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Basic life support knowledge of healthcare students and professionals in the Qassim University

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Abstract:

Objective: To evaluate the knowledge of basic life support (BLS) among students and health providers in Medicine, Pharmacy, Dentistry, and Allied Health Science Colleges at Qassim University.

Methodology: A cross sectional study was performed using an online BLS survey that was completed by 139 individuals.

Results: Ninety-three responders were medical students, 7 were medical interns, 6 were dental students, 7 were pharmacy students, 11 were medical science students and 15 were clinical practitioners. No responder scored 100% on the BLS survey. Only two out of the 139 responders (1.4%) scored 90–99%. Both of these individuals were fifth year medical students. Six responders (4.3%) scored 80–89%. Of these, 5 were fifth year medical students, and one was fourth-year medical student. Eleven responders (7.9%) scored 70–79%. Of these, eight were fifth year medical students, two were medical interns and one was a pharmacist. Twenty-three responders (16.5%) scored 60–69%. Of these, 11 were fifth year medical students, 1 was a fourth-year medical student, 3 were medical interns, 2 were medical science students, 1 was a dentistry student, and 5 were pharmacists. Twenty-eight responders (20.1%) scored 50–59%. Of these, 11 were fifth year medical students, 3 were fourth-year medical students, 1 was a third-year medical student, 1 was a second-year medical student, 2 were first-year medical students, 1 was a pharmacy student, 3 were dental students, 1 was a allied health science student, 2 were doctors, and 3 were pharmacists. The remaining 69 responders (49.6%) scored less than 50%.

Conclusion: Knowledge of BLS among medicine, pharmacy, dentistry, and allied health science students and health providers at Qassim University is poor and needs to be improved. We suggest that inclusion of a BLS course in the undergraduate curriculum with regular reassessment would increase awareness and application of this valuable life-saving skill set.

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Introduction

Basic life support (BLS) includes recognition of signs of sudden cardiac arrest, heart attack, stroke, and foreign body airway obstruction, and the performance of cardiopulmonary resuscitation (CPR) and defibrillation with an automated external defibrillator. [i] Cardiac arrests and accidents are the most common type of emergencies with grave consequences, but simple maneuvers and skills can improve the outcome, and immediate CPR can double or triple the chances of survival. [ii,iii] The majority of patients who experience an out-of-hospital cardiac arrest do not receive adequate resuscitation by health care professionals within the critical time, 3–5 min after onset, thus reducing the chance of survival. [iv] The chance of successful resuscitation after sudden cardiac arrest decreases by 7–10% with every minute that resuscitation is delayed. [v] Early delivery of a shock with a defibrillator (CPR, plus defibrillation) within 3–5 min of collapse can result in survival rate of 49–75%. [vi,vii]

Knowledge of BLS and practice of simple CPR techniques increase the chances of survival of the patient until experienced medical help arrives and, in most cases, is sufficient for survival in itself. [viii] It is important that those who may be present at the scene of a cardiac arrest, particularly lay bystanders, have knowledge of appropriate resuscitation skills and the ability to put these into practice. [ix] Even if they have poor initial knowledge, medical students are able to transfer CPR skills to others after they have been taught. [x] Therefore, it is crucial that everyone in the medical field has knowledge of BLS. [xi] In the wider community there is an expectation that competence in CPR and BLS is at a high standard in all hospital medical and nursing staff. [xii] But little is known about the same in health care students and professionals in Saudi Arabia. So, we conducted this study among students and health providers in medicine, pharmacy, dentistry, and allied health science colleges at Qassim University to evaluate their knowledge of BLS.

Methods

A cross-sectional prospective survey-based-on-questionnaire was conducted at Qassim University, Buraidah, Kingdom of Saudi Arabia. Ethics approval was sought and obtained from the institutional ethics committee. Completion of the questionnaire was voluntary and anonymous. Consent to participate in the study was determined by the completion and return of the questionnaire. An anonymous online survey on BLS was conducted on the social networks like twitter, whats app, facebook, colleges' website. The identification of IP address was utilized to prevent a single respondent from filling the survey more than one time Students and healthcare providers in medical-related colleges at Qassim University were invited to participate in the survey. The survey contained 20 questions on BLS (Appendix 1) and was prepared using the advanced cardiac life support manual posted in Indian Journal of anesthesia 2010. The questionnaire was previously used and validated by a study conducted in India with a very large number of respondents. [13]

SPSS software and suitable statistical tests were used to analyze the data gathered from the data collection form. A p-value equal to or less than 0.05 was considered as significant level. The data analysis Descriptive statistics were analyzed [xiii] using SPSS version 13.0.

