

## Poor Basic Life Support Awareness among Medical and College of Applied Medical Sciences Students Necessitates the Need for Improvement in Standards of BLS Training and Assessment for Future Health Care Providers

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**Abstract:** Basic Life Support (BLS) is medical procedures and skills utilized in case of an emergency to save lives. It is given to the victims of life-threatening illnesses or injuries until provision of full medical care at hospitals. BLS is given by health care providers such as physicians, paramedics, emergency medical technician and by lay-persons with BLS training. College of Applied Medical Sciences (CAMS) and college of medicine (COM) students at King Saud Bin Abdulaziz University of Health Sciences (KSAU-HS) Riyadh are the future health care providers in community, which makes their awareness and knowledge of BLS crucial. Therefore, this study was conducted to find out the level of BLS knowledge among CAMS and COM students, to figure out their attitude to obtain knowledge of BLS skills, to practice these skills and wherever needed. This study was conducted by assessing the responses of CAMS and COM students to a questionnaire consisting of 20 questions about BLS. Response of students to the questionnaire was recorded and documented using Microsoft Excel. Data was analyzed using SPSS version 16.0. The most of the responders (CAMS 63.4%, COM 67.36%) had secured less than 50 score corresponding to poor level of BLS knowledge. None of the COM students secured 80% or more score corresponding to excellent BLS awareness and only 1.38% got above 70% score. Six (6%) CAMS students secured 90-100 score (outstanding level), 3 (3%) scored 80-89 (excellent level), 8 (8%) got 70-79 score (very good level), 7 (7%) scored 60-69 (good level) and 13 (13%) secured 50-59 score (satisfactory level). The mean scores was for CAMS and COM students were 45.05% and 37.9% respectively. These data show overall poor BLS knowledge, specifically about CPR, among CAMS and COM students. Poor BLS awareness, specifically about CPR, among CAMS and COM students shows the need for their training and experience in this field. Improvement in standards of BLS training and assessment are recommended. It is also recommended to carry out BLS awareness surveys in students of all KSAU-HS colleges to improve the BLS awareness and skills.

**Key words:** Basic Life Support • Awareness • Students • Assessment • Saudi Arabia

### INTRODUCTION

BLS is defined as medical procedures and skills that can be utilized in case of an emergency to save lives. It is given to the victims of life-threatening illnesses or injuries until they can be given full medical care at a hospital [1]. BLS procedures include Cardiopulmonary Resuscitation (CPR), bleeding control, artificial ventilation and basic

airway management [2]. It is given by health care providers such as physicians, paramedics, emergency medical technicians (EMT) and by lay persons who have received BLS training. American Heart Association (AHA) recognizes and encourages early CPR and defibrillation to maximize victim's survival rates [3]. It also promotes public awareness of BLS to assure quick response achieved in case of an emergency.

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The students of health science colleges like college of applied medical sciences (CAMS) and college of medicine (COM) are the future health care providers in community, which makes their awareness and knowledge of BLS crucial so as to increase patients' chances of survival [2, 4]. At the same time, they can promote the public awareness of BLS through public education which will ultimately increase the whole community awareness and chances of survival of community members [4, 5].

Various studies have been carried out to access the level of knowledge and attitude towards BLS, which reflects its importance in emergency care of the patients. It has been reported that BLS awareness was very poor among health professionals like doctors and nurses of medical, dental, homeopathy and nursing colleges [4]. In another study [5], authors found a low prevalence of current training and lack of basic CPR knowledge and therefore recommended widespread CPR program [5]. It has been shown that CPR knowledge in Poland is low [6]. Some authors have, after studying the importance of BLS in pediatrics, have shown that parents as well as caregiver's knowledge of the current guidelines was poor [7]. It has also been found that lay public in Republic of Slovenia had poor knowledge about CPR. They also found that knowledge was better in trained versus untrained individuals [8].

