

Awareness of indications and procedural techniques of basic life support and cardio-pulmonary and cerebral resuscitation among undergraduate medical students and the possibility of including the topic into the current existing curriculum

Sameer M Khan

Department of Physiology in College of Medicine, University of Bisha, Kingdom of Saudi Arabia

ABSTRACT

Background: The future doctors are today's medical students. Being ready to perform emergency life-saving techniques like Cardiopulmonary and Cerebral Resuscitation (CPCR) whenever and whenever necessary is one of the most important abilities that students should acquire during their graduate training. The students are essential to the process of learning, developing, and ingraining the most useful clinical competence in CPCR.

Aim: The aims of the study are to assess undergraduate medical students' awareness of CPCR, to screen students' knowledge of precise, efficient CPCR procedural techniques; determining their interest in Cardiopulmonary Resuscitation (CPR) training programs; and instilling CPCR as an active component of clinical practice going forward.

Materials and Methods: The questionnaire comprised of three essential parts; first one dealing with general questions to know the importance of CPR in clinical practice, second one consisted of the main goal and accuracy of CPR intervention and the last segment comprised of questions targeting the indications, methods and effectiveness of CPR. The study consisted of year 2 to year 5 undergraduates. The components of awareness, indications and of CPCR were scored. Descriptive statistics and multiple response analyses were done by using SPSS software.

Results: The participants had good knowledge about the importance of CPCR in clinical practice and stand average in knowing its indications and effectiveness. Whereas, only 1.2% of them were completely aware about the universal compression ventilation ratio, and 20.4% were aware of the current order of CPCR being Compression, Airway and Breathing (CAB).

Conclusion: Although there is a decent level of CPCR awareness among the participants, CPCR skills must be learned through appropriate, approved training programs on a regular basis, and knowledge must be updated to reflect evolving CPCR trends. The pupils' overall impression was negative, and they lacked confidence in their ability to execute BLS/CPR. To increase the students' knowledge, CPR/BLS instruction and training must begin early in the curriculum. Their confidence would grow with more training.

Keywords: cardiopulmonary cerebral resuscitation, basic life support, medical students, awareness, curriculum

Address for correspondence:

Sameer M Khan

Department of Physiology in College of Medicine, University of Bisha, Saudi Arabia

E-mail: khansameer307@gmail.com

Word count: 3918 **Tables:** 00 **Figures:** 05 **References:** 29

Received: 03 October, 2024, Manuscript No. OAR-24-149472

Editor Assigned: 06 October, 2024, Pre-QC No. OAR-24-149472(PQ)

Reviewed: 20 October, 2024, QC No. OAR-24-149472(Q)

Revised: 26 October, 2024, Manuscript No. OAR-24-149472(R)

Published: 31 October, 2024, Invoice No. J-149472

INTRODUCTION

One of the fastest-evolving fields of modern medicine is Cardiopulmonary and Cerebral Resuscitation (CPCR), which consists of several life-saving procedures that increase the chances of survival after cardiac arrest. The underlying problem of achieving early and successful CPCR persists, even though the best course of action may change based on the rescuer, the victim, and the resources at hand. Given this difficulty, the 2010 American Heart Association (AHA) guidelines for CPCR and Emergency Cardiovascular Care (ECC) continue to place a high priority on the detection of arrest and the rescuer's quick response [1, 2].

There are reports of inadequate emergency medical services training in India. In India, there is a dearth of emergency medical specialists, and not much has been done to change the current situation. Because of this, most Indian medical schools do not provide a master's degree in emergency medicine. Therefore, doctors working in casualty at various private and public hospitals address most crises [3-9].

A suitable response in an emergency scenario depends on good technical understanding, which decides the patient's outcome. As a result, emergency medical care education for physicians and medical students is crucial and ought to be taken extremely seriously. Emergency medical care includes Cardiopulmonary and Cerebral Resuscitation (CPCR) and Basic Life Support (BLS). Lifesaving BLS/CPCR treatment is provided promptly. Medical students' lack of confidence in their ability to conduct BLS is one of the causes of their subpar performance. There have also been reports of inadequate training among medical undergraduates from Poland and the UK. Reports of inadequate BLS knowledge have come from Pakistan and Switzerland.