Results

One hundred and thirty-nine individuals completed the survey (responders), out of a total of 311 individuals approached, thus the response rate was 44.7%. Ninety-three responders were medical students, seven were medical interns, six were dental students, seven were pharmacy students, eleven were allied health science students, four were doctors, and eleven were pharmacists. Eighty-eight responders (63%) had previously been into BLS training and 51 (37%) had not.

No responder had complete knowledge of BLS, i.e., a score of 100%. Two responders (1.4%), both fifth year medical students, scored90–99%. Six responders (4.3%); five fifth year medical students and one fourth-year medical student) scored 80–89%,11 (7.9%, 8 fifth year medical students, 2 medical interns, and 1 pharmacist) scored70–79%, 23 (16.5%); 11 fifth year medical students, one fourth-year medical student, three medical interns, 2 allied health science students, 1 dentistry student,

and 5 pharmacists) scored 60–69%, 28 (20.1%); 11 fifth year medical students, 3 fourth-year medical students, 1 third-year medical student, 1 second-year medical student, 2 first-year medical students, 1 pharmacy student, 3 dental students, 1 allied health science student, 2 doctors, and 3 pharmacists) scored 50–59%, and 69 (49.6%) scored less than 50%. 14 (27.5%) of fifth year medical students, 16 (76.2%) fourth-year medical students, 9 (90%)of third-year medical students, 4 (80%) of second-year medical students, 4 (66.7%) of first-year medical students, 2 (28.6%) of medical interns, 2(33.3%) of dental students, 6 (85.7%) of pharmacy students, 8 (72.7%) of medical science students, 2 (50%) of doctors and 2(18%) of pharmacists scored less than 50%.

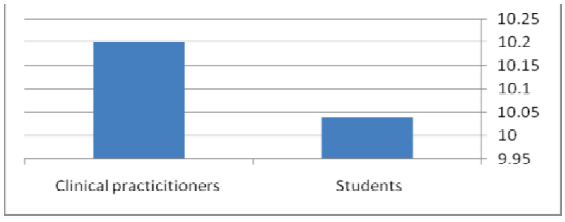

Figure 1. Score of clinical practitioners and students

Clinical practitioners achieved a higher score than all students combined (Figure 1 Medical students achieved a higher score than students of allied health colleges (Figure 2), and medical students in the fifth year of study achieved a higher score than medical students who were not yet in the fifth year of study (Figures 3 and 4). This may be because emergency course is a part of the fifth year medical school curriculum.

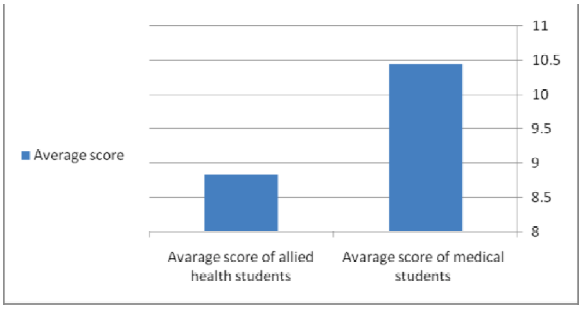

Figure 2. Score of medical students and allied health students.

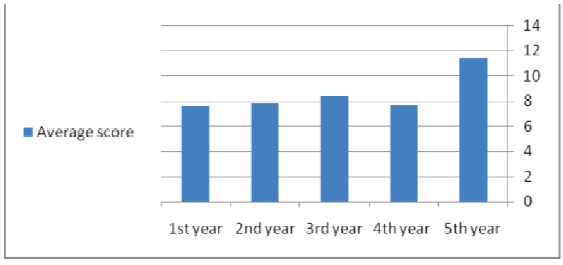

Figure 3. Score of medical students according to year of study.

