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Impact of compression only life (COLS) training to police personnel as first responder to cardiac arrest

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ABSTRACT

Background: Bystander CPR is an essential part of Out of Hospital Cardiac Arrest (OHCA). The Indian Society of Anaesthesiology Gujarat State Branch (ISAGSB) had embraced initiatives to teach Compression Only Life Support (COLS) to police personnel as they are likely to arrive before the emergency medical services in case of OHCA, thus increasing the chances of survival of victims. We evaluated the impact of one such training to 300 police men at our institute.

Materials and Methods: Participants were given a questionnaire in the pre and post training period and the impact of our training was evaluated in terms of attitude and knowledge by comparing the pre and post training scores.

Result: In both attitude and knowledge sections, there was a significant improvement in scores ($p < 0.001$). Marked percentage rise was also seen in the knowledge section with regards to the technique of COLS (<20% pre training to >80% post training).

Conclusion: We conclude that raising awareness towards COLS and imparting proper training to first responders like police personnel can significantly improve the chances of survival.

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1. Introduction

Life-threatening emergencies including sudden cardiac arrest can occur at any place. Out of hospital Cardiac Arrest (OHCA) is a public health burden globally accounting for nearly 10% of global mortality and 50% of cardiovascular deaths. Every minute delay in initiation of resuscitation reduces survival chance by 7-10%.¹

The CPR technique is defined as a chain of survival by the American Heart Association (AHA), as this technique has provided the greatest chance of survival to the patient of cardiac arrest. But there are certain limitations of

conventional CPR hence practical guidelines of CPR have been developed by Resuscitation Council formed by the Indian Society of Anaesthesiologist for resuscitating victims of OHCA by lay person - Compression Only Life Support (COLS).

COLS is as effective as conventional CPR in out-of-hospital cardiac arrest as proved by various randomized controlled trials.^{1,2} However bystander CPR rate in India is reported to be only 1.3% - 9.8%.³ This is far below the target goal of 62% set by the AHA-ECC. In our country where road traffic accidents, pedestrian mortality, and other such events occur in the eyes of society, the police personnel are most times contacted first in such emergencies even before medical help arrives. Hence imparting awareness and training of COLS to them can help

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improve outcome of OHCA in India. The American Heart association (AHA), the Australian Resuscitation council (ARC) and the Canadian Red cross have also acknowledged COLS CPR as the preferred alternative for members of the community who witness sudden arrest.²

The purpose of our study is to know the prevailing knowledge and attitude and assess the effect of imparting technical skills of COLS amongst Police personnel.

2. Materials and Methods

This prospective, cross-sectional observational study was done after institutional ethical committee approval (Approval Number : PUIECHR/PIMSR/00/081734/6607) and was conducted following the principles of the Declaration of Helsinki, 2013. A COLS training program for 314 Police Personnel was conducted in our Hospital. Information about the purpose, procedure and benefit of the study was explained to volunteers verbally by trained residents and a written consent was obtained. Respondents were allowed to withdraw from the study at any time.

A questionnaire was given to all the participants in the pre-training period. The same questionnaire was given at the end of each training session, i.e. post-training period. This pre-validated questionnaire, previously used in such other studies was, modified and translated into local language. Training was given to all the participants as per the standard guidelines issued by ISA. First part of the questionnaire consisted of questions regarding general information about life saving skills and educational status of the participants. Second part of the questionnaire consisted of three questions regarding Attitude towards COLS. In this section each item was marked on a scale of 1 (strongly disagree) to 5 (strongly agree) with total score range between 3 to 15. Third and Last part consisted of six questions based on knowledge about COLS. One mark was assigned for each correct answer for questions testing the knowledge resulting in a possible total score ranged from 0 to 6.

The training was performed in three groups of 100 each. 2-sessions were conducted for each group - initial half hour was a PowerPoint lecture based on the standard accepted guidelines explaining the three Core links of COLS along with information about usage and importance of AED. This was followed by hands on training in groups of twenty.