It has been reported that although most high-school students were willing and motivated to learn CPR, a smaller percentage of students had a negative attitude towards CPR which showed the need to associate this training with positive references in an attempt to assist those for whom negative attitude may present as a barrier to learning and retaining CPR knowledge [9]. There is an observation that teen-agers can learn and perform basic life support skills with reasonable accuracy and can retain these skills for longer periods, thus CPR training has been recommended to be provided to youth from early teenage life during their study programs [10]. It has been strongly recommended to include BLS programs in undergraduate students of different health care study programmes arguing that it can have excellent outcomes with outstanding participant satisfaction [11]. It has been shown that most of the medical students, although had not attended the course, had some knowledge about BLS. They also suggested that inclusion of this course in the undergraduate curriculum will increase awareness and application of this valuable life saving maneuver [12]. Researchers have found that the overall attitude towards CPR was positive among students of King Saud University Riyadh Saudi Arabia. However, the authors found the knowledge on the topic to be insufficient and

Table 1: BLS Questionnaire

BLS Questionnaire:

1. What is the abbreviation of "BLS"?
2. When you find someone unresponsive in the middle of the road, what will be your first response? (Note: You are alone there)
3. If you confirm somebody is not responding to you even after shaking and shouting at him, what will be your immediate action?
4. What is the location for chest compression?
5. What is the location for chest compression in infants?
6. If you do not want to give mouth-to-mouth CPR, the following can be done EXCEPT:
7. How do you give rescue breathing in infants?
8. Depth of compression in adults during CPR
9. Depth of compression in Children during CPR:
10. Depth of compression in neonates during CPR:
11. Rate of chest compression in adult and Children during CPR
12. Ratio of CPR, single rescuer in adult is:
13. In a new born the chest compression and ventilation ratio is:
14. What does abbreviation AED stands for?
15. What does abbreviation EMS stands for?
16. If you and your friend are having food in a canteen and suddenly your friend starts expressing symptoms of choking, what will be your first response?
17. You are witnessing an infant who suddenly started choking while he was playing with the toy, you have confirmed that he is unable to cry (or) cough, what will be your first response?
18. You are witnessing an adult unresponsive victim who has been submerged in fresh water and just removed from it. He has spontaneous breathing, but he is unresponsive. What is the first step?
19. You noticed that your colleague has suddenly developed slurring of speech and weakness of right upper limb. Which one of the following can be done?
20. A 50-year-old gentleman with retrosternal chest discomfort, profuse sweating and vomiting. What is next?

therefore emphasized more focus to be placed on the improvement of CPR skills. In addition, they suggested more studies to be carried to assess knowledge and attitudes towards CPR in the community [13]. No studies have yet been carried out in health care workers of King Abdulaziz Medical City Riyadh and the students of different colleges of King Saud Bin Abdulaziz University for Health Sciences to access the level of current knowledge and attitude towards training and application of BLS.

Therefore, the aim of this study was to find out the level of knowledge of BLS among CAMS CoM students and their attitude towards knowledge and practice of BLS.

## MATERIALS AND METHODS

This was a cross-sectional study conducted at CAMS and COM, KSAU-HS, Riyadh, Saudi Arabia. All students of CAMS and COM, KSAU-HS enrolled in undergraduate programs were recruited for their BLS

information to accomplish the study. A questionnaire comprising of 20 selected basic questions regarding BLS was distributed among CAMS and COM students (Table 1) [4]. Questionnaire was collected from the students after one week and their answers to the questions were documented using Microsoft Excel. In order to find out the level of current knowledge of students as well as their aptitude to learn and practice BLS, data was analyzed using SPSS version 16.0 [2, 12, 14]. For the assessment of students on the basis of the score, the parameters were: 90-100 score as outstanding, 80-89 as excellent, 70-79 as very good, 60-69 as good, 50-59 as satisfactory and less than 50 as poor [4].

## RESULTS

**College of Applied Medical Sciences:** Questionnaire was distributed to 150 students out of which 101 responded, with a response rate of 67%. The frequency of response to different questions varied among students.

In the first ten questions, none of the responders had complete knowledge on BLS (Figures 1, 2). About 23.8% of the responders did not know the abbreviation of BLS as basic life support ( $p < 0.0001$ ) while 51.5% failed to insist on looking for safety as the first step in BLS. About 47.6% failed to insist on activating EMS immediately after confirming the unresponsiveness in an adult and 42.7% failed to insist on activating EMS immediately after confirming the unresponsiveness in an adult. Most of the responders 61.4% were unaware of the correct location of chest compression in an infant was one finger breadth just below the nipple line ( $p < 0.0001$ ). Sixty-eight percent 68.4% of the responders were not familiar with alternative techniques of resuscitation when mouth-to-mouth ventilation was not opted. On the other hand, 72.3% of the responders failed to select mouth-to-mouth and nose technique as the rescue breathing for infants. A majority of the students 86.2% did not know that the depth of chest compression in an adult was 1.5 to 2 inches while 61.4% did not know that the depth of chest compression in a child was one-third to one-half the depth of the chest. On the same lines, 63.4% did not know that the chest compression in an infant was one-third to one-half the depth of the chest (Figure 1, 2). Our data reveals insufficient CPR knowledge in CAMS students.