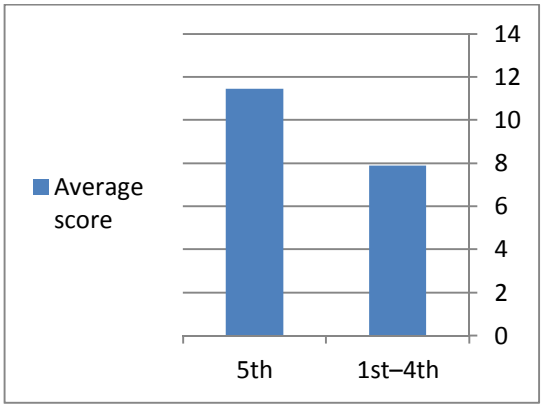

Figure 4. Score of medical students in the fifth year of study and medical student snot yet in the fifth year of study.

Twenty five responders (18%) did not identify the correct meaning of the abbreviation BLS, 59 (42%) failed to identify 'looking for safety' as the first step in BLS, and 104 (75%) failed to identify activating EMS as the course of action to take immediately after confirming the unresponsiveness of an adult. Forty six responders (33%) did not identify the correct location for chest compressions in an adult, 89 (64%) did not identify the correct location for chest compressions in an infant, 55 (40%) did not identify the correct alternatives to mouth-to-mouth ventilation, 76 (55%) did not identify the correct rescue breathing technique for infants, 108 (78%) did not identify the correct depth of chest compression for an adult, 72 (52%) did not identify the correct depth of chest compression for a child, and 89 (64%) did not identify the correct chest depth of chest

compression for a neonate. Sixty two responders (45%) did not identify the correct rate of chest compression for adults and children, 66 (48%) did not identify the correct compression-ventilation ratio for an adult with a single rescuer, and 98 (71%) did not identify the correct ratio of compression-ventilation in a neonate. Ninety one responders (66%) did not identify the correct meaning of the abbreviation AED, and 54 (39%) did not identify the correct meaning of the abbreviation EMS. Ninety four responders (67%) failed to identify 'confirming the severity of obstruction' as the course of action to take with a suspected foreign body obstruction victim, and 70 (50%) failed to identify the correct technique for removal of a foreign body from an infant. Eighty (58%) failed to identify the role of the recovery position in a spontaneously breathing, unresponsive victim, 60 (43%) did not correctly identify the early signs of stroke, and 46 (33%) failed to identify how to recognize and help a patient with acute coronary syndrome (Table 1).

Table 1. Number of correct and incorrect responses to each question on the basic life support survey

Question	Number of correct responses	Number of incorrect responses
Abbreviation of BLS	114	25
Safety in BLS	80	59
Activating EMS	35	104
Location of chest compression in adults	93	46
Location of chest compression in infants	50	89
Awareness of CPR without mouth-to-mouth breathing	84	55
Rescue breathing in infants	63	76
Depth of chest compression in adults	31	108
Depth of chest compression in pediatrics	67	72
Location of chest compression in neonates	50	89
Rate of chest compression in adults and children	77	62
Chest compression-ventilation ratio in adults	73	66
Chest compression-ventilation ratio in newborns	41	98
Meaningof AED	48	91
Meaning ofEMS	85	54
First response in suspected foreign body obstruction in an adult	45	94
First response in severe form of foreign body obstruction in an infant	69	70
Need of recovery position	59	80

Recognition of stroke and appropriate immediate action	79	60
Recognition of ACS and appropriate immediate action	93	46

BLS (Basic life support), EMS (emergency medical services), CPR (cardiopulmonary resuscitation), AED (Automated external defibrillator), ACS (Acute coronary syndrome)

Discussion

The burden of cardiovascular disease is immense, Sudden cardiac death (SCD) is often the first manifestation of cardiovascular disease. SCD is the most common cause of death worldwide, accounts for about 15% of all death in Western countries, [(xiv)] in Saudi Arabia, this problem is even more profound, a vast majority of killer diseases in the Kingdom of Saudi Arabia (KSA) are non-communicable, chronic diseases. Of the 413 deaths per 100,000 in 2002, 144 (35 percent) were due to cardiovascular disease (WHO report, 2008). [(xv)] CPR can make a profound difference in outcome in case of sudden cardiac arrest. Extensive education of the population in particular countries and regions has led to high numbers of bystander CPR in cases of out-of-hospital cardiac arrests. Health care professionals are expected to be adept in BLS. BLS training in high school seems highly effective considering the minimal amount of previous knowledge the students possess. The results of our study showed that although clinical practitioners had better BLS knowledge than students, their knowledge was not complete. [(xvi)] This result supports a similar study conducted in 2010 in India, [(13)] and may reflect the fact that clinical practitioners are more experienced than students and have undergone reassessments of their BLS knowledge. The BLS knowledge of medical students was better than students of allied health colleges, likely because an emergency course is part of the fifth year medical school curriculum. This is supported by the fact that the fifth year medical students had better BLS knowledge medicine than students who were not yet in the fifth year.

