Research Article

Impact of Additional Short Session of Video Training on Performance of Basic Life Support Skills in 2nd-Year Medical Students

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Abstract

Context: Basic life support (BLS) is a core life-saving skill which everyone should know, but knowledge of BLS is poor even among medical students. **Aims:** The aim of our study was to assess the knowledge regarding BLS among medical students and see impact of training and also to know whether a short session of video training made an impact on their cardiopulmonary resuscitation (CPR) skills. **Settings and Design:** Ninety-two 2nd-year medical students were included in the study. **Materials and Methods:** Their baseline knowledge regarding BLS was assessed before workshop with pretest 1. Following workshop posttest 1 and 1 month later, posttest 2 was conducted. A short duration video training on BLS was done after posttest 2 and its impact was assessed 2 months later with performance of CPR skills on a mannequin. **Statistical Analysis Used:** Data analysis was done using SPSS version 23.0. Pearson's Chi-square test was used to evaluate the differences between groups for categorized variables. Unpaired and paired *t*-test was used to calculate the difference of means for quantitative variables. **Results:** There was significant improvement in knowledge regarding BLS after the workshop. Even after 1 month, though there was decline in knowledge, still it was significantly higher than the baseline. Short duration video training session did not lead to any improvement in BLS skills. **Conclusions:** BLS training should start early in medical curriculum with reinforcement at regular intervals. Single short duration video training session did not have any impact on improvement of skills.

Keywords: Cardiopulmonary resuscitation, curriculum, medical, students

Introduction

Basic life support (BLS) is a life-saving skill which not only health-care personnel but even layperson should know. BLS is the foundation on which building of advanced cardiovascular life support (ACLS) and postcardiac arrest care stands. If timely and properly performed, BLS care is not provided immediately; however, good ACLS may be, either we are going to lose the patient or going to get a patient with permanent neurological damage. The chances of survival of cardiac arrest victim decreases by 7%–10% with each passing minute.[1] Hence, time is the key and importance of BLS is paramount. However, unfortunately, in our country, knowledge of BLS is poor not only among laypersons but even among medical students and junior doctors.[2,3] Most of the time, when a cardiac arrest occurs in hospital, an anesthesiologist or emergency physician is called upon, and by the time that a person reaches on the scene, the crucial time is already lost and sometimes we lose a potential survivor. Sometimes, even if cardiopulmonary resuscitation (CPR) is performed, it is ineffective because of lack of knowledge and proper training. There is a correlation between bystander CPR quality and patient outcome.[4] Ideally, everyone should know BLS, but for medical and paramedical staff, it is a must. However, much emphasis is not placed on teaching and reinforcing BLS skills in medical curriculum.[5]

Rationale and aim

BLS is one procedure which does not require any special equipment or drug, but it requires proper training and regular practice. Early exposure of medical students to BLS skills is essential along with reinforcement in each successive year

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because life-saving skills decline rapidly.[6] In this study, we tried to assess the baseline knowledge of 2nd-year medical students regarding BLS, trained them on BLS, and again assessed them and also tried to find out whether an additional short session of video training made any difference in their performance of CPR skills on a mannequin.

Materials and Methods

Study area

Second-year medical students of a 250-bedded tertiary care hospital were included in the study.

Study design

This was a prospective interventional study.

Sample size

Ninety-eight 2nd-year medical students were selected for the study. We included 2nd-year medical students ($n = 98$) as they have adequate knowledge of anatomy and cardiovascular and respiratory physiology. Moreover, learning and practicing clinical skills are novel experience for them after studying theory continuously for 1 year. Of 98 students, six students were excluded from the study as they could not be contacted after repeated follow-ups by the investigator.

Study period

The study period was November 2017–February 2018 (3 months).

