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Knowledge of 2015 basic life support (BLS) guidelines among doctors and nursing staff of a rural based tertiary care hospital, in western India: Current status and requirement

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Abstract

Background & Aim: The chances of return of spontaneous circulation and survival to hospital discharge increase after cardiac arrest with high quality cardiopulmonary resuscitation (CPR). In the era of evidence based medicine and as a requirement of National accreditation board for Hospitals and healthcare providers (NABH), basic life support (BLS) should be practiced as per latest guidelines. The aim of this study was to evaluate the knowledge of recent BLS guidelines with emphasis on high quality chest compressions, among doctors and nursing staff of our center.

Method: This cross-sectional study was conducted in a tertiary care hospital in Western India. The awareness about recent guidelines of American heart association (AHA), BLS, and factors associated which include profession, age, gender, current primary posting, previous BLS training and updated with Highlights of 2015 was assessed by using a MCQ based questionnaire.

Statistical Analysis: The descriptive analysis was run to find the proportions of various parameters and Chi-square test was applied to find association between different qualitative variables. Significant result was considered at 5% level of significance.

Results: Among 213 participants, 92 were doctors and 121 were nursing staff. Only 10.3% had acceptable score (>16 correct answers out of 20 MCQs). Relation between acceptable score and responders having updated with 2015 guidelines and previous BLS training was found to be statistically insignificant. Conclusion: Knowledge about BLS is very poor among health care providers in a tertiary care hospital.

Keywords: Healthcare provider, Basic life support, Knowledge, Training, Recent guidelines.

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Introduction

American heart association(AHA) has made "better heart and brain" health their mission and remains committed to Basic life support (BLS) and advanced cardiovascular life support (ACLS) training, the act of bringing resuscitation science to life. BLS is the foundation for saving lives after cardiac arrest, respiratory arrest and choking in adults, children and infants.[1] The chances of return of spontaneous circulation(ROSC) and survival to hospital discharge increase after cardiac arrest with high quality cardiopulmonary resuscitation (CPR).[2] The recent BLS guidelines were available on internet as "Highlights of the 2015 AHA, update for CPR & ECC (Emergency cardiovascular care)" in October 2015 and the printed manual in March 2016. In the past, many studies have been done on awareness about BLS in various health care professionals.[3-13] Eyes do not see and hands do not perform, if mind does not know. The study was conducted in the hospital, accreditated for National accreditation board for Hospitals and healthcare providers (NABH). In the era of evidence based medicine, BLS, a protocol based practice, should be as per latest guidelines. In this hospital, department of anaesthesiology conducts AHA, BLS & ACLS workshop twice a year, since 2012. As a requirement of NABH all the health care providers need to be trained in BLS. The competent authors have been regularly giving in house training to all health care providers, in batches.

The objective of this study was to evaluate the knowledge of recent BLS guidelines with emphasis on high quality CPR, among doctors and nursing staff in a rural based tertiary care hospital.

Methods

After getting approval from institutional ethics committee, this cross-sectional study was conducted between June-August 2016, in a rural based tertiary care hospital in Gujarat. Doctors and nursing staff involved with patient care were asked for their time and then they were briefed about the purpose of study. Upon their verbal consent they were given a printed questionnaire containing twenty multiple choice questions (MCQs) pertaining to assessment of knowledge of recent BLS guidelines. The questions were mostly self-developed on components of high quality CPR and were consensually agreed upon by the subject experts before administration. The questionnaire was distributed personally by one of the authors and responses were filled by the participants themselves while the researchers were around.