A BLS provider must be familiar with certain abbreviations to save time at the scene. Twenty percent of the responders did not know the abbreviation BLS meant ‘basic life support’, while 66% of the responders did not know that the abbreviation AED meant 'automated external defibrillator', and only 59% knew that the abbreviation EMS meant 'Emergency Medical Service'.

Failing to look for safety in BLS can put the victim and the rescuer in unsafe situations; therefore, the fact that a high proportion of the responders failed to identify this correctly as at the first step in BLS is concerning. Furthermore, an even higher proportion of the responders failed to identify activating EMS as the appropriate action to take immediately after confirming the unresponsiveness of an adult, yet this is necessary to provide the critical advanced life support equipment in a crucial time.

Performing chest compressions at the correct location increases the likelihood of enhancing coronary circulation and lessens the risks of accompanying complications such as rib fractures. Also the depth, rate and interruption duration of the compressions directly influence the outcome of cardiac arrest. However, only two thirds of the responders identified the correct location of chest compressions for an adult, and one third identified the correct location for an infant.

Mouth-to-mouth resuscitation is not optimal in all situations, and there are situations in which the use of an advanced ventilation techniques would provide a better outcome. However, a high proportion of the responders did not correctly identify alternative techniques of resuscitation. In infants, the narrow space between the mouth and nose means that the correct rescue breathing technique is mouth-to-mouth and nose; however, this was only identified by half of the responders.

Performing chest compressions of incorrect depth can be either useless or harmful to the victim; however, the results of the survey indicated that two thirds of the responders did not know the proper depth of chest compressions for an adult, half did not know the proper depth for a child, and two thirds did not know the proper depth for an infant. Only

54% of the responders correctly identified the rate of chest compression for all age groups.

Knowing the exact compression-ventilation ratio is extremely important, as it ensures that the proper time is allowed for coronary arteries to circulate blood. Only half of the responders identified the correct ratio for a child and an adult when there is a single rescuer, and less than one third identified the correct ratio for a neonate.

If one suspects a foreign body obstruction, talking to the victim can detect the severity of the obstruction and helps election of the appropriate rescue maneuver. However, two thirds of the responders did not identify this step. Infants should be handled differently from adults, and not knowing the correct technique for an infant could expose them to harm; however, only half of the responders identified the proper technique for an infant.

In a spontaneously breathing, unresponsive victim there is no role for CPR and the recovery position is optimal to provide the proper position for free breathing and protection from various complications such as aspiration. However, only 41% of the responders correctly identified this strategy.

Recognizing and identifying the early signs of stroke and acute coronary syndrome can save time that is a crucial factor in saving the life of the victim. However, just over half of the responders correctly identified the early signs of stroke, and one third did not identify how to recognize and help a patient with acute coronary syndrome.

In a recent study in Scandinavia done on high school students, there was significant improvement and a good retention rate four months after BLS training. It was observed that increasing the number of trained students may minimize the reluctance to conduct bystander CPR and increase the number of positive outcomes after sudden cardiopulmonary collapse. [xvii] So addition and continuous reassessment of BLS courses for undergraduates is need of the hour.

Practical skills of BLS were not assessed in this study.

Conclusions

The results of this study indicate that knowledge of BLS among students in medicine, pharmacy, dentistry, and allied health science colleges and among health providers at Qassim University is poor and needs to be improved. We suggest that the addition of a BLS course to the undergraduate curriculum, along with regular reassessment, will increase awareness and knowledge of this valuable life-saving skill set. There is a need to conduct BLS programs in almost all corners and sectors of our society, with the intention of creating a high number of people capable of performing BLS.