CPCR training was previously restricted to medical practitioners. It was later discovered that many these incidents took place outside of hospitals, necessitating early CPCR bystander witness reporting. As a result, CPCR is regarded as a universal skill. The odds of survival and quality of life are also observed to be improved for those who quickly receive bystander CPCR even in absence of expert support. In contrast survival chances decline by 7%-10% for every min, if CPCR is delayed [10].

It is imperative that everyone, or at least those connected to the healthcare system, receive instruction and support in order to become proficient in CPCR. If all undergraduate medical

students have access to CPR training programs, this might be accomplished at the most basic level.

BLS/CPR is often taught in the final year of the Indian medical curriculum, according to the current curriculum. A small number of BLS/CPR classes offered as part of the program don't seem to be sufficient. The analysis of the research mentioned above suggests this. Thus, it is crucial that medical students receive more education and training in BLS/CPR. Research examining BLS/CPCR knowledge is helpful in determining training requirements and creating learning goals for a BLS course. Understanding how students view BLS is also helpful.

MATERIALS AND METHODS

Study design and sample size

With institutional ethics committee approval, this questionnaire-based study was carried out at Sri Siddhartha Medical College. The questions have been examined and validated by the experienced anesthetists and certified trained professionals who are currently involved in many BLS and Advanced Cardiovascular Life Support (ACLS) training program [11].

After being informed of the study's goals and objectives, the participants were extended an invitation to take part. A questionnaire that was given out in English, the teaching language, was used to collect participant input. The questionnaire was divided into three sections: the first asked general questions about the significance of CPR in clinical practice; the second focused on the primary objective and precision of CPR intervention; and the final section asked questions about the indications, techniques, and efficacy of CPR. Certain statements were purposefully reframed as negative questions to gain a deeper understanding of the information and prevent prejudice [12].

Study instrument development and pre-testing

An anonymous, semi-structured questionnaire was created to gather the following data:

- Fundamental attributes of the research subjects.
- BLS/CPR knowledge: The American Heart Association's guidelines served as the basis for the questions.
- Views on CPR and BLS.

A 5-point Likert scale was used to rate the statements that explored their perceptions (strongly disagree to strongly agree). There was a pretest for this questionnaire. A few adjustments were made in light of the pretesting results. A few of the open-ended and closed-ended questions were replaced. The questions' sequence was altered.

The final questionnaire had the following categories of questions about the knowledge of BLS:

- Indications for BLS
- Response to a situation needing BLS
- Order of performing BLS
- Signs of successful resuscitation and
- Setting where BLS is performed. For each knowledge question depicting a series of responses to a hypothetical real-life situation.

Options of 'yes', and 'no' were provided. The answered questions were rewarded as follows:

- Positive or negative questions answering correctly - +01 points
- Positive or negative questions answering incorrectly - +00 point
- The questions having multiple positive or negative answers; each option ticking correctly rewarded with +01 point.

Data collection

The study was carried out with approval from the Institutional Ethics Committee. The college's dean granted permission to speak with the students in their classes. The study's goal was elucidated. The students gave their permission to participate. The voluntary nature of the engagement was made explicit. There was a space on the form for people to indicate why they did not wish to participate. They were given twenty minutes to answer. The questionnaires that were gathered were examined [13].

Data analysis

The sample size, as per World Health Organization (WHO) Epi info software, was calculated to be 250. Data entry, scores, descriptive statistics and multiple response analyses was done using SPSS software [14].

The results were expressed as proportions, in appropriate tables. The mean scores, along with their standard deviations were computed for various knowledge categories and overall perceptions. A score of less than 50% for that knowledge category was considered inadequate. Similarly, a score of <14 was considered as a negative perception. Comparisons were made between students who had undergone previous training, if any, and those who had no such training. The student independent 't' test was the test of significance used. $p < 0.05$ was considered significant [15].