There was also a great variation in level of the knowledge of responders to questions 11-20 as well (Figure 3, 4). While 36.7% of the responders did not correctly answer the rate of chest compression as 100/minute in adults and children CPR, 58.4% of the

responders had correctly answered that the compression ventilation ratio in a child and adult single rescuer CPR was 30:2. 30.6% of the students knew that the ratio of compression ventilation in a new born was 3:1 while majority 60.4% of the responders did not know that the abbreviation of AED was 'automated external defibrillator'. Only 56.4 % knew that the abbreviation of EMS was 'Emergency Medical Service'. 81.2% of responders did not know the first step in helping a suspected foreign body obstruction victim is to confirm the severity of obstruction by talking to him. Only a minority 45.5% of the students were aware about the right technique of foreign body removal from an infant. About one third (26.7%) of students knew about the role of the recovery position in a spontaneously breathing unresponsive victim. 44.6% of the responders did not know the early signs of stroke. 73.3% knew how to recognize and help a patient with acute coronary syndrome.

On the basis of their score, there were different levels of BLS awareness among students (Figure 3). In this regard, 6 out of 101 (6%) had secured between 90-100 score (Outstanding level), 3 out of 101 (3%) had scored 80-89 (excellent level), 8 out of 101 (8%) had got 70-79 score (very good level), 7 out of 101 (7%) had scored 60-69 (Good level), 13 out of 101 (12%) had secured 50-59 score (Satisfactory level) while most of the responders (64/101=63%) had secured less than 50 score corresponding to poor knowledge of BLS. The means score was 45.05% showing overall poor knowledge of responder students about BLS.

**College of Medicine:** One hundred and forty four medical students were included, all of which responded to the questionnaire (100% response rate). As in CAMS students, the frequency of response to different questions varied among students.

Seventy four percent of the responders knew the abbreviation of BLS as basic life support. Fifty six percent insist on looking for safety as the first step of BLS. Only thirteen percent activated EMS immediately after confirming the unresponsiveness in an adult. Sixty six percent knew that the right location for chest compression was the mid chest. Thirty five percent knew that the correct location for chest compression in an infant was one finger breadth just below the nipple line (Figure 1).

Sixty percent of the students participated knew that alternative techniques of resuscitation when mouth to mouth was not opted. Twenty seven percent answered correct to select mouth-to-mouth and nose technique as rescue breathing for infant. Nineteen percent knew that

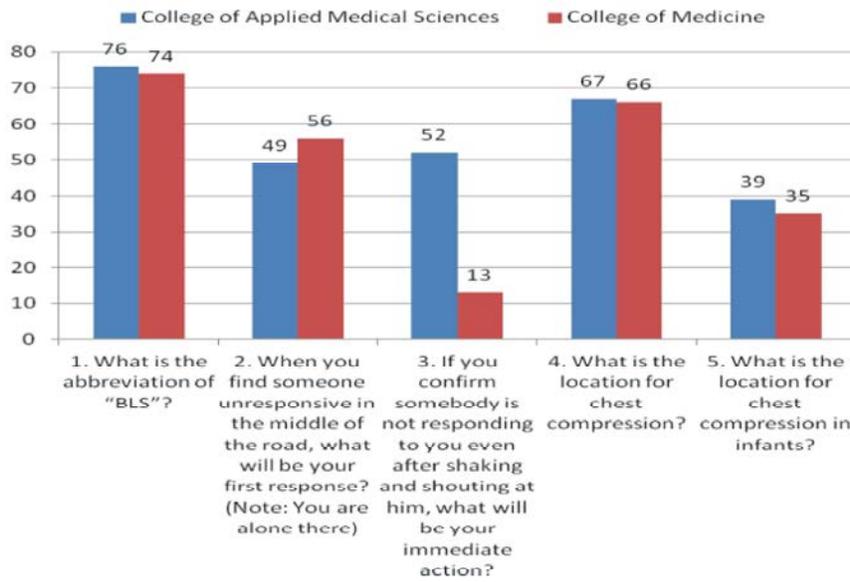


Fig. 1: Response of students to BLS questionnaire (Questions 1-5)