Study tool and sampling technique

A preworkshop questionnaire based on the American Heart Association (AHA) 2015 guidelines, pretested and self-administered consisting of ten questions to test the core competencies, was prepared. One mark was awarded for correct response while zero was given for incorrect answer. The main aim was to evaluate the correct sequence of CPR, ratio of chest compression to ventilation, and rate and depth of chest compressions. The pretest was conducted on the day of workshop, in which 92 students participated. This was followed by the workshop in which an interactive lecture consisting of PowerPoint presentation was taken which was followed by practical demonstrations of core competency skills of chest compressions, airway and breathing, and use of automated external defibrillator AED at skill stations by the trainers. After this single rescuer and two rescuers, CPR on a mannequin was demonstrated. After the demonstration by trainers, hands-on sessions were conducted. Three stations were set up. On each station, there was a mannequin with feedback system, pocket mask, ambu bag with mask, and an AED. Students were divided into different groups with each group having six students. Each student was given a chance to practice the skills, and simultaneously, feedback was given by the experts to improve the skills. Special emphasis was given on chest compressions since these are most important in the initial few minutes of arrest and can be started immediately without requiring any equipment. At the end of workshop, posttest 1 was conducted to know the gain in knowledge regarding BLS.

As another part of the study, posttest 2 was conducted 1 month after the workshop to know the retention of knowledge. Similar questionnaire as earlier was given to participants, but students were divided into two groups randomly of 46 each using simple random sampling technique (envelope method). One group was control group named as C group and the other was VT or video-trained group. The VT group was shown AHA video on BLS followed by debriefing on BLS (total duration of 8 min) immediately after the posttest 2. Two months after the video training, students of both the groups were asked to demonstrate the CPR skills on the mannequin. Each student was assessed individually. The first part included assessment and call for help which was further divided into five parts beginning with scene safety, check responsiveness, shouts for help and activate emergency response system and ask for AED, check breathing, and check pulse. In the second part, actual performance of CPR was assessed which was again divided into five steps beginning with proper hand placement on lower half of sternum, compression rate of 100–120/min, complete recoil after each compression, each breath given over 1 s, and visible chest rise with each breath. A checklist was prepared based on these steps; one mark was given for each step done correctly and zero was awarded if step was performed incorrectly or not in proper sequence. It was like a summative assessment, and no feedback to students was given at that point of time. The final aim of our study was to know whether the additional session of the training and visual effect of the video made any difference in the performance level of the students among the two groups.

Data analysis

Collected data were entered into the MS Excel Spreadsheet, coded appropriately, and later cleaned for any possible errors. Analysis was carried out using Statistical Package for the Social Studies for Windows version 23.0 and online GraphPad software (Prism 5 for Windows) version 5.01. During data cleaning, more variables were created so as to facilitate association of variables. Clear values for various outcomes were determined before running frequency tests.

Pearson's Chi-square test was used to evaluate the differences between groups for categorized variables. Unpaired and paired "*t*"-test was used to calculate the difference of means for quantitative variables.

Normally distributed data were presented as means and standard deviation or 95% confidence intervals. All tests were performed at a 5% level of significance; thus, an association was significant if the $P < 0.05$. Written informed consent was obtained from the study participants, and the study was conducted according to the institutional ethical policy.

Results

The pre- and post-workshop questionnaire consisted of 10 questions. It can be seen clearly that there is dramatic improvement in knowledge of students following workshop. More improvement was seen in question no 4–8 which

included questions regarding chest compressions and pulse check. Overall, the best score was for question no 7 which was regarding where to check for pulse in adults, for which almost everyone answered correctly. Percentage-wise improvement was highest for question no 5, in which almost everyone got aware that, for adults, the ratio of compression to breaths is 30:2. Another question where significant improvement is seen is no 8, in which 97% participants became aware about correct rate and depth of chest compressions after the workshop [Table 1].

It can be seen from the paired samples' statistics that there is statistically significant improvement in scores in both posttest 1 and posttest 2 as compared to pretest scores ($P < 0.001$). Mean score achieved in pretest was 1.95 ± 1.33 which increased to 7.47 ± 0.99 in posttest 1 and this rise was statistically significant. Similarly, in posttest 2, the mean score was 6.99 ± 1.35 which is again significantly higher than the pretest score but lesser than the posttest 1 score. On comparing posttest 1 and posttest 2, there was statistically significant decrease in the marks scored in posttest 2 ($P < 0.05$) [Table 2].