Total scores in the attitude and knowledge sections were expressed as mean±SD and were compared between the pre and post training sessions. In the attitude section, the score of each question was also expressed as mean±SD and compared individually between pre and post training. In the knowledge section, the correct answers for each question were also expressed as percentage and compared between Pre and Post training sessions.

The analysis of questionnaire data was done by using Stata MP 14.1 to compare the mean values of pre and post training observations. A large sample Z-test was applied.

P value of <0.05 was considered statistically significant. P value <0.05 suggests that training is highly effective and made statistically significant difference in the attitude and knowledge of the participants.

3. Results

We enrolled 314 participants. 14 forms were incompletely filled hence rejected. Total number of forms analyzed were 300. (n= 300).

Maximum numbers of participants were graduates (49%).

Tables 2 and 3 show Mean, SD and p values of scores in the attitude and knowledge sections in the pre and post training sessions suggesting significant improvement in both sections after training.

On further question wise analysis of the attitude section, we found a marked rise in the willingness to learn and perform COLS. (Table 4)

Table 5 shows question wise percentage improvement in the knowledge section between pre and post training. It shows marked improvement in the knowledge about COLS after training. Significant gains were observed in the technique of giving compression. In the pre training session less than 20% participants were correct about rate and depth of compression which improved to more than 80% after training.

Table 1: Educational status of participants

Educational Status	Percentage (%)
School	35%
Graduate	49%
Post Graduate	16%

Table 2: Mean scores in attitude section before and after training

Pre Training (Mean + SD)	Post Training (Mean + SD)	P Value
7.56 ± 1.53	12.64 ± 1.17	P < 0.001

Table 3: Mean scores in knowledge section before and after training

Pre Training (Mean + SD)	Post Training (Mean + SD)	P Value
2.82 ± 1.29	5.28 ± 0.94	P < 0.001

4. Discussion

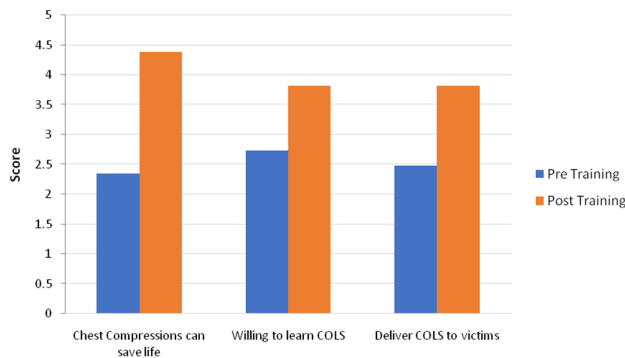
Police forces are abundant circulating and may arrive before emergency medical services in OHCA victims. If properly trained, they can provide basic life support within minutes, probably increasing the survival of the victims. This study evaluates the impact of COLS training on attitude and

Table 4: Question wise attitude score

Question	Pre training	Post training	P Value
Do you agree that chest compressions can help to save life?	2.35 ± 0.91	4.39 ± 0.61	P < 0.001
Are you willing to learn COLS To save collapsed victim?	2.73 ± 0.89	3.82 ± 0.77	P < 0.001
If trained, would you deliver it to victims?	2.48 ± 0.81	3.82 ± 0.77	P < 0.001