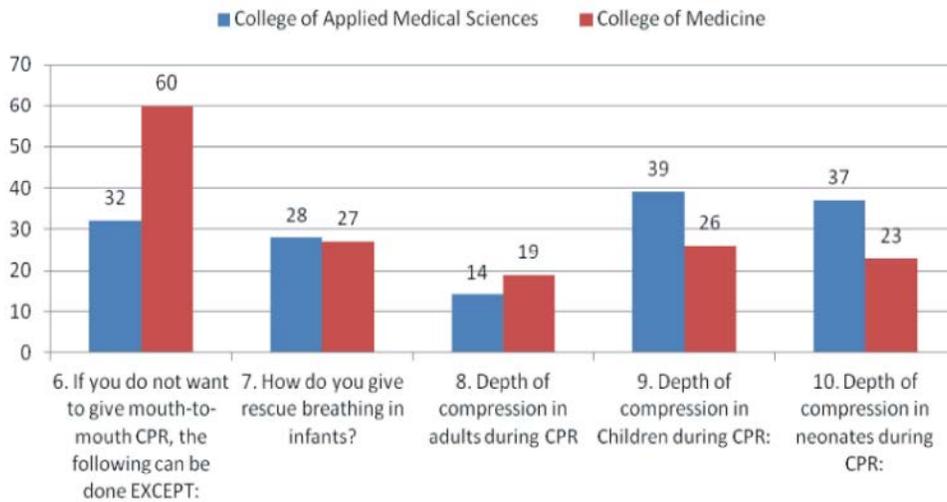


Fig. 2: Response of students to BLS questionnaire (Questions 6-10)

the depth of chest compression in an adult was 1.5 to 2 inches. Twenty six percent knew that the depth of chest compression in a child was one third to one third of the depth of the chest. Twenty three percent knew that the chest compression in an infant was one third to one-half the depth of the chest (Figure 2). It shows insufficient knowledge about CPR among our medical students.

Fifty three percent of the responders answered chest compression as 100/minute in adults and children CPR. Fifty three percent correctly answered that the compression ventilation ratio in a child and adult single rescuer was 30:2 (Figure 3). Only seventeen percent knew that the ratio of compression ventilation in a new born

was 3:1. Twenty nine percent knew the abbreviation of AED was "automated external defibrillator. Sixty four percent knew that the abbreviation of EMS was "Emergency Medical Service".

Twenty three percent knew that the first step in helping a suspected foreign body obstruction victim is to confirm the severity of the obstruction by talking to him. Forty eight percent aware about the right technique of foreign body removal from an infant. Twenty one percent knew about the role of recovery position in spontaneously breathing unresponsive victim. Thirty four percent knew the early signs of stroke and fifty three percent knew to recognize and help a patient with acute coronary syndrome (Figure 4).

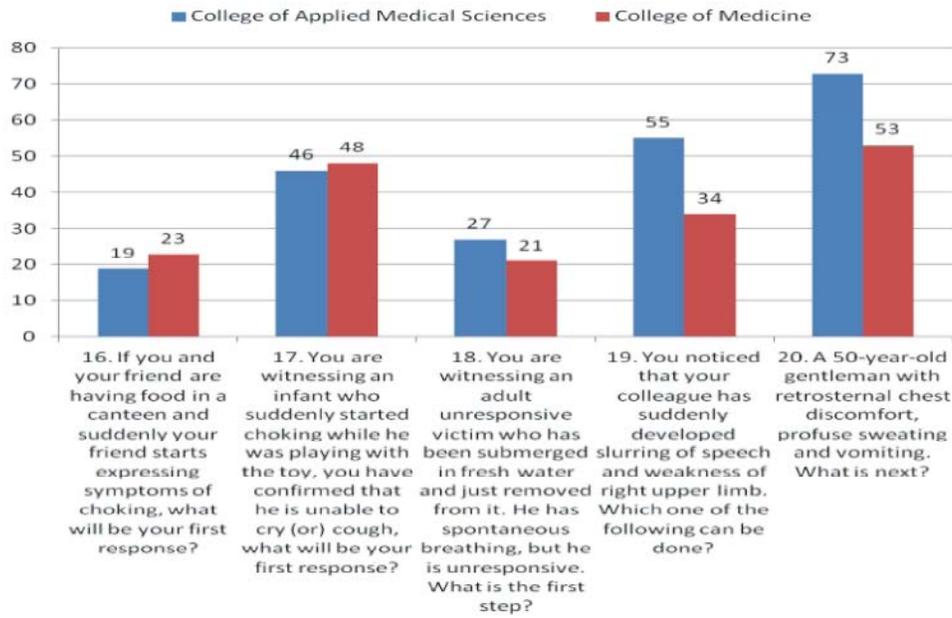


Fig. 3: Response of students to BLS questionnaire (Questions 11-15)