RESULTS

Out of the total of 377 students participated in the study 53.3% were males and 46.7% were females as depicted in figure 1. Only 30% of students felt they have adequate knowledge and 70% had heard about CPR but felt that the information was not sufficient as shown by figure 2. Around 37% of the students were able to respond correctly to the questions pertaining to indications of doing CPR. Regarding the question of response to situation needing BLS 40% of the students responded correctly [16]. The order of performing CPR correctly was known only to 39.5% of the students while most students were unaware of change in the order. The setting in which BLS can be performed was a bit confusion to the students. Many students about 60% responded by saying the at BLS can only be done in hospital setting as depicted in figure 3. Students also were not confident about the signs of successful resuscitation as majority of them had not seen or done the CPR procedure [17]. Around 45% of the students had done CPR or had seen CPR being performed by someone else as part of the training course so where able to tell the correct signs of successful resuscitation. On the other hand, about 55% students had not seen nor done CPR as shown by figure 4. Majority of the students (95%) are in favor of introducing the CPR into the curriculum whereas (5%) were not in favor as depicted by figure 5.

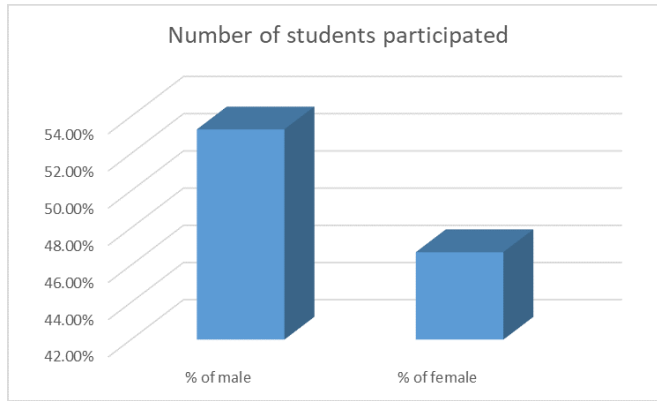


Fig. 1. Number of students participated

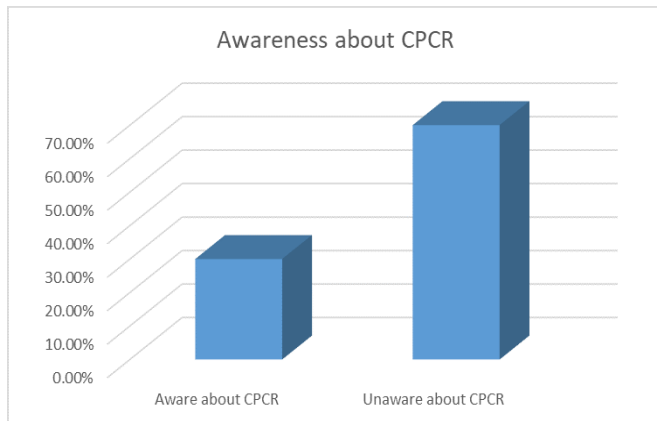


Fig. 2. Awareness about CPR

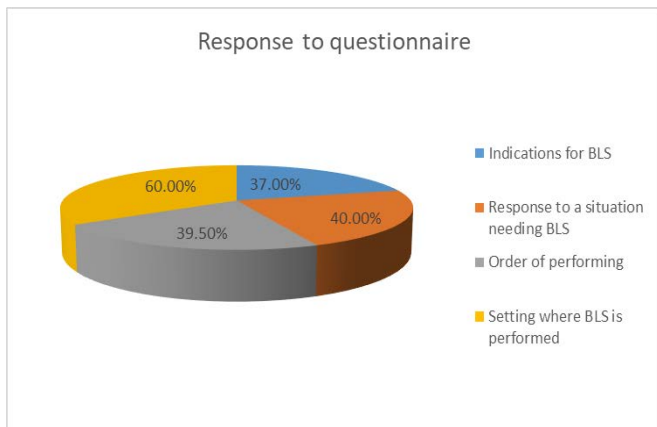


Fig. 3. Response to questionnaire

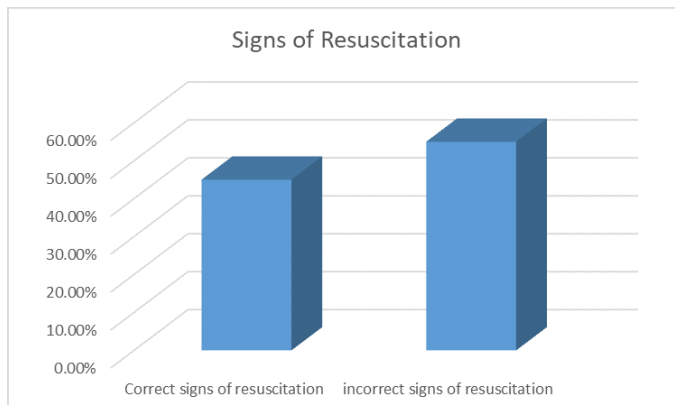


Fig. 4. Awareness of signs of successful resuscitation

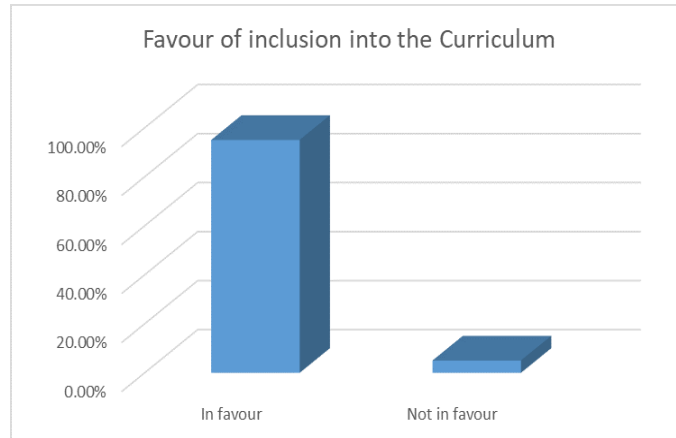


Fig. 5. Favor of inclusion into curriculum

DISCUSSION