Questionnaire for BLS: (Your participation in this survey is voluntary and the information given by you

will remain confidential. Please fill the complete information and encircle the correct answer).
Doctor / Nursing Staff
Age: Years Sex: Male / Female
BLS training taken: Yes / No
Posted in: Casualty / OPD / Ward / OT / ICU.
Updated with Highlights of the 2015, AHA: Yes / No

1. The right sequence for BLS is:
   a. C-A-B
   b. A-B-C
   c. C-B-A
   d. B-C-A
2. What does abbreviation EMS stands for:
   a. Effective medical services
   b. Emergency management services
   c. Emergency medical services
   d. External medical support
3. The core purpose of learning and practising BLS is:
   a. Job demands it
   b. You get extra money
   c. To save a life
   d. Only to be practised on near and dear one.
4. What does abbreviation AED stands for:
   a. Automated external defibrillator
   b. Automated electrical defibrillator
   c. Advanced electrical defibrillator
   d. Advanced external defibrillator
5. The chest compression in cardiac arrest are given with victim in:
   a. Supine position with face up
   b. Prone position
   c. Lateral position
   d. Sitting position
6. During BLS, chest compressions are started when:
   a. The victim is unresponsive, not breathing and has pulse
   b. The victim is unresponsive, breathing and has pulse
   c. The victim is unresponsive, not breathing and has no pulse
   d. The victim is responsive, coughing vigorously and has pulse
7. According to 2015 BLS guidelines by American Heart Association(AHA):
   a. Pulse is checked after checking response and breathing
   b. Pulse is checked simultaneously along with breathing after checking for response
   c. There is no need to check pulse before starting chest compressions
   d. Pulse check should be done only after opening airway and giving 2 rescue breaths
8. The chest compressions during cardiac arrest should be started:
   a. In < 10 sec.
   b. In < 30 sec.
   c. In < 60 sec.
   d. In < 90 sec.
9. The correct rate of chest compressions is:
   a. Approximately 100/min
   b. At least 100/min
   c. 100-120/min
   d. > 140/min
10. The correct depth of chest compressions in adults is:
    a. Approximately 2 inches
    b. At least 2 inches
    c. At least 2 inches but not more than 2.4 inches
    d. 1 ½ to 2 inches
11. The compression-ventilation ratio in adults CRP is:
    a. 5:1
    b. 15:2
    c. 30:2
    d. 3:1
12. The chest compression is done on:
    a. Left side of the chest wall
    b. Lower half of the breast bone
    c. Upper half of the breast bone
    d. Anywhere on the chest wall
13. All holds true regarding chest wall recoil during chest compressions EXCEPT
    a. Will allow the heart to refill with blood
    b. Compression-relaxation time should be 50:50
    c. Leaning on chest improves blood flow to the heart
    d. Hand position remains the same maintaining contact with the chest wall
14. The chest compressions are interrupted during:
    a. Rescue breaths with advanced airway
    b. Rescue breaths without advanced airways
    c. Attaching AED pads
    d. Giving IM/IV Naloxone injection
15. The compression fraction during CPR should be:
    a. < 40%
    b. Atleast 60% but desirable up to 80%
    c. 40% to 60%
    d. None of the above
16. The time taken for 30 compressions is:
    a. < 10 sec.
    b. Atleast 15 sec but < 18 sec
    c. > 20 sec
    d. 30 sec.
17. High quality chest compressions does not include:
    a. Allowing chest wall recoil
    b. Check pulse with every chest compression
    c. Minimize interruption during chest compressions
    d. Avoid hyperventilation
18. In trauma victims opening the airway is done by:
    a. Head tilt chin lift.
    b. Jaw thrust
    c. Turning only head to left side
    d. Applying cervical collar

19. Ventilation with advanced airway during cardiac arrest is:
    a. One breath over 1 sec repeated every 6 sec.
    b. One breath over 1 sec repeated every 6-8 sec
    c. One breath over1 sec repeated every 3-5 sec
    d. One breath over 1 sec repeated every 10 sec
20. Hyperventilation during rescue breathing leads to:
    a. Gastric distension
    b. Increased chances of regurgitation, vomiting and aspiration
    c. Decreased blood flow to heart and brain
    d. All of the above.

