Research article

Periodic reinforcement of knowledge and attitude towards basic life support skills among the medical undergraduates: A necessity of undergraduate medical education

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ABSTRACT

Introduction and Aim: A sudden cardiac arrest can be a life-threatening emergency with poor survival rates. By learning basic life support (BLS) and practicing simple cardiopulmonary resuscitation (CPR), the patient is likely to survive until arrival of expert medical help. The study therefore aims to determine if trained medical undergraduate students retain knowledge and attitude regarding skills.

Methods: About 150 students in the first year of medical school participated in the current study. The students attended two BLS training sessions of three hours each. The students were evaluated at six weeks and followed up at six months following the initial training session. The psychomotor skills were check-listed, and the performance was scored between 0 to 5. Data on knowledge and attitudes were collected with a pre-validated self-administered questionnaire.

Results: Among the participants, 69% were males, and 33% were females. The mean age group of study subjects was 21 ± three years. The skill scores (p=0.001) and knowledge scores (p=0.001) were significantly different at six weeks and six months after the initial training. Six weeks after the initial training session, the percentage of correct responses for knowledge questions was significantly higher than six months later. Approximately 86.3% of participants felt the BLS training was adequate to perform resuscitation confidently, while only 66.7% were confident after six months of training (p=0.001). Also, the number of students confident to give BLS during a medical emergency was significantly higher at six weeks after the initial training session than six months (p=0.001).

Conclusion: The study shows significant decay in psychomotor skills and knowledge and attitude among the medical undergraduates. Therefore, regular hands-on training with certifiable courses is required to reinforce skills and update knowledge regarding BLS.

Keywords: First-year medical undergraduate; cardiopulmonary resuscitation; basic life support; knowledge; attitude.

INTRODUCTION

A sudden cardiac arrest can be a life-threatening emergency with poor survival rates. The cardiac arrest occurring out-of-hospital is a leading cause of mortality with about 0.5 to 1 death per 1000 population annually (1). Cardiopulmonary resuscitation (CPR) involves chest compressions to restore circulation and artificial ventilation to maintain oxygenation during cardiac arrest. Early CPR is a vital component in the survival chain, according to American Heart Association. By learning basic life support (BLS) and practicing simple CPR, the patient is likely to survive until arrival of expert medical help, and this is crucial life support to the patient (2).

Most of the time, the patients lose their lives due to a lack of immediate CPR by personnel knowledgeable in administering CPR (2). Both psychomotor skills and cognitive knowledge is essential for administering CPR effectively during an emergency (3). Every individual must know BLS and CPR. BLS Training is now proposed to be in the secondary school curriculum. However, the worldwide implementation of BLS training among these students is still not conceptualized. The knowledge, attitude regarding BLS is studied vastly among the bystanders, interns, medical officers, and paramedical personnel. The previous research has evaluated the knowledge and attitudes of undergraduate medical students regarding CPR (3,4).

With the evolution of a competency-based medical curriculum, BLS training has become an essential part of medical education. The importance of implementing it and reinforcing it throughout the undergraduate course is a matter of concern. However, the knowledge and confidence of medical students are varied regarding practice of BLS/CPR during the management of a medical emergency (5). Medical personnel should be aware of CPR in order to ensure their competency before managing patients in wards or out of the hospital. Therefore, early training the medical undergraduates is a necessity in Emergency
Cardiovascular Care. The study, therefore aims to determine if trained medical undergraduate students retain knowledge and attitude regarding skills.

MATERIALS AND METHODS

Study settings and participants

About 150 first-year medical undergraduates from the medical school in Mangalore participated in this cross-sectional study. The study included all those student volunteers who have undergone one training session of CPR.

Study design

The students attended two BLS training sessions of three hours each. Each training session involved instructor-guided information regarding five critical links of BLS like scene safety and patient assessment, the emergency response system activation, chest compressions, airway and breathing, and to resuscitate an adult who is non-responsive, not breathing, and has impalpable pulse, using an automated external defibrillator. Also, all the skills were demonstrated to the participants by the instructor. The students practiced the skills with the instructor-guided video. The essential skills are chest compressions, so adequate time was given to practice chest-compression skills. The students were given a short assignment after two sessions. Students were also assessed by peer-assessed checklist-based training for evaluating the skill aspect of BLS, in which the students played the roles of the examiner and trainee. However, the grades obtained by the immediate assessment are not included for statistical analysis.