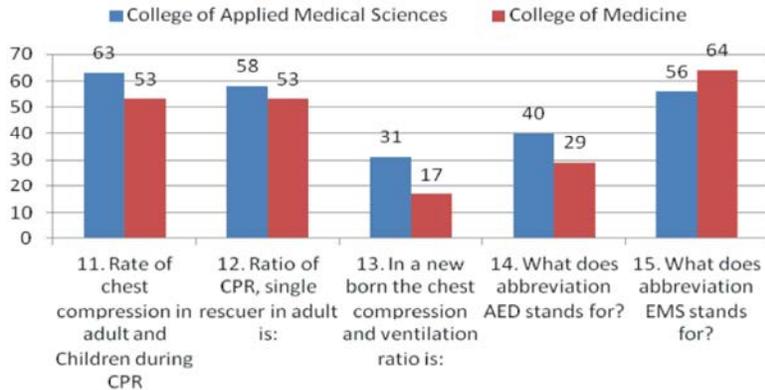


Fig. 4: Response of students to BLS questionnaire (Questions 15-20)

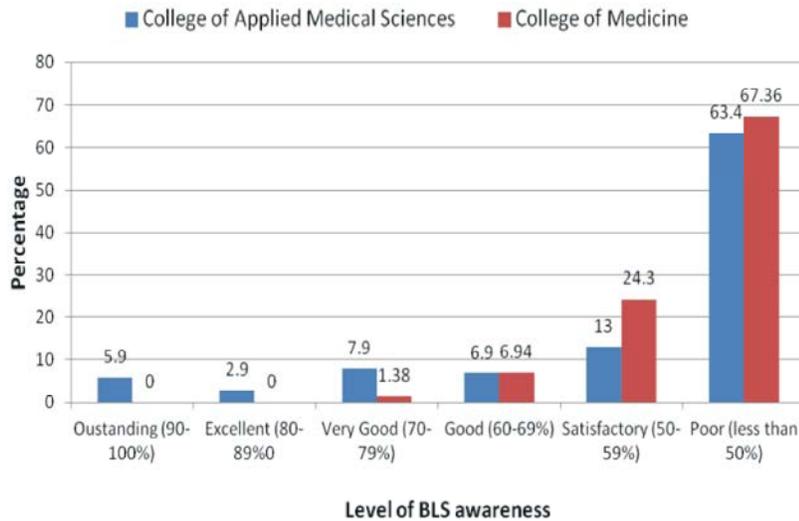


Fig. 5: Levels of BLS awareness among CoM and CAMS students at KSAU-HS, Riyadh

No student had complete (10%) knowledge in BLS among responders. Only two out of 144 students (1.38%) had secured 70-79%. Ten out of 144 responder (6.94%) had secured 60-69%. Thirty five of 144 (24.30%) secured 50-59%. Ninety seven responders (67.36%) had secured less than 50% of marks (Figure 5). The means score was 39.7% showing overall poor knowledge of medical students about BLS, as compared to college of applied medical sciences students (45.05%).

Our data shows overall poor BLS knowledge, specifically about CPR, in college of applied medical sciences and college of medicine students at King Saud Bin Abdulaziz University of Health Sciences Riyadh.

