

Effectiveness of short duration of CPR training based on Indian guidelines among the doctors of a tertiary care teaching hospital in Western India- An interventional study

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Abstract

Introduction: Successful cardio pulmonary resuscitation (CPR) can lead to positive outcome after sudden cardiac arrest. Hence knowledge and skills among the medical and paramedical staff regarding CPR becomes very important. Various international guidelines were being followed till now, but recently the Indian guidelines for CPR have been published. We conducted an interventional study to know the effectiveness of short training of CPR based on these guidelines among the doctors.

Materials and Methods: The doctors who attended the training were included in this interventional study. The training comprised of a lecture on all aspects of Indian guidelines of CPR published in 2017, followed by hands on training including assessment, airway management and chest compression on a manikin. The participants were requested to fill a questionnaire before and after the training. Their knowledge score was calculated from the answers.

Results: Complete questionnaires were 108 in total. Mean post-test score (6.58) was significantly higher than the mean pre-test score (2.94), p value <0.0001. In pre-test, 101 (93.52%) participants scored less than 50% and none of the participant could score more than 70%. While in post-test, 34 participants scored more than 70%, (3 scored >91%, 8 scored 81-90%, 23 scored 71-80%). 28 participants (25.93%) scored less than 50% even after the training.

Conclusion: Overall knowledge score improved after 90 minutes of short CPR training based on Indian guidelines among the doctors.

Keywords: Resuscitation, Heart arrest, Training, Cardio pulmonary resuscitation (CPR), Questionnaire.

Introduction

Cardiac arrest carries a high mortality rate within and outside the hospital.¹ Early initiation of cardio pulmonary resuscitation (CPR) has been known to improve the survival rates.² Successful CPR requires appropriate teamwork and hence knowledge amongst medical and paramedical staff becomes necessary. Different guidelines are being followed by different countries for BLS/CPR and structured training programs are also conducted for various specialities as per the health institute's policies.

In India, none of this kind of training is mandatory for any health institute. Recently, the Indian guidelines for CPR have been published which are relatively more practical and feasible for the hospitals in this country as per the facilities available here.³⁻⁵

CPR training is most effective when conducted in a structured manner with lecture and hands on training for four-five hours as recommended by American Heart Association (AHA). Various studies have been published to support effectiveness of this extended training on CPR knowledge and skills.^{6,7} Limited data is available on effectiveness of short duration training with the lecture and hands on training on CPR knowledge.

We conducted this interventional study to know the effectiveness of short CPR training of Indian guidelines on the knowledge of CPR among the doctors and to sensitize the doctors regarding the new Indian CPR guidelines.

Materials and Methods

Ethical Consideration

The study was conducted after Scientific Review Board and Institutional Human Ethics Committee approval. Written and informed consent of the participants was taken. The information collected from all the participants was kept confidential.

Study Design

An interventional study was conducted at a tertiary care teaching hospital from Gujarat, India.

Study Setting

This medical college and hospital was started in the year 2011. The hospital is a 750 bedded public hospital with all speciality departments. The college runs undergraduate medical course with yearly admission of 150 MBBS students since 2011.

Study Population

We planned to include all the doctors from our medical college in this study. All the doctors were invited for the training. The training was planned on three different days and all the doctors were given the choice to select any one date suitable to them to assure maximum doctors attend this training.

Inclusion Criteria

1. All the doctors who attend CPR training

Exclusion Criteria:

1. Doctors who refuse to take part in the study
2. Incomplete questionnaire

Intervention

A lecture with hands on training for approximately two hours was organized based on Indian guidelines of CPR published in 2017.³⁻⁵ The training was conducted by one of the authors who is a BLS/ACLS instructor and has experience in this field for around 12 years. The lecture was for around 35 to 40 minutes. The lecture included all the aspects of CPR including Compression only life support (COLS) a stepwise approach for lay person for out of hospital cardiac arrest, Basic cardiac life support (BCLS) - for medics and paramedics for out of hospital cardiac arrest, and Comprehensive cardiac life support (CCLS)- for medics and paramedics for in hospital cardiac arrest. This was followed by demonstration of CPR skills on the manikin. After that, the participants were divided into three groups for hands on training on manikin by rotation in three workstations. Training given at the workstations included: A- assessment and airway management, B-chest compressions and C- full sequence CPR training in a given scenario. Any doubts or queries from any of the participants were satisfied.