It was once understood that any kind of lethal wound or damage to interior tissue would inevitably result in the person's death. However, it is now recognized that several treatments can prolong a patient's life if they are completed in less than 4 minutes. Since the official CPR guidelines were first established over 40 years ago, it has been recommended that all health care providers undergo CPR training. Around the world, thousands of lives have been saved over the past 50 years thanks to the fundamentals of early recognition and activation, early CPR, early defibrillation, and early access to emergency medical care. These saved lives serve as a testament to the value of clinical translation and resuscitation research [18, 19].

The survival rates following cardiac arrest vary remarkably throughout healthcare systems, with some claiming survival rates that are five times greater than those of others. "Although technology like that found in Automated External Defibrillators (AEDs) has increased the likelihood that someone suffering from cardiac arrest will survive, no initial intervention can be given to the victim unless bystanders are prepared, willing, and able to act. Moreover, to be successful, the acts of bystanders and other care providers must occur within a system that organizes and integrates each component of care into a comprehensive whole, focusing on survival to discharge from the hospital". This extremely thorough questionnaire assesses medical students' knowledge of the 2010 AHA Guidelines' most significant modifications and thought-provoking recommendations [20]. "The foundation of a care system that can optimize outcomes beyond Return of Spontaneous Circulation (ROSC) is high-quality CPR." The goal of a resuscitation system of treatment is to return to a prior functioning condition of health and quality of life [21].

Why must a doctor know and be aware about accurate CPR skill at student level?

"As everyone hopes for a better tomorrow", anybody can be a lifesaving rescuer for a cardiac arrest victim. CPR skills and their application depend on the rescuer's training, experience, and confidence. It is very important that every person in the community know about CPR.