On further comparing VT group and C group in posttest 2 by applying unpaired *t*-test, mean score achieved was 6.98 ± 1.40 in VT group and 7.00 ± 1.32 in C group. The difference of mean marks scored between the two groups was statistically not significant ($P > 0.05$) [Table 3].

Two months after video training, skill testing was done on BLS mannequin. The results are shown in a graphical form [Figure 1]. Both groups performed almost similarly, and on statistical analysis, no significant difference was found among the two groups in any of the ten parameters assessed [Table 4].

Discussion

The present study was conducted keeping in mind the importance of BLS for medical students. In our study, after assessing the baseline knowledge regarding BLS, we trained them as per the AHA guidelines and then again assessed their theoretical knowledge as well as practical skills on the mannequin. We also tried to find out whether an additional short session of video training made a difference on CPR performance.

In our study, the initial knowledge regarding BLS was poor among medical students. Similar results have been reported in earlier studies.[2,3] After training, there was a dramatic improvement in their knowledge as seen in posttest 1. Even after 1 month, there was significant retention of knowledge as seen from posttest 2 though it was significantly less than pretest 1. After the additional session of teaching for VT group, both the groups were tested for actual performance of CPR on the mannequin. The students in both the groups performed similarly as can be seen graphically [Figure 1].

Video training is a simple, fast, inexpensive, less cumbersome method of teaching. We hypothesized that after traditional classroom teaching based on the AHA guidelines, reinforcement can be done with the video training session. Keeping this in mind, we instructed one group with a short video session of 8 min duration (VT group), while in the other group, no intervention was done (C group).

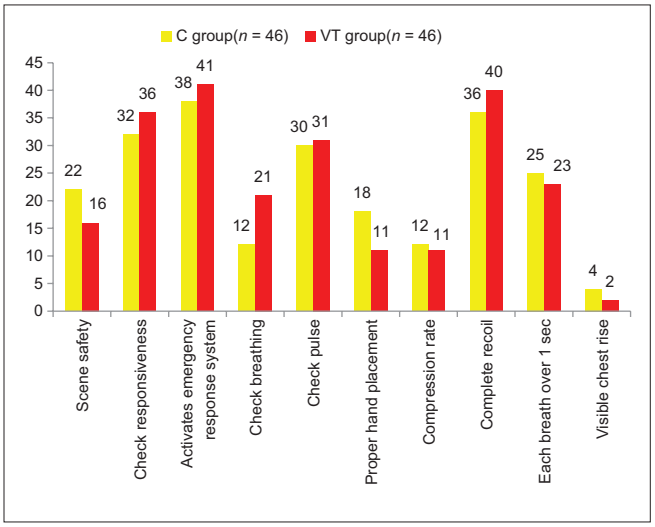

Figure 1: Comparison of skill set between both the study groups. C: Control; VT: Video trained

Table 1: Correct responses and percentages for pretest, posttest 1, and posttest 2

	Number of correct responses (%)		
	Pretest	Posttest 1	Posttest 2
Most out of hospital cardiac arrest occurs in	68 (73.9)	83 (90.2)	91 (98.9)
First step to do on seeing a unconscious person	11 (11.9)	51 (55.4)	68 (73.9)
Expanded form of AED	10 (10.8)	65 (70.6)	38 (41.3)
Correct sequence of CPR	9 (9.8)	84 (91.3)	79 (85.9)
Ratio of chest compressions to breaths in adults	5 (5.4)	90 (97.8)	90 (97.8)
How long a pulse check should last	22 (23.9)	78 (84.8)	70 (76)
Where to check pulse in adult	18 (19.6)	91 (98.9)	81 (88)
Rate and depth of compressions in adult	6 (6.5)	89 (96.7)	77 (83.7)
How to reduce risk of gastric insufflation	4 (4.3)	58 (63)	12 (13)
First step as soon as the AED arrives	18 (19.6)	12 (13)	44 (47.8)