### DISCUSSION

This study reveals the lack of awareness of BLS and specifically CPR, in majority of the applied medical sciences and medical students, though CAMS students had a slightly better level of awareness than medical students, possibly due to integration of many training courses and training programs specifically related to BLS in their third and fourth professional year curriculum. Although results are not reported in literature about BLS knowledge of applied medical science students, there are many reports about awareness of students of medicine, pharmacy, nursing and dentistry about BLS. Chandrasekaran *et al.* [4] carried out a study to find out level of BLS awareness in medicine, pharmacy, nursing and dentistry where none of the students had complete knowledge on BLS and most of the students (84.82%) securing less than 50% score, indicating a poor knowledge in majority of the students studying different disciplines of health sciences. These results are in accordance with our finding about poor level of BLS awareness among college of medicine and college of applied medical science students. In another study, Abbas, Bukhari and Ahmad [2] assessed the first aid and basic life support knowledge amongst medical student and found mean of students was less than 50%, which also support our findings. Studies have shown that even trained health professionals did not have enough knowledge about BLS, probably due to insufficient BLS training or lack to interest to practice it. Xanthos *et al.* [15] reported that most of the nurses had either poor or insufficient knowledge about BLS. Passali *et al.* [16] found out that medical doctors and nurses did not bear the required awareness about BLS. In a study conducted at King Saud University Riyadh, it was found that 88% of the students really wanted to learn BLS courses and prefer it to be a part of their curricula [13]. Therefore, BLS training courses should be an integral part of the

curriculum in health science colleges specifically and colleges generally.

It has been reported that younger age is an important factor of successful BLS training [17]. A recent study carried out in high school students at Riyadh Saudi Arabia indicates that although school students lacked CPR knowledge, they had a keen interest in getting CPR training [18]. In many European countries, BLS training for school children has been found feasible at all ages and has been observed to be more sustainable if begins early during school children learning [19]. American Heart Association in 2011 recommended CPR as mandatory training for school children [20]. It has been reported that countries with mandatory CPR training for school children had significantly higher lay resuscitation rates as compared to those without mandatory CPR training [21]. Therefore, we recommend the BLS courses to be incorporated as a mandatory subject in curricula of high school and college students, so that they can have better opportunity of grasping knowledge and practically implementing this important part of emergency medical sciences.

Every study has certain limitations and our study is not an exception in this regard. We believe that it was not possible to assess practical BLS skills of students using our methodology. As total number of study subjects was small, we recommend this study to be carried out at other applied medical science colleges of different universities as well as in other medical, dental, nursing and pharmacy colleges.

We recommend that BLS training should be mandatory for health professionals. As most of students at CAMS and COM had poor knowledge about BLS, we recommend BLS courses to be the part of the curricula in undergraduate study programs. We also recommend BLS training to be integral part of high school and college study programs so as to ensure that young students could grasp enough knowledge about BLS and have capability to help the people in emergency situations and disasters.

### REFERENCES

1. Jones, C.M., A. Owen, C.J. Thorne and J. Hulme, 2012. Comparison of the quality of basic life support provided by rescuers trained using the 2005 or 2010 ERC guidelines. *Scand J. Trauma. Resusc. Emerg. Med.*, 9: 20: 53.
2. Abbas, A., S.I. Bukhari and F. Ahmad, 2011. Knowledge of first aid and basic life support amongst medical students: a comparison between trained and un-trained students. *J. Pak. Med. Assoc.*, 61(6): 613-6.