The present study was aimed to know the level of understanding and awareness about the most sensitive aspects of the CPR and plan to enrich by giving presentations at medical colleges to raise

awareness of the growing concerns about BLS so that one becomes capable of a true health care provider. In this study we had chosen practical, easily understandable and most important areas of CPR at par with the student's knowledge. From the results obtained of the questionnaire study, we found that students had excellent knowledge about importance of CPR in clinical practice. However, majority of them scored average regarding accuracy of CPR and effectiveness of CPR. Though quite large number of students were completely ignored regarding the important aspects of the CPR. However, their interest and zeal to know and be part of the CPR, the lifesaving tool should not be underestimated [22].

It is just not enough making the students theoretically knowledgeable about CPR but also there is an absolute necessity to encourage them to inculcate, master and practically execute learned CPR procedural techniques in day-to-day life or in future clinical practice.

As 377 students participated in the study and the only 30% of the students had heard of BLS/CPCR, the sample size was considered adequate for the interpretation of results. As we had studied knowledge according to separate components like, Indications, Response to a Situation, and Signs of Successful Resuscitation, we could not find comparative data on these aspects from the previous published reports. For example, the only study from India (Pondicherry) reports that 85% had obtained <50% marks without providing any specific information about the components. Moreover, their study sample consisted of students from medical, dental, nursing, and homeopathy colleges, apart from doctors, which makes the comparison inappropriate [23].

Majority (70%) of the students had heard of BLS/CPCR. But lack of knowledge about indications for CPR could be inferred from that fact that about 37% felt that CPR should be administered to an unconscious person with normal palpable pulses and respiration, and 39.5% only knew the correct order for performing CPR. The results reflect that student had adequate overall understanding about the 'response to a situation where CPR is needed' and 'settings where BLS can be performed'. Less than half (48.1%) of the students from Switzerland could give correct answers on knowledge-based questions. Similarly low levels (54.3%, and 25%) of knowledge have been reported from medical students in Poland and interns from southern India, respectively [24].

The apparent good knowledge observed in our study about 'response to a situation,' and 'settings where BLS can be performed'

probably reflects 'guesswork/commonsense'. As the study subjects consist of students from all the years of MBBS, it can be inferred that final year students would be in a better position to do guesswork. Lack of knowledge about specific aspects of CPR/BLS reflects the truth, which is similar to the situation reported from the other studies referred to above [25].

Most (55%) had not seen nor done CPR/BLS, although the number of students who has seen the CPR is performed were 45%. Similar findings have been reported from Europe. Very few (18.9%) had undergone training. Low levels of training have been reported from Pakistan and UK. A comparison of students who had undergone training with those who had not undergone training revealed that training improved knowledge, but did not improve the confidence or alter the perceptions of the students [26].

A study from Netherlands reported that only 38% of the clinical picture and diseases and 69% of the skills were mastered by the students after the training] as the skills deteriorated over a period of time, the students did not have confidence or have a favorable perception about CPR/BLS. Although training improves the knowledge, the loss of skills with time highlights the need to have repeated training over a period of time. This is possible only if the training is introduced at the beginning of the curriculum rather than in the final year, which is the current practice. As most (93.7%) of the students wanted to learn about it from the beginning of the course, it reflects the 'felt needs' of the students. (Figure 5) [27-29].

This being a questionnaire-based study; response bias might have been present. But it is common to most of the questionnaire-based studies. Furthermore, a certain amount of guesswork from students could have resulted in higher levels of certain components of knowledge about CPR/BLS, as discussed earlier in the text. By exploring the awareness and perceptions of various components, it was possible to get an overall idea, thereby, reducing the impact of guesswork.

CONCLUSION

One fundamental medical skill that all health care workers, including medical students, are expected to have been the capacity to identify and manage a respiratory or cardiac arrest. As we infer from this questionnaire survey, CPR knowledge in medical students stand average, these significant weaknesses might be improved by implementing numerous well-designed certified training programs, so that the students would be well informed in these aspects right from the graduate level.