CPR: Cardiopulmonary resuscitation; AED: Automated external defibrillator

Table 2: Paired statistics of pretest, posttest 1, and posttest 2

	Mean score	*n* (number of students)	SD	*P*
Pretest	1.95	92	1.329	0.000
Posttest 1	7.47	92	0.988	
Pretest	1.95	92	1.329	0.000
Posttest 2	6.99	92	1.355	
Posttest 1	7.47	92	0.988	0.005
Posttest 2	6.99	92	1.355	

SD: Standard deviation

Table 3: Comparison of two groups in posttest 2

Posttest 2	*n*	Mean score	SD	*P*
C group	46	7.00	1.317	0.939
VT group	46	6.98	1.406	

C: Control; VT: Video trained; SD: Standard deviation

Table 4: Number of students performing basic life support skills correctly on the mannequin

Skill test	C group (*n*=46)	VT group (*n*=46)	*P*
Scene safety	22	16	0.204
Check responsiveness	32	36	0.342
Activates emergency response system	38	41	0.369
Check breathing	12	21	0.051
Check pulse	30	31	0.852
Proper hand placement	18	11	0.116
Compression rate	12	11	0.810
Complete recoil	36	40	0.271
Each breath over 1 s	25	23	0.676
Visible chest rise	4	2	0.398

C: Control; VT: Video trained

The VT group performed similar to C group in skill testing with no statistically significant difference. In the study by Todd *et al*., it was found that video self-instruction training was better as compared to traditional CPR training.[7] In our study, no improvement in the performance of CPR skills after video training could be due to short duration of training session which failed to make an impact. In another study, two or three booster training sessions of 120 s each, increased the retention of CPR skills in pediatric provides significantly.[8] In our study, though training duration was 8 min, only one booster session was there, which could be the reason for poor retention of CPR skills.

In the study by Lešnik *et al*., it was found that an additional session of training increases the theoretical knowledge as well as self-confidence in performing the skill, unlike in our study, because it was a full course of 5 h duration.[9]

Probably, we need to increase the number of such short duration training sessions to see the difference in the skills as one training session may not be sufficient.

In our study, main focus was on initial assessment and activation of the emergency response system and core competency of chest compressions as these are most important in initial few minutes. In fact, recent Indian guidelines on BLS by laypersons outside the hospital emphasize only on chest compressions.[10]

We want to emphasize that BLS should be a regular part of the curriculum and its training should start in the 1st year itself. It should be consolidated in 2nd year when the students have sufficient knowledge of anatomy and cardiovascular and respiratory physiology. After that, there should be reinforcement of skills in each successive year. In a previous study, even the students felt the need for inclusion of such trainings in their curriculum and willingness to participate in resuscitations.[11] It has been found that skills fade with time interval even as short as 2 months after training.[12] Hence, as to maintain the skills continuous, repeated efforts are needed.[13]

After proper training, they can even reach to society during their community medicine postings and can train the laypersons in the community. In fact, this could be one of the practical methods to train the laypersons in a huge population of a country like ours. Similar pyramidal teaching approach has been suggested by Toner *et al*. to teach BLS skills to schoolchildren.[14]

Not only BLS but even ACLS can be included in the curriculum once they are trained in BLS. After this, gradual introduction of courses such as pediatric advanced life support, neonatal resuscitation program, and advanced trauma life support into the curriculum during their graduation years will make them confident in handling any type of emergency requiring resuscitation.

Conclusions

It can be concluded that BLS is the foundation on which whole of the resuscitation is based and its early introduction into the curriculum along with training at regular intervals is necessary to produce a medical graduate having adequate knowledge and sufficient skills to save the life of a cardiac arrest victim. Single short duration additional session of video training failed to show any impact on performance of BLS skills. Probably, the skills can be improved by increasing the frequency of such training sessions.

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Conflicts of interest

There are no conflicts of interest.

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