The students were evaluated at six weeks following their initial training session. The psychomotor skills were check-listed, and the performance was scored between 0 to 5. One point each was given for every step of performing the CPR procedure. Data on knowledge and attitudes were collected with a pre-validated self-administered questionnaire used in previous studies (6,7) that involved 18 questions: 12 questions assessing knowledge and six regarding attitude towards skill. After six months of the initial training session, the skill performance was again evaluated, and the same questionnaire was administered to determine the knowledge as well as attitude towards acquiring CPR skills.

Ethical considerations

The ethical clearance was obtained from the Institutional Ethics Committee before initiating the study. Written informed consent was obtained from all the study participants.

Statistical analysis

Data was analyzed using SPSS 20 (Statistical Package for Social Sciences 20.0). Descriptive data are expressed as percentages, frequencies, and mean. The mean of skills and knowledge scores were compared at six weeks and after six months using Paired t-test. The strength of association between the knowledge and attitudes towards skill was calculated using the Chi-squared test. The statistical significance was considered at P values <0.05.

RESULTS

Around 182 undergraduate medical students volunteered to participate in the study. Of these, the total number of respondents in the study was 150. Ten questionnaires were not included in statistical analysis as they were incomplete. Another 22 did not participate in the follow up survey at six months. Among the participants, 69% were males, and 33% were females. The mean age group of study subjects was 21 ± three years.

![Fig. 1: Distribution of skill scores at six weeks and after six months. * Significantly higher than the skill scores at six months.](image)

The skill score distribution shows a significant difference (p=0.001) in skill scores at six weeks and six months following the initial training (Fig. 1). The average scores obtained during skills assessment during six weeks were considerably higher than those during six months.

![Fig. 2: Distribution of knowledge scores at six weeks and after six months. *Significantly higher compared to knowledge scores assessed at six months](image)
Table 1: Comparison of frequency of correct responses of questions regarding knowledge of the undergraduate students

| Questions                                                                 | Percentage of correct response | p-value |
|--------------------------------------------------------------------------|--------------------------------|---------|
| 1. What should you do first during the emergency?                        | 79.4%                          | 0.45    |
| 2. Pulse check is the initial step in CPR                                 | 79.4%                          | 0.001*  |
| 3. Indications of CPR                                                    | 74.5%                          | 0.001*  |
| 4. What is CAB?                                                          | 86.3%                          | 0.001*  |
| 5. How to determine the location of chest compressions?                 | 75.5%                          | 0.001*  |
| 6. What is the depth of compressions?                                    | 78.4%                          | 0.001*  |
| 7. What is the abbreviation of AED?                                       | 78.4%                          | 0.001*  |
| 8. What is the recommended ratio for chest compression to ventilation?   | 71.6%                          | 0.001*  |
| 9. What is the rate of chest compression in adult and children during CPR?| 63.7%                          | 0.008*  |
| 10. How long to continue CPR?                                            | 83.3%                          | 0.02*   |
| 11. What are shockable rhythms?                                          | 74.5%                          | 0.003*  |
| 12. What are the contraindication for CPR?                               | 73.5%                          | 0.001*  |

*Statistical significance at p<0.05

Table 2: The frequency distribution of attitude towards BLS at six weeks and after six months

| Questions                                                                 | Percentage of correct response at six weeks | Percentage of correct response at six months | p-value |
|--------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------|---------|
| 1. I feel my training is adequate to equip me to handle resuscitation confidently | 86.3%                                      | 66.7%                                      | 0.001*  |
| 2. Resuscitation should be done by a qualified medical professional only | 86.3%                                      | 73.5%                                      | 0.03*   |
| 3. All 1st year students should have a BLS course before entering 2nd year | 92.2%                                      | 90.2%                                      | 0.8     |
| 4. Are you confident enough in giving BLS                                | 88%                                        | 56%                                        | 0.001*  |
| 5. Do you think that the BLS course should be reevaluated frequently     | 92.2%                                      | 85.3%                                      | 0.1     |
| 6. Do you think you are confident enough in saving a life with your BLS knowledge | 93.1%                                      | 32.4%                                      | 0.001*  |

*Statistical significance at p<0.05

All most all the participants knew what they should do during an emergency. No significant difference existed in their response even at six months of training (Table 1). The percentage of correctly answered questions regarding other knowledge questions was significantly high at six weeks than six months following the initial training session.