By carrying out several questionnaire surveys similar to this one, we can increase the range of qualitative knowledge and abilities possessed by all doctors at the student level. Additionally, these sorts of active programs raise knowledge of CPR, which will support the development of confidence when the participant has the potential to change the course of clinical treatment and even save lives. To impose it as a requirement on the curriculum of all health-related programs, including nursing, medical, and paramedical, and to teach undergraduate students the fundamentals of CPR. To identify a suitable and effective course design, further research is necessary. It would be preferable to take a proactive approach

and teach the community CPR techniques to raise the survival rates of cardiac arrest. Learning CPR is a vital skill that everyone must possess. To perform or understand CPR, one does not have to be a medical expert. You never know when, when, or how he might use this ability to save a stranger or prove himself a hero to someone else. From this study, we hope to take away a powerful lesson particularly to all healthcare professionals, whatever of their status, should set aside some time to complete CPR training and should take pleasure in performing the miracle.

At least the doctors, nursing and paramedical staff are anticipated to know about it, as they are routinely facing life threatening situations, and the knowledge of CPR will be definitely useful. However, there is a lack of research studies related to CPR awareness in health care sectors. "The knowledge of CPR is a major determinant in the success of resuscitation and plays a vital role in the final outcome of acute emergency situations".

RECOMMENDATIONS

It is our belief that students must receive both instruction and training to acquire the necessary abilities for performing CPR intervention at the community level. The study might also be able to suggest ways to set up beneficial awareness campaigns, such as carefully thought-out CMEs, seminars, and symposiums on the highlighted topics, which would draw in students. Regardless of the bystander's identity, health care providers can effectively train and coach them if they all attain efficiency. This would not only assist prevent disability but also broaden the scope of CPR awareness initiatives. CPR training should be taught via simulations taking in account of various cardiac arrest scenarios. to boost students' self-esteem and aid in their understanding of the value of collaboration.

ACKNOWLEDGMENTS

We thank the Dean, the Institutional Ethics Committee and the students who permitted us to conduct the study. We also thank the students. Without their participation, this study would not have been possible skill to save lives and improve the quality of community health.

LIMITATIONS OF THE STUDY

The study would have been more comprehensive if all healthcare providers like interns/junior/senior doctors, dentists, clinical pharmacists and nursing students/staff were also included and compared the level of awareness.

We received very good response from the students; however, one of the barriers for not responding correctly to our questionnaire study would have been exhaustive MBBS class hours. This study was done randomly in students; we must have missed few good scholar students. This questionnaire was more of extracting theoretical knowledge rather evaluating practical skills of CPR which perhaps could have been more assertive.

CONFLICT OF INTEREST

The Author declare(s) that there is no conflict of interest.

