Variables	Frequency (%)
Which health care professional are eligible to receive training in BLS who should be trained in BLS?	
ER health Personnel	1(1.0)
All health personnel	25(23.8)
General Public	78(74.3)
Missing value	1(1.0)
Total	105 (100)
Reluctant to perform resuscitation if yes	
Transmission of disease	2(1.9)
Ineffective	1(1.0)
Taking responsibility	4(3.8)
Any other	5(4.8)
Don't know	6(5.7)
Missing value	87(82.9)
Total	105(100)
Reluctant?	
Not reluctant	88(83.8)
Reluctant	11(10.5)
Missing value	6(5.7)
Total	105(100)
Mouth to mouth ventilation	
Willing to perform without any hesitancy	63(60.0)
Prefer to use some type of barrier	38(36.2)
Would stay back & let someone else to volunteer	1(1.0)
Refuse to perform	2(1.9)
Missing value	1(1.0)
Total	105(100)

Table 2: Shows Questions of Questionnaire Regarding Basic Knowledge About BLS Answered by Participants

Variables	Frequency (%)
Have you ever performed CPR in dealing with the patients	
No	16(15.2)
Seldom	19(18.1)
Frequent	69(65.7)
Missing value	1(1.0)
Total	105(100)
CPR stand for	
Cardiopulmonary rate	2(1.9)
Cardiopulmonary resuscitation	83(79.0)
Any other	5(4.8)
Don't know	14(13.3)
Missing value	1(1.0)
Total	105(100)
No sign of life means?	
No pulse is present	4(3.8)
No breathing is present	3(2.9)
Pulse and breathing absent	90(85.7)
Any other	2(1.9)
Don't know	2(1.9)
Missing value	4(3.8)
Total	105(100)
Man collapses scene safe what next step you will take to recognize the arrest	
Call for emergency medical service	12(11.4)
Shake shoulders and shout	69(65.7)
Any other	13(12.4)
Don't know	1(1.0)
Missing value	10(9.5)
Total	105(100)

survival' in cardiac arrest victim was correctly answered as 'cardiac arrest to defibrillation time' by 38.1% participants. 'Method to relieve choking in adults' by abdominal thrusts was answered correctly by 76.2% participants.

Table 3: Shows Questions of Questionnaire Regarding Basic Skills About BLS Answered by Participants

Variables	Frequency (%)
Artery used for checking pulse in adults	
Femoral artery	2(1.9)
Carotid artery	92(87.6)
Brachial artery	3(2.9)
Any other	5(4.8)
Don't know	2(1.9)
Missing value	1(1.0)
Total	105(100)
Location of hands on chest for CPR	
At upper half of sternum	5(4.8)
At lower half of sternum	56(53.3)
A mid-level of sternum	41(39.0)
Any other	2(1.9)
Missing value	1(1.0)
Total	105(100)
Rate of chest compression in adults	
100	60(57.1)
80	5(4.8)
60	10(9.5)
Any other	20(19.0)
Don't know	7(6.7)
Missing value	3(2.9)
Total	105(100)
Depth of chest compression in adult	
1.5 inches=4 cm	20(19.0)
2.0 inches = 5 cm	62(59.0)
1 inch = 2.5	8(7.6)
Any other	7(6.7)
Don't know	6(5.7)
Missing value	2(1.9)
Total	105(100)

Table 4: Shows Questions of Questionnaire Regarding Skills About BLS Answered by Participants

Variables	Frequency (%)
Ratio of chest compression and ventilation in adult	
18:2	2(1.9)
30:2	89(84.8)
Any other	6(5.7)
Don't know	7(6.7)
Missing value	1(1.0)
Total	105(100)
Depth of chest compression and ventilation in adult	
3 cm	44(41.9)
5 cm	8(7.6)
4 cm	30(28.6)
Any other	12(11.4)
Don't know	10(9.5)
Missing value	1(1.0)
Total	105(100)
Open airway by	
Lifting chin and opening the mouth	10(9.5)
Head tilt, chin lift	81(77.1)
Any other	7(6.7)
Don't know	4(3.8)
Missing value	3(2.9)
Total	105(100)
Give breaths how many	
4 quick breath	1(1.0)
1 long breath	5(4.8)
2 breath	92(87.6)
Any other	5(4.8)
Missing value	2(1.9)
Total	105(100)

DISCUSSION

This was a local study restricted to one hospital only. Participants ranged from senior doctors to the junior student nurse level. Men and women both took part. All participants were trained with the video-based course of 2010 BLS