Study Tool

A structured questionnaire was prepared to measure the knowledge of the participants based on Indian guidelines for CPR. It included total ten questions- eight multiple choice questions, one short answer and one true/false. We also collected the basic demographic details of the participants.

Face validation as well as content validation was done by three independent experts in this field for the prepared questionnaire and changes were made according to their suggestions in the final version of the questionnaire. The same questionnaire was used as a pre-test and post-test. All the participants were given serial numbers and the same was written on each pre-test and post-test. The serial numbers were kept anonymous. Pre-test questionnaire was given to the participants before starting the lecture and they were given adequate time to fill them up before they were collected. Post-test questionnaire was given after the demonstration and hands on training.

Outcome Measure

Difference in knowledge score (mean score out of 10) between pre-test and post-test after one hour of lecture and hands on training for CPR based on Indian guidelines.

Data Analysis

The collected data was entered in Microsoft office excel sheet 2007 and then statistical analysis was done by using Graph Pad Prism version 7.0. Descriptive analysis was done using percentage and mean as appropriate. Comparison between pre-test and post-test was done using paired t test.

Results

Total 200 Doctors from various departments were given invitation to attend the training program. Total 151 doctors gave confirmation to attend, but 124 participants attended the training. Out of which, 13 participants did not give pre-test as they came late, three participants had to leave early due to emergency call so couldn't give post test, hence 16

were excluded from the analysis. Total 108 participant's records were available for analysis. The score was derived as the number of correct answers out of ten questions.

Demographic Details

Out of 108 questionnaires that were answered completely, the demographic data was available in 86 records, 43 were males and 43 were females.

Difference in the mean score before and after Training

Table 1 shows the difference in mean knowledge score. There was average increase of 3.64 in the mean knowledge score after training, which was statistically significant ($P < 0.0001$).

For ease of interpretation, scores were converted into percentages and grouped as shown in table 2. In pre-test, 101 (93.52%) participants scored less than 50% and none of the participant could score more than 70%. While in post-test, 34 participants scored more than 70%, (3 scored >91%, 8 scored 81-90%, 23 scored 71-80%). 28 participants (25.93%) scored less than 50% even after the training.

Discussion

This interventional study showed improvement in knowledge regarding CPR after the training based on Indian CPR guidelines.

We don't have a formal training program in our hospital for CPR. As new Indian guidelines for CPR have been published in 2017, it was planned to sensitise all the doctors including SRs, JRs and nursing staff regarding the same. As an initial step, we decided to conduct the training program of a short duration (90 minutes) with the faculties and SRs first. This marked the beginning of more other training programs regarding CPR to follow, eventually making it a regular Institutional training policy.

To understand the effectiveness of the training program, we conducted the pre-test and post-test and analysed the scores.

Poor Pre Test Score

The pre-test mean knowledge score of the participants in our study was 2.94 out of ten, which is very low. The probable reason could be in our institute, CPR training is not mandatory. The faculties who have studied CPR during their post graduation, their knowledge may not have refreshed due to lack of repeated training. And many of the participants being in non-clinical branches may have studied only during their undergraduate course. Moreover, they do not come across to such scenario routinely. Some previous studies done in India have also reported low knowledge score among medical faculties.^{8,9}

Improved Knowledge Score after Training

The average increase in the mean knowledge score was 3.64 in our study. Approximately 30% participants could score more than 70% after the training. Among which, 3 participants scored >91% and 8 participants scored 81-90%.

