



BASIC LIFE SUPPORT(BLS) SKILLS BEFORE AND AFTER BLS TRAINING AMONGST HEALTH CARE WORKERS- A LONGITUDINAL OBSERVATIONAL STUDY

Anaesthesiology

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ABSTRACT

This study assessed the Basic Life Support (BLS) knowledge, skills and performance of Medical Assistants before and after training in a mock cardiac arrest scenario while undergoing training with retention of skills at 0,3 and 6 months.

Materials and methods : Eighty nine paramedics undergoing training were assessed for baseline knowledge after ab-initio training, given BLS training as per standard protocol and were assessed before and after and at 3 and six months for performance and retention of skills. They were assessed on a scale of 10 by the OSCE method.

Results : The performance of students receiving structured training had better scores for with good retention of skills .

KEYWORDS

Basic Life support , CPR , Training, Skills retention.

INTRODUCTION

Sudden Cardiac Death is a common cause of death worldwide. It affects younger people in India and its incidence is expected to rise in the coming years with increase in incidence of lifestyle diseases and sedentary lifestyles. Immediate bystander cardiopulmonary resuscitation (CPR) significantly improves survival after a sudden cardiac pulmonary collapse. Basic life support is important in the chain of survival resulting in better outcomes in patients who receive immediate care especially in out of hospital cardiac arrests.

Basic Life Support knowledge amongst paramedical personnel is paramount as they are at many times the first responders during emergencies . A large number of studies have studied the baseline knowledge of doctors, nurses but few have validated the baseline knowledge, effect of standardized training and retention of skills. This study assessed the Basic Life Support (BLS) knowledge, skills and performance of Medical Assistants before and after training in a mock cardiac arrest scenario while undergoing training.

Aim: To determine basic life support skills before and after BLS training for Medical Assistants.

Objectives

1. Assess baseline knowledge after ab-initio course among trainees.
2. BLS training as per protocol using training manikins at a training centre for paramedics .
3. Evaluation of BLS skills before and after training at 0, 3, and 6 months.
4. Assess effectiveness of current training for retention of skills.

Study design -Prospective, interventional trial.

Study population - Sample of students from Medical Assistants undergoing paramedical training course.

Study setting - Training establishment of Medical Assistants. Study involves assessment of baseline knowledge of probationer medical assistants at entry after basic training, training in BLS skills as per current international guidelines of European resuscitation Council (ERC) guidelines and AHA (American Heart Association) by trained instructors, effectiveness of training as measured by evaluation of trainees after the course and skills retention at 3 and 6 months of training. Also video based instructions and simple refresher demonstration of BLS for retention of skills was assessed at 3 and six months.

METHODS :

Written consent and approval from hospital ethics committee was obtained. Student attitudes, prior experience and baseline knowledge was assessed using an initial questionnaire and a CPR/AED pre-test.

Students were then imparted BLS training over two days including classroom videos and practical hands-on-manikin skills in CPR and bag mask ventilation and use of AED use through a standard training programme

BLS manikins were used for CPR and bag mask ventilation training while Advance-CPR manikin was used for assessment of skills . The Advance-CPR manikin gives a printout of the complete BLS cycle indicating correctness of rate and depth of CPR. The manikin generates a report on any interruptions in CPR and this can be assessed to evaluate performance of high quality CPR. The complete sequence was tested as an OSCE (Objective Structured Clinical Examination) evaluated on a ten point scale.

Student skills were tested in a standardized fashion by the study team. The students were shown a video based tutorial as refresher before assessment at 3 and six months. Three and six months later, written and practical examinations were repeated by the same students and supervised by the study team. Examination score differences were analyzed using matched pair t-tests. Statistical analysis was carried out to measure differences in scores. The primary outcome measure was the percentage of students who could correctly perform CPR and application/operation of an AED in a mock adult cardiac arrest scenario at 0, 3, and six months.