Acknowledgement

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Appendix 1: Online Survey

1. What does the abbreviation BLS stand for?
   a. Best Life Support
   b. Basic Life Support
   c. Basic Lung Support
   d. Basic Life Services
2. When you find someone unresponsive in the middle of the road, what should your first response be? (Note: You are alone)
   a. Open airway
   b. Start chest compression
   c. Look for safety
   d. Give two breathings
3. If you confirm somebody is not responding to you even after shaking and shouting at him, what should your immediate action be?
   a. Start CPR
   b. Activate EMS
   c. Put him in recovery position
   d. Observe
4. What is the location for chest compressions?

a. Left side of the chest

b. Right side of the chest

c. Mid chest

d. Xiphisternum

5. What is the location for chest compressions in an infant?

a. One finger breadth below the nipple line

b. One finger breadth above the nipple line

c. At the intermammary line

d. At Xiphisternum

6. If you do not want to give mouth-to-mouth CPR, which of the following is NOT an appropriate course of action?

a. Mouth-mask ventilation and chest compression

b. Chest compression only

c. Bag mask ventilation with chest compression

d. No CPR

7. How do you give rescue breathstoinfants?

a. Mouth-to-mouth with nose pinched

b. Mouth-to-mouth and nose

c. Mouth-to-nose only

d. Mouth-to-mouth without nose pinched

8. What is the correct depth of chest compression foradults?

a. 1½ – 2 inches

b. 2½ – 3 inches

c. 1 – 1½ inches

d. ½ – 1 inch

9. What is the correct depth of compression forchildren?

a. 1½ – 2 inches

b. 2½ – 3 inches

c. Onehalf to onethird depth of chest

d. ½ – 1 CM

10. What is the correct depth of compression for neonates?

a. 1½ – 2 inches

b. 2½ – 3 inches

c. ½ – 1 CM

d. Onehalf to onethird depth of chest

11. What is the correct rate of chest compression foradults and children?

a. 100 / min

b. 120 / min

c. 80 / min

d. 70 / min

12. What is the correct ratio of CPR for an adult when there is a single rescuer?

a. 15:2

b. 5:1

c. 30:2

d. 15:1

13. What is the correct chest compression:ventilation ratio for a neonate?

a. 15:2

b. 5:1

c. 30:2

d. 3:1

14. What does the abbreviation AED stand for?

    a. Automated External Defibrillator

    b. Automated Electrical Defibrillator

    c. Advanced Electrical Defibrillator

    d. Advanced External Defibrillator

15. What does the abbreviation EMS stand for?

    a. Effective Medical Services

    b. Emergency Management Services

    c. Emergency Medical Services

    d. External Medical Support

16. If you and your friend are having food in a canteen and your friend suddenly starts expressing symptoms of choking, what should your first response be?

    a. Give abdominal thrusts

    b. Give chest compression

    c. Confirm foreign body aspiration by talking to him

    d. Give back blows

17. You witness an infant who suddenly starts to choke while playing with a toy. You have confirmed that he is unable to cry and/or cough. What should your first response be?

    a. Start CPR immediately

    b. Try to remove the suspected foreign body using a blind finger sweeping technique

    c. Back blows and chest compression of five cycles each then open the mouth and remove foreign body only when it is seen

    d. Give water to the infant

18. You witness an adult unresponsive victim who has just been removed from submersion in fresh water. He has spontaneous breathing, but is unresponsive. What should your first response be?

    a. CPR for 2minutes and inform EMS

    b. CPR for 1minute and inform EMS

    c. Compress the abdomen to remove the water

    d. Keep him in recovery position

19. You notice that your colleague has suddenly developed slurring of speech and weakness of the right upper limb. Which one of the following should be done?

    a. Offer him some drinks, probably hypoglycemia

    b. Possibly stroke, get him to the nearest clinic

    c. Possibly stroke, he may require thrombolysis and hence activate emergency medical services

    d. May be due to sleep deprivation, make him sleep

20. A 50-year-old gentleman presents with retrosternal chest discomfort, profuse sweating and vomiting. What is the most appropriate course of action?

    a. Probably myocardial infarction, hence activates EMS, give an aspirin tablet and allow him to rest

    b. Probably acid peptic disease, give antacid and Ranitidine

    c. Probably indigestion, hence give soda

    d. Walk him to the nearest clinic

Answer key:

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

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