The attitude of the respondents regarding the adequacy of training to handle the resuscitation confidently was significantly different. Approximately 86.3% of participants felt the BLS training was adequate to perform resuscitation confidently, while only 66.7% were confident after six months of training. It was also observed that the number of students confident to give BLS during a medical emergency was significantly higher at six weeks than at six months (Table 2). However, all the respondents felt that the first-year students should be trained for BLS during early part of medical course and frequently reevaluated concerning knowledge and skills of BLS during the different phases to handle a medical emergency efficiently.

DISCUSSION

The present study evaluated the knowledge, skills of BLS during emergencies among first-year medical undergraduates at six weeks. Also, it assessed the retention of the knowledge and skills at six months. The study’s findings suggest that both skills, knowledge was significantly higher during the six weeks following the initial training session.

The focus during BLS training is on knowledge and skills of initial emergency care during sudden cardiac arrest. All medical professionals should be knowledgeable as well as competent to perform BLS during medical emergencies. After sudden cardiac arrest, the chances of reviving a patient with successful resuscitation reduces by 7-10 % with every minute (8).

The study results show that psychomotor skill scores, knowledge scores were significantly different between six weeks and six months among medical graduates. The psychomotor skills and knowledge scores were high at six weeks following the initial training session compared to six months. The knowledge and attitude of medical interns were evaluated in a study by
Avabratha et al., in several medical colleges of Karnataka and authors reported 45.2% had insufficient knowledge regarding resuscitation (9). A survey among final-year medical students in Japan showed that 84% could not perform standard CPR (10). Some studies reported that students lacked essential skills, and some concluded that the skill did not correlate with knowledge (11). Research among dental students has reported that 70% had adequate knowledge, 50% were unaware of performing CPR in correct sequence. (5). In addition, reports from previous studies concluded that the medical students were not competent enough to perform CPR despite training in their medical school (8). Most of the above studies have assessed students after one session or after of their undergraduate course. Presently, the BLS training has become an essential part of the first-year medical curriculum with competency-based medical education. However, efficient implementation and reinforcement are often challenging, for still basic training for BLS is not practiced in many medical schools.

A cross-sectional study that assessed knowledge, attitude, and practice about CPR among the medical students of fourth year, final year and interns reported that 93.3% of them had good BLS knowledge, of which, final year students were 36.2%, fourth-year students were 34.1%, and interns were 23% respectively. Among study participants, 80.7% of students did not practice CPR (12). In the present study, students are evaluated in six weeks and six months. The efficiency in CPR skills, knowledge and attitude about CPR significantly faded with time. The study results demonstrate the importance of reinforcement as repeated educational training programs concerning BLS to be incorporated in the medical curriculum.

Attitude towards various skills among the students who participated in the study shows the significant difference concerning the adequacy of training, confidence to handle resuscitation efficiently when assessed at six weeks and after six months. All participants felt that BLS training must be included in the regular medical curriculum and should be an integral part of medical education. A similar attitude was reported in several studies (6, 13, 14).

A quasi-experimental study among many health care professionals demonstrated that the number of previous BLS training courses attended correlated with the levels of attitude about CPR (6). Sudeep et al. showed that training improved the knowledge and skills of CPR. Lack of training and updates in an undergraduate program was the common cause of decreased knowledge retention about BLS (15). Among medical professionals, the retention of knowledge is influenced by prior CPR training complimented by clinical exposure. During the first year, a medical undergraduate would be trained about essential skills and knowledge about BLS in a simulation laboratory set up. This must be reinforced in subsequent phases of medical education in the emergency medicine department to handle emergencies and deliver CPR efficiently. Moreover, all health care professionals should have some standard of CPR/BLS training in the form of hands-on courses to master the skills and refresh, update the knowledge.

CONCLUSION

The study shows significant decay in psychomotor skills and knowledge and attitude among the medical undergraduates. Therefore, regular hands-on training with certifiable courses must reinforce skills and update knowledge regarding BLS for medical undergraduates.

CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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