REFERENCES

1. Sasson C, Rogers MA, Dahl J, Kellermann AL. Predictors of survival from out-of-hospital cardiac arrest: a systematic review and meta-analysis. *Circ Cardiovasc Qual Outcomes*. 2010;3:63-81.
2. Travers AH, Rea TD, Bobrow BJ, Edelson DP, Berg RA, et al. Part 4: CPR Overview: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122: 676-684.
3. Meena Kumari K. The Clinical Views of Cardiopulmonary Resuscitation among University Medical Students - A Questionnaire Study. *J Clin Diagn Res*. 2014;8:140.
4. Konstandinos HD, Evangelos KI, Stamatia K, Thyresia S, Zacharenia AD. Community cardiopulmonary resuscitation training in Greece. *Res Nurs Health*. 2008;31:165-171.
5. Pearn J. Successful cardiopulmonary resuscitation outcome reviews. *Resuscitation*. 2000;47:311-316.
6. Sarin H, Kapoor D. Adult basic life support. *Indian J Crit Care Med*. 2006;10:95-104.
7. Edomwonyi NP, Egbagbe EE. The Level of Awareness of Cardiopulmonary Resuscitation (CPR) Amongst Radiographers in Nigeria. *J Med Biomed Res*. 2006;5:29-35.
8. Goddard KB, Eppert HD, Underwood EL, McLean KM, Finks SW, et al. Basic Life Support and Cardiopulmonary Resuscitation Training for Pharmacy Students and the Community by a Pharmacy Student Committee. *Am J Pharm Educ*. 2010;74:100.
9. Field JM, Hazinski MF, Sayre MR, Chameides L, Schexnayder SM, et al. Part 1: Executive Summary: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122.
10. Chandrasekaran S, Kumar S, Bhat SA, Saravanakumar, Shabbir PM, et al. Awareness of basic life support among medical, dental, nursing students and doctors. *Indian J Anaesth*. 2010;54:121-126.
11. Sharma R, Attar NR. Adult basic life support awareness and knowledge among medical and dental interns completing internship from deemed university. *NUJHS*. 2012;2:6-13.
12. Roshana S, Batajoo KH, Piryani RM, Sharma MW. Basic life support: knowledge and attitude of medical/paramedical professionals. *World J Emerg Med*. 2012;3:141-145.
13. Al-Turki YA, Al-Fraih YS, Jalaly JB, Al-Maghlouth IA, Al-Rashoudi FH, et al. Knowledge and attitudes towards cardiopulmonary resuscitation among university students in Riyadh, Saudi Arabia. *Saudi Med J*. 2008;29:1306-1309.
14. Ragavan S, Schneider H, Kloeck WG. Basic resuscitation—knowledge and skills of full-time medical practitioners at public hospitals in northern province. *S Afr Med J*. 2000;90:504.
15. Avabratha KS, Bhagyalakshmi K, Puranik G, Shenoy KV, Rai BS. A Study of the Knowledge of Resuscitation among Interns. *Al Ameen J Med Sci*. 2012;5:152-156.
16. Larsen P, Pearson J, Galletly D. Knowledge and attitudes towards cardiopulmonary resuscitation in the community. *N Z Med J*. 2004;117.
17. Swor R, Khan I, Domeier R, Honeycutt L, Chu K, et al. CPR training and CPR performance: do CPR trained bystander perform CPR? *Acad Emerg Med*. 2006;13:596-601.
18. Smith JM. Potential role of pharmacy students on hospital cardiopulmonary resuscitation response teams. *Am J Health-Syst Pharm*. 2012;69:369.
19. Garg RH. Who killed Rambhor?: The state of emergency medical services in India. *J Emerg Trauma Shock*. 2012;5:49-54.
20. Krishnan V. AIIMS to start specialized course in emergency medicine.
21. Ruesseler M, Weinlich M. Simulation training improves ability to manage medical emergencies. *Emerg Med J*. 2010;27:734-738.
22. Freund Y, Duchateau FX, Baker EC, Goulet H, Carreira S, et al. Self-perception of knowledge and confidence in performing basic life support among medical students. *Eur J Emerg Med*. 2013;20:145-146.
23. Mastoridis S, Shanmugarajah K, Kneebone R. Undergraduate education in trauma medicine: The students' verdict on current teaching. *Med Teach*. 2011;33:585-587.
24. Chojnacki P, Ilieva R, Kolodziej A, Krolikowska A, Lipka J, et al. Knowledge of BLS and AED resuscitation algorithm amongst medical students—preliminary results. *Anestezjol Intens Ter*. 2011;43:29-32.
25. Businger A, Rinderknecht S, Blank R, Merki L, Carrel T. Students' knowledge of symptoms and risk factors of potential life-threatening medical conditions. *Swiss Med Wkly*. 2010;140:78-84.
26. Zaheer H, Haque Z. Awareness about BLS (CPR) among medical students: Status and requirements. *J Pak Med Assoc*. 2009;59:57-59.
27. Chandrasekaran S, Kumar S, Bhat SA, Saravanakumar, Shabbir PM, et al. Awareness of basic life support among medical, dental, nursing students and doctors. *Indian J Anaesth*. 2010;54:121-126.
28. Sharma R, Attar NR. Adult basic life support (BLS) awareness and knowledge among medical and dental interns completing internship from deemed university. *NUJHS*. 2012;2:6-13.
29. Tan EC, Hekkert KD, van Vuqt AB, Biert J. First aid and basic life support: A questionnaire survey of medical schools in the Netherlands. *Teach Learn Med*. 2010;22:112-115.