A pre-test consisting of 10 multiple choice questions covering basic aspects of CPR and basic life support skills was conducted as a part of assessment of baseline knowledge. Also, a post-test was conducted after BLS training to assess knowledge after training. Practical examination was conducted for the trainees before and after BLS training on advance CPR manikin to assess the CPR skills by trained instructors who assessed the students using an OSCE scoring card out of ten points. A printout of the CPR recording for one cycle was also analysed for correctness in rate and average depth of compressions. The scores were then analysed for improvement after training on a ten point scale. The OSCE was based on the evaluation of BLS sequence as per protocol as applied as an OSCE on a ten point scale.

The same procedure was followed at 03 and 06 months after giving a video tutorial and a hands on demonstration as a refresher for the trainees. The trainees were then re-assessed as per the OSCE method averaged on a ten point scale for retention of BLS skills.

Results were analysed for performance before and after BLS training, at 3 and 6 months . Also, knowledge and attitudes of trainees to CPR/BLS training were analysed to improve training pattern for future batches from the feedback reports obtained from the trainees at the end of their course.

RESULTS :

A total of 89 students of one batch of trainees reporting for MA-II (Q) course at SOMA were enrolled for the study. The trainees were all male sailors who had undergone similar training and had the same physical, and educational profile. Since these trainees were allocated the Medical branch their academic profile was above average during basic training at INS Chilka. All the trainees allocated the Medical branch had a baseline qualification of 10+ 2 with Physics, Chemistry and Biology.

Before the training, only 18 % of the students performed chest compressions correctly (as assessed by a score of 5 or more) compared to 100% immediately post- training.(P<0.05%). The baseline knowledge of the trainees pre training on reporting was assessed on a scale of 10 with a mean of 3.76 +/- (0.54) as compared to the post training performance score of 8.25 +/- (0.41) (P < 0.05) . The obvious higher scores post training are reflective of the success of a structured training programme on BLS conducted for the trainees.

A pre-test score on a scale of ten also gave an average score of 3.4 before training to a high score of 8.9 post training. The candidates were confident to identify the emergency and did the correct steps to call for help, start high quality CPR on the manikin for an adequate period of time. The quality of CPR was assessed on the Skill testing advance CPR manikin along with a scoring system on correctly performed tasks on a score of 10.

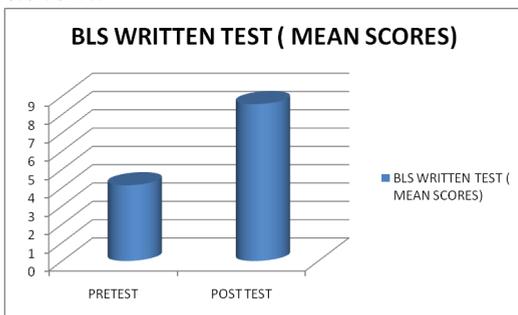


Chart 1 : Mean Score before and after training (on a scale of 10) Pre and Post Training Written MCQ test

At 3 months and 6 months follow up 99% and 98% of students still performed chest compressions correctly. The BLS assessment score improvement a mean score of 4.5 to 9.8 post training which was retained at 3 and 6 months at 9.8 and 9.4 respectively. Hence, there was good retention of skills at 3 and 6 months with minimal intervention of a video demonstration and BLS flash card given to the trainees as an aide-memoire.

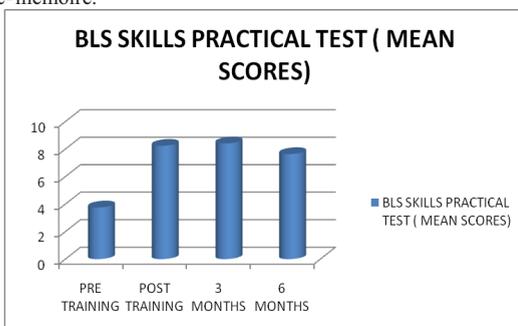


Chart 2 : Mean Scores : Pre training, post training and at 3 and 6 months(on a scale of 10) Mean Practical Skills scores as per evaluation sheet on BLS Skills

DISCUSSION

Basic Life support skills are essential in the management of Sudden Cardiac Arrest. The incidence of Sudden Cardiac Arrest has been increasing in the recent past due to increase in lifestyle diseases. Also, in our country the younger people who are often the sole breadwinners in the family are involved. Bystander CPR and early recognition and high quality CPR has been shown to improve survival in out of hospital cardiac arrests. The chain of survival is vital and every link is essential to perform in ensuring a favourable outcome from Sudden Cardiac Arrest.