Table 5: Question wise percentage change in the knowledge section

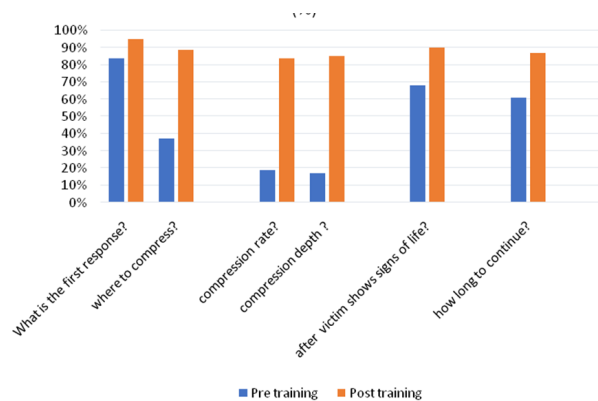
Question No	Pre training	Post training
What will be your first Response if you see a victim collapsing ?	84%	95%
What is the location for chest compression ?	37%	89%
What will be the rate of chest compression per minute ?	19%	84%
What will be the depth of Compression ?	17%	85%
What will you do after the victim shows signs of life ?	68%	90%
In case of no response even after chest compressions, what will you do ?	61%	87%



Graph 1: Questionwise comparison of pre & post training Attitude score

knowledge of police personnel. Our training and questions were based on 3 core links suggested by Resuscitation Council, under the Indian society of Anaesthesiologists (ISA) for resuscitation of cardiac arrest victims outside hospital by layperson.²

1. Early recognition
2. Early chest compression
3. Early transfer



Graph 2: Questionwise comparison of pre & post training Knowledge score

Approximately 6 million death due to sudden cardiac arrest occur annually and out of them 85% occur outside the hospital.⁴⁻⁶ The most common prearrest rhythm is ventricular fibrillation and if managed timely by resuscitation attempts it can be reverted to sinus rhythm.^{6,7} Awareness about CPR is less than 1% among Indian population.⁵ Hence there is an urgent need to create not only awareness but to provide proper structured training pertaining to both, knowledge and Skill among laypersons especially first responders like police and firefighters. Study shows significant issues and apprehension for CPR in community which can be mitigated by such training.¹

The main reasons for their lack of willingness could be⁸⁻¹⁰

1. They have never received training and awareness earlier in their career.
2. They are worried about their insufficient practical skills.
3. Some of the volunteers believed that it was illegal to give COLS if you are not qualified as a medic or paramedic.

Such factors can be alleviated by organizing frequent training sessions. Compression only CPR also helps to mitigate social discomfort associated with providing mouth to mouth respiration.⁷

Our study revealed that there is significant improvement in attitude and knowledge scores regarding COLS between the pre and post training sessions. (p< 0.001). There are other studies that suggest similar gain in basic knowledge and willingness to deliver CPR among volunteers undergoing training at community level.^{9,10}

With regard to individual questions in the knowledge section, the maximum percentage rise was observed in the questions regarding Location of chest compression, rate and depth of compressions. This data also suggests that training can lead to performance of high quality uninterrupted

chest compressions and hence improve the outcome of the victims. Mario Krammel et al.¹¹ studied the impact of police based first responder system on outcome after out of hospital cardiac arrest. They found no difference in compression rate or compression ratio between professional EMS and police personnel. They suggest that law enforcement personnel might also depict a more fitness-affine population group than average, leading to potential better quality CPR. This study also found that equipping police cars with AED reduced the time frame of no-flow in cardiac arrest victims by half and also associated with favorable neurological outcome.^{12,13}

Some studies have found that RCT (response to compression time) was reduced in enhanced video based training as compared to conventional methods. They suggest that video based learning keeps the behaviorally inactive learners engaged by increasing their ability of thinking and learning. Also, it is time saving, less expensive and can be repeated more frequently.⁷

Other studies done at community level also suggest robust gain in basic knowledge and significant increase in willingness to deliver Compression only CPR.^{14,15} With such gain in knowledge can change their attitude towards Compression only CPR.

However, we acknowledge that there were certain limitations to this study. Varied education qualifications of the police personnel could have affected our results and secondly this was a onetime training, however such training may need repeated sessions to improve retention.

5. Conclusion

We emphasize that such structured training sessions do positively affect the overall perception and bring about an improvement in the attitude and skills regarding COLS and if imparted to other first responders like fire fighters and disaster management teams on regular basis can certainly improve the outcome in cases of OHCA victims.

6. Source of Funding

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7. Conflict of Interest

The authors declare no conflict of interest.


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