Answer Key

1(a)	6(c)
11(c)	16(b)
2(c)	7(b)
12(b)	17(b)
3(c)	8(a)
13(c)	18(b)
4(a)	9(c)
14(b)	19(a)
5(a)	10(c)
15(b)	20(d)

The answer key was prepared using Basic Life Support, American heart association, provider manual, 2016.

Statistical Analysis: All responses collected were entered into excel sheet and analysed statistically using SPSS version 14.The descriptive analysis was run to find the proportions of various parameters and Chi-square test was applied to find association between different qualitative variables. Significant result was considered at 5% level of significance. The response to, must know selected questions (1, 6, 9, 11) was analysed as correct or incorrect and calculated in percentage.

Results

All the participants that were approached agreed to participate and respond. Total 213 fully filled forms were collected, of which 92 were doctors and 121 were nursing staff. Seventy percent of total responders were females and 30% were males. Majority of the participants were aged less than forty years in both nurses and doctors. Out of 213, 73.7% (157) had taken BLS training earlier. Out of total participants 38% (81) of responders were having primary posting in ICU and 22.2% (43) in OT. Ninety seven out of 213 had updated themselves with 2015 AHA guidelines for BLS.

We considered $\geq$16 out of 20 as an acceptable score, corresponding to $\geq$80% correct answers from given MCQs. Only 10.3% (22) had acceptable score. Doctors had more number of acceptable score compared to nurses and the difference was statistically significant (p value < 0.001). The difference between females and males showing acceptable score was statistically insignificant. The impact of previous BLS training on the acceptable score was statistically insignificant. Only 2 out of 81 primarily posted in ICU had acceptable score. Relation between acceptable score and responders having updated with 2015 guidelines was analysed and it was found to be statistically insignificant. Acceptable score of responders primarily posted in ICU was compared to those posted in others areas and it was found that the performance was very poor in those posted in ICU (p value < 0.002) (Table 1).

Analysis of response to must know questions (1,6,9,11) was done. In 15.49% responders, knowledge about the correct sequence of BLS was lacking though it is same as 2010 guidelines. Failure to recognize cardiac arrest was seen in 18.3%. Surprisingly, 64.31% of responders were not aware of revised rate of chest compressions, a basic building block for high quality CPR. The correct ratio of compression to ventilation in adult CPR was incorrectly answered by 15.02% (Table 2).

Table 1: Distribution of score by various important variables of the participant

	Score in not acceptable range	Score in acceptable range	Total	P value
Profession				
Doctor	75	17	92	<0.001
Nurse	116	5	121	
BLS training done				
Yes	142	15	157	0.609
No	49	7	56	
Updated with guidelines				
Yes	84	13	97	0.258
No	107	9	116	
Current primary posting				
ICU	79	2	81	0.002
Other departments	112	20	132	

Table 2: Number of correct and incorrect responses to must know questions on the basic life support survey

Question	Number of correct responses (%)	Numbers of incorrect responses
Q.1	180(84.5%)	33(15.49%)
Q.6	174(81.69%)	39(18.30%)
Q.9	76(35.68%)	137(64.31%)
Q.11	181(84.97%)	32(15.02%)

Discussion

BLS is medical care which is used for victims of life threatening illness or injuries. It can be provided by trained medical personnel, emergency medical technician, paramedics and by qualified bystanders with hands only, minimum airway equipment's and AED (Automated external defibrillator). Drugs (other than Naloxone for suspected opioid overdose leading to life threatening emergencies) and invasive skills are not included in BLS. In 2008, AHA coined the term "Hands only CPR" and in 2010 endorsed CAB (chest compressions, airway, breathing) as sequence for BLS, in-order to emphasize the primary importance of chest compressions in CPR. Resuscitation as a science is being practiced since 1960 and the guidelines are updated every five years.