Medical Assistants are often the first to arrive on the scene during their duties in hospitals. It is essential that as first responders they are able to recognize Sudden Cardiac Arrest and perform Basic Life Support skills such as high quality CPR, bag mask ventilation using an AED for defibrillation or providing rescue breaths till further help arrives.

In this study we decided to select a class of paramedical course trainees who undergo a medical course for six months at our paramedical training center. The trainees have already undergone first aid and CPR training during their basic training. It was necessary to evaluate their basic skills before and after training via a structured course on BLS from trained instructors .

The latest guidelines by the American Heart association in 2015 regarding education and training in Basic and Advanced Life support Skills have laid down evidence based guidelines on training as :

- Use of a CPR feedback device is recommended to assist in learning the psychomotor skill of CPR.
- Devices that provide corrective feedback on performance are preferred over devices that provide only prompts (such as a metronome).
- The use of high-fidelity manikins is encouraged for programs that have the infrastructure, trained personnel, and resources to be an appropriate choice for organizations that do not have this capacity.
- BLS skills seem to be learned as easily through self-instruction (video or computer based) with hands-on practice as through traditional instructor-led courses.

A study conducted by Meissner et al on Basic Life Support skills on High school students before and after training found similar results wherein the baseline knowledge was meager and post training high levels of skills and retention was obtained. In our study too it was observed that desirable skills were obtained post training while level of skills retention was good with minimal intervention retraining till one year.¹⁰

Another study conducted by Ohoud Alotaibi et al on Basic life support: Knowledge and attitude among dental students and Staff in the College of Dentistry, King Saud University demonstrated inadequate baseline knowledge among dental students but a positive attitude towards learning. In our study, we found the students more than eager to master basic life support skills . During the feedback report at end of course submitted by the students this capsule training on Basic Life Support was rated the highest in content, relevance and from point of view of the desirability to learn and acquire skills in BLS.¹¹

As was relevant in our study, it was necessary to ascertain the baseline knowledge of trainee Medical Assistants which was below desirable standards. The reason for this is attributed to the type of training hitherto received in First aid classes. To attain skill sets in CPR and Bag Mask ventilation , a practical manikin based training with timing / metronome and indicators of adequate rate/ depth of CPR need to be achieved by the student. No classroom based lecture/ group demonstration can achieve high level of skills. The fact that adequate time per manikin was spent on each and every student to achieve skills till deemed perfect by the instructor are essential in the performance of High quality CPR.

The other factor in imparting good training in CPR is to have good quality video demonstration of Basic Life Support skills. The video demonstration used for CPR were very useful for training and practice . The impact of a multimedia video is highly beneficial than classroom based lectures or mass demo. Personal attention on an individual basis by trained instructors is the key to success of BLS training programmes. It is obvious that the programme is manpower dependant. Each instructor can teach in groups of 5-6 students and one manikin at a time with accessories such as a pocket mask, bag mask , AED trainer to complete the mock cardiac arrest scenario. This type of training is in conformation with the training programmes carried out by American Heart Association (AHA) and European Resuscitation Council (ERC) guidelines. In our study the average scores post training were higher than 8 on a scale of ten. At the end of training all trainees were correctly performing CPR and Bag mask ventilation.

CONCLUSION :

A structured training programme with hands on skills training with video demonstrations is essential to have desirable skill levels amongst

Medical Assistants, who are more likely to be first responders / primary level of caregivers in the event of Cardiac arrest. Having a trained workforce of medical personnel in BLS skills will improve the survival rates of Sudden Cardiac Death and out of hospital cardiac arrest scenarios.

Conflicts of interest :

None.

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