Many previously done studies have established the effectiveness of CPR training program on the knowledge of

the participants. Partiprajak et al. observed immediate improvement in knowledge and skills after BLS training in nursing students.¹⁰

Ajjappa et al. also observed improved BLS knowledge among medical interns after BLS training based on AHA guidelines.⁷ Owojuyigbe et al also showed improvement in knowledge among dental students after BLS training.¹¹ In our study, though the scores showed improvement as compared to the pre-test, still the knowledge scores are not up to the mark as expected. This may be overcome by long duration of training and repeated trainings. Once doctors get sensitized, it will be easier to propagate knowledge among the junior doctors and nursing staff.

Different types of Training

Traditionally, in most of the Indian healthcare institutes, the guidelines which are followed for CPR are those given by AHA, which obviously are designed and suitable for western countries. The AHA training is costly, lengthy, and needs periodic renewals. These may be the reasons many healthcare professionals avoid such trainings unless it's compulsory. The Indian resuscitation council has now published the CPR guidelines which are suitable to our setup. We kept this training to sensitize the doctors regarding these new Indian CPR guidelines, so we planned a short training of 60-90 minutes.

As per the observation in our study, the brief CPR training improved the knowledge of doctors significantly. BCLS and CCLS algorithms are very simplified and suggestive of what to do and when. The lecture included power point presentation with many photographs, and that was followed by hands on demonstration and practice. Different types of trainings have been tried in different study population previously which have reported to improve knowledge as well as skills for performing CPR. Lee et al. compared the effect of four different levels of BLS training (level 1-40 minutes, level 2-80 min, level 3-120 min, level 4-180 minutes) and concluded that short duration trainings helped in skill improvement but long duration training with hands on is required for high quality CPR skills and use of AED.¹² Roppolo et al. studied the effect of three different modules of CPR training including standard training on medical students. They observed the self directed learning groups were more successful in initiating the switch for two-rescuer CPR on manikins. However, the overall CPR passing rate was more in the standard long duration instructor given training.¹³ Ko et al., in a randomized controlled trial of lay persons, compared simplified CPR training focusing on only chest compression with standard training and observed better retaining skills and recall of CPR steps.¹⁴

Limitation

We have assessed only knowledge aspect after the CPR training and not the skill aspect, which is practically more important. So from this study, it can be implied that though the theoretical knowledge is improved, the same may not be duplicated in practical real life scenario. This study was

conducted at a single tertiary care hospital, hence the findings may not be generalized. Also, we have not assessed the long term retention of knowledge after single brief training.

Future Implication

The findings in this study may help in forming a protocol based on this new Indian guideline for repeated and mandatory BCLS and CCLS training at our institute. This training should be made compulsory for even nursing staff as well as intern doctors.

Future Directions

Effect of BCLS and CCLS training on CPR skills can be studied on skill reporting manikins. The effect of duration of training can be assessed. Long term patient survival rate after in hospital cardiac arrest can be assessed to know the clinical impact of such trainings after they are made compulsory. Long term retention of knowledge among the trainees can be assessed at different time intervals.

Table 1: Comparison of score before and after the training

	Pre test score*	Post test score
Mean	2.94	6.58
SD	1.48	1.63

P value < 0.0001, paired t-test, * score out of ten

Table 2: Percentage wise mean pre-test and post-test score

% score	Number of participants (%) pre-test	Number of participants (%) post-test
> 91	0 (0.00)	3 (2.78)
81-90	0 (0.00)	8 (7.40)
71-80	0(0.00)	23 (21.30)
61-70	2 (1.85)	25 (23.15)
51-60	5 (4.63)	21 (19.44)
< 50	101 (93.52)	28 (25.93)
Total	108 (100)	108 (100)

Conclusion

This interventional study showed that short CPR training based on Indian guidelines improved the knowledge regarding the same among the doctors and senior residents.

Conflict of Interest: None.

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