Table 5: Summarizes BLS Knowledge of Participants

Questions	Correct (%)	Incorrect (%)	Don't know (%)
1. CPR stands for	84(80%)	7(6.7%)	14(13.3%)
2. 'No sign of Life' means	91(86.7%)	11(10.5%)	3(2.9%)
3. Person collapses in front of you, scene Safe, what to do next	70(66.7%)	28(26.7%)	3(2.9%)
4. Artery use to check pulse in adults	92(87.6%)	11(10.5%)	2(1.9%)
5. Location of hands on the chest for CPR	56(53.3%)	49(44.8%)	2(1.9%)
6. Rate of chest compression in adults	61(58.1%)	35(33.3%)	7(6.7%)
7. Depth of chest compression in adults	62(59%)	36(34.2%)	6(5.7%)
8. Ratio of chest compression: ventilation	90(85.7%)	8(7.6%)	7(6.7%)
9. Depth of chest compression in infants	8(7.5%)	87(82.8%)	10(9.5%)
10. Open airway by	82(78.1%)	22(21%)	5(4.8%)
11. Given breaths, how many	93(88.6%)	6(5.8%)	5(4.8%)
12. Most important determinant of survival In cardiac arrest victim	40(38.1%)	63(60%)	1(1%)
13. Relieve choking in adults	80(76.2%)	19(18.1%)	6(5.7%)

guidelines, formulated by American Heart Association. The course content is strictly followed in keeping with the AHA format. The retention of knowledge and skills of Basic Life Support training in Health Care Professionals is a major problem. Some studies shows that skills and knowledge decline rapidly, even days after a course is completed.[7,10] This study was done to assess the level of knowledge and skills of basic life support in trained medical/paramedical staff of this hospital in last one year.

The study revealed that participants although were lacking in many aspects of knowledge and skills of basic life support. CPR training significantly influenced the BLS knowledge of the participants. Those who were trained in last 6 months better performed than those whose training period was beyond 6 months. Some studies showed that skills and knowledge of basic life support decline rapidly.[8,9] The study performed in Nepal also concludes that those who were involved in resuscitation frequently performed better as compared to those who did it infrequently.[13]

Regular updates and simulation training in CPR skills have been shown to help HCPs remain competent and knowledgeable.[8,12] This study also showed that some aspects of skills and knowledge has been mixed up or forgotten. Still, the retention of knowledge and skills were adequate, and the number of answer/skills done correctly were statistically significant.

In this study, 7 out of 13 questions were answered correctly by >75% of the participants. 4 out of 13 questions were answered correctly by 50% and above, and 2 answers out of 13 were < 38%.

Other aspect identified is the positive attitude of the participants towards BLS. About 84.8% of the participants were not reluctant to perform CPR when needed, and 15 (14.3%) were reluctant. The most common reason for not doing CPR was to avoid responsibility, transmission of disease, felt ineffectiveness of the procedure. Others were not sure about the cause of their reluctance.

The study showed that the new 2010 BLS guidelines as video-based instructions for skills development and practice is able to provide high quality training in BLS. A study by Eisenburger et al, says 'Student age, psychomotor skills, course content, instructor training, digression of instructor from course content, insufficient time to practice, poor supervision and poor feedback have all been shown to be associated with skill loss.[10]

It was a fact that participants who were engaged in CPR in real time scenarios on day to day bases, were the ones who did better than those in out-patient department or in other places, labs etc. who seldom practiced basic life support. Eliff et al, and Mohamed et al, also observed that previous experience in real life resuscitation increased the incidence of correct answers.[14,15] Other studies also concluded that knowledge of trained personnel was better than untrained.[18]

BLS course should become a basic prerequisite for everyone working in the medicine field and handling patients in emergency states and should be taught as part of the initial orientation to this hospital.[20] A study performed in South Africa showed that the new video based course is able

to provide high quality training in BLS, and this study shows that although some decline in knowledge and skills was seen but overall performance were good when seen in the staff after 3 months of training.[21]

Time from collapse to defibrillation has been internationally recognized as the most valuable for reviving the cardiac arrest victim with shockable rhythm. This is seen to be poorly understood (40%)by the study group.[6]

CONCLUSION

This study depicts the variable knowledge and skills retention of basic life support by health care professionals. The average health personnel in our hospital were found to have adequate skills in CPR/BLS. The farther it is from the date of training the less is the efficiency. Those who were frequently involved in day to day performance of CPR in their work places like Emergency department or CCU/ICU did performed better.

ACKNOWLEDGEMENT

I am thankful for the support from Faraz Saeed Siddiqui in data collection work. Hina feroz in helping to analyze the data, Muslima Ejaz in helping to lay out the format of the study and Nousheen Pradhan helping to incorporate the basic requirements of the paper.

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