Sudden cardiac arrest occurs when the heart develops an abnormal rhythm and can't pump blood. It is life threatening emergency, recognized by presence of unresponsiveness, abnormal or no breathing and absence of carotid pulse in adults. CPR initiated timely and effectively can sustain life, till ALS provider takes over and can prevent hypoxic brain injury and eventually death. According to AHA 2015,BLS guidelines, for both in hospital and out of hospital, adult cardiac arrest chain of survival, immediate recognition of cardiac arrest, early activation of EMS, early CPR and defibrilation as soon as possible is likely to improve ROSC and survival.[1]

In this hospital, anaesthesia department has been regularly giving BLS training to health care providers, in batches. This is being done since 2012, initially with 2010 guidelines and after March 2016 with 2015 guidelines. In every session of two hours duration, a lecture of CPR for 30 mins was followed by demonstration cum hands on experience to most of the health care providers.

Twice yearly held AHA certified, BLS course in our hospital differs from in-house training in many aspects. In AHA certified course, pre-course, student provider manual is given on registration. These 5 hours, paid course, is a video based learning facilitated by AHA faculty and instructors with a student to instructor ratio of 6:1 and every student performs the skills while watching the video. The student to manikin ratio is 2:1 or 3:1. The practical skill of each student is assessed using a skill performance checklist and knowledge by MCQ based written exam at the end of the course. The validity of BLS provider card issued to successful candidates is only for 2 years.

Adult learning is a self learning process and even the role played by teachers is more like a facilitator. Curiosity to learn is essential to gain knowledge and internet is a good source to acquire the same, ahead of printed material. In this study, we wanted to find out the knowledge of recent 2015 BLS guidelines among doctors and nurses.

AHA issues BLS provider card only if score is $\geq$ 84% in written test.[1] For ease of calculation, in our study we had considered, $\geq$80% as acceptable score. Alarmingly, only 10.3% had acceptable score. Doctors had more number of acceptable score compared to nurses and the difference was statistically significant (p value < 0.001).This may be due to poor understanding of the questionnaire printed in English among nursing staff, but actually the number of persons having acceptable scores is very small. Inspite of previous exposure to BLS training (157/213) and being updated with Highlights of 2015, AHA,(97/213), the knowledge of recent guidelines was found to be poor.(22/213).

Lack of interest to learn resuscitation during in-house training, update one-self, less time and busy schedules, less number of manikins with feedback devices, no pre training reading material, no exams following in-house training , comparatively lesser exposure to cardiac arrest in practice, fading of knowledge with time, large turn- over of health care providers with possibility of new untrained personnel in the hospital and no existing mandatory rules and regulations to be certified BLS provider are likely explanation for poor knowledge of BLS . All previous studies done also conclude with poor awareness, knowledge and attitude of BLS in various health care providers and have suggested to include such important training in teaching curriculum.[3-13]

Countries where BLS is used for education of 'first responders' are: USA, UK, Spain, Belgium, Brazil, France, Poland, Portugal, Germany, Romania, Netherland and Turkey.[14]

Indian heart association, established in 2013, is located in Hyderabad, India. It was founded by Sevith Rao and Sishir Rao, and focuses on prevention of cardiovascular diseases and stroke. Also, no Indian guidelines for resuscitation are available at the time of writing this article.

Limitations

We could assess the knowledge of only those who volunteered for the study. Certain doctors and nurses were not assessed due to shift duties or those who were

on leave. Only theoretical, limited, knowledge was assessed. Practical skills and attitude to perform BLS was not assessed.

Conclusion

The knowledge of recent guidelines of BLS is very poor among doctors and nurses in our hospital in spite of regular 'training. More frequent training, with case-based scenarios in a simulation laboratory, adequate time, resources like manikins with feedback devices, basic airway equipments and AEDs, and trainers, videos for learning and assessment by MCQs at the end of the session is likely to sensitize and improve attitude, knowledge and skills in future. Atleast doctors and nursing staff involved with patient care working in ICU, intermediate care unit, casualty, operation theatre and post anesthesia care unit should be BLS certified and should renew the same, once every 2 years.

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