3. Spencer, B., J. Chacko and D. Sallee, 2011. American Heart Association. The 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiac care: an overview of the changes to pediatric basic and advanced life support. *Crit Care Nurs Clin North Am.* 23(2): 303-10.
4. Chandrasekaran, Shanta, Sathish Kumar and Shamim Ahamed Bhat, 2010. "Awareness of basic life support among medical, dental, nursing students and doctors." *Indian journal of Anaesthesia*, 54(2): 121.
5. Papadima A., A.B. Pappas, E.E. Lagoudianakis, A. Kotzadimitriou, H. Markogiannakis, K. Filis, E. Vavouranakis, A. Manouras, T. Xanthos and L. Papadimitriou, 2010. Cardiopulmonary resuscitation by chest compression alone: a reality check. *Hellenic J. Cardiol.*, 51(1): 55-61.
6. Rasmus, A. and M.S. Czekajlo, 2000. "A national survey of the Polish population's cardiopulmonary resuscitation knowledge." *European Journal of Emergency Medicine*, 7: 39-44.
7. Cu, J., P. Phan and F.M. O'Leary, 2009. Knowledge and attitude towards paediatric cardiopulmonary resuscitation among the carers of patients attending the Emergency Department of the Children's Hospital at Westmead. *Emerg Med Australas.*, 21(5): 401-6.
8. Rajapakse, Renata, Marko Noè and Janko Kersnik, 2010. "Public knowledge of cardiopulmonary resuscitation in Republic of Slovenia." *Wiener klinische Wochenschrift*, 122(23): 667-672.
9. Parnell, M.M., J. Pearson, D.C. Galletly and P.D. Larsen, 2006. Knowledge of and attitudes towards resuscitation in New Zealand high-school students. *Emergency Medicine J.*, 23(12): 899-902.
10. Naqvi, S., R. Siddiqi, S.A. Hussain, H. Batool and H. Arshad, 2011. School children training for basic life support. *J. Coll Physicians Surg Pak.*, 21(10): 611-5.
11. Harvey, P.R., C.V. Higenbottam, A. Owen, J. Hulme and J.F. Bion, 2012. Peer-led training and assessment in basic life support for healthcare students: synthesis of literature review and fifteen years practical experience. *Resuscitation.*, 83(7): 894-9.
12. Zaheer, H. and Z. Haque, 2009. Awareness about BLS (CPR) among medical students: status and requirements. *J. Pak. Med. Assoc.*, 59(1): 57-9.
13. Al-Turki, Y.A., Y.S. Al-Fraih, J.B. Jalaly, I.A Al-Maghlouth, F.H. Al-Rashoudi, A.F. Al-Otaibi, A.A. Al-Thnayan, A.I. Trabzoni and A.S. Al-Shaykh, 2008. Knowledge and attitudes towards cardiopulmonary resuscitation among university students in Riyadh, Saudi Arabia. *Saudi Med. J.*, 29(9): 1306-9.
14. SPSS Inc. Released, 2008. SPSS Statistics for Windows, Version 16.0. Chicago: SPSS Inc.
15. Xanthos, T., A. Akrivopoulou, I. Pantazopoulos, F. Aroni, A. Datsis and N. Iacovidou, 2012. Evaluation of nurses' theoretical knowledge in Basic Life Support: a study in a district Greek hospital. *Int Emerg Nurs.*, 20(1): 28-32.
16. Passali, C., I. Pantazopoulos, I. Dontas, A. Patsaki, D. Barouxis, G. Troupis and T. Xanthos, 2011. Evaluation of nurses' and doctors' knowledge of basic & advanced life support resuscitation guidelines. *Nurse Educ Pract.*, 11(6): 365-9.
17. Sandroni, C., G.L. Gonnella, C. De Waure, F. Cavallaro, G.L. Torre and M. Antonelli, 2010. Which factors predict candidate outcome in advanced life support courses? A preliminary observational study. *Intensive Care Med.*, 36(9): 1521-5.
18. Alanazi A., Bin-Hotan, M. Alqahtani, H. Alhalyabah, A. Alanazi and S. Al-oraibi, 2013. Community Awareness About Cardiopulmonary Resuscitation Among Secondary School Students in Riyadh. *World J. Med. Sc.*, 8(3): 186-189
19. Bohn, A., H. Van Aken, R.P. Lukas, T. Weber and J. Breckwoldt, 2013. Schoolchildren as lifesavers in Europe - training in cardiopulmonary resuscitation for children. *Best Pract. Res. Clin Anaesthesiol.*, 27(3): 387-96.
20. Cave, D.M., T.P. Aufderheide, J. Beeson, A. Ellison, A. Gregory, M.F. Hazinski, L.F. Hiratzka, K.G. Lurie, L.J. Morrison, V.N. Mosesso Jr, V. Nadkarni, J. Potts, R.A. Samson, M.R. Sayre and S.M. Schexnayder, 2011. American Heart Association Emergency Cardiovascular Care Committee; Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation; Council on Cardiovascular Diseases in the Young; Council on Cardiovascular Nursing; Council on Clinical Cardiology and Advocacy Coordinating Committee, 2011. Importance and implementation of training in cardiopulmonary resuscitation and automated external defibrillation in schools: a science advisory from the American Heart Association. *Circulation*, Feb 15; 123(6): 691-706.
21. Gräsner, J.T., P. Meybohm, R. Lefering, J. Wnent, J. Bahr, M. Messelken, T. Jantzen, R. Franz, J. Scholz, A. Schleppers, B.W. Böttiger, B. Bein and M. Fischer, 2011. German Resuscitation Registry Study Group, 2011. ROSC after cardiac arrest--the RACA score to predict outcome after out-of-hospital cardiac arrest. *Eur Heart J.*, 32(13): 1649-56.