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RESEARCH ARTICLE
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COMPRESSION ONLY LIFE SUPPORT (COLS) CARDIOPULMONARY RESUSCITATION TRAINING IN SCHOOL AND ITS INTRODUCTION IN SCHOOL CURRICULUM: A STUDY PROTOCOL

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Abstract

Background: Immediate cardiopulmonary resuscitation, or CPR, greatly improves survival rates and chances in cases of sudden cardiac arrest, which is one of the world's major causes of morbidity and mortality. Compression Only Life Support (COLS) is a simplified CPR method recommended for laypersons, especially in resource-limited settings. Introducing COLS training at the school level empowers students with lifesaving skills.

Objective: Study will assess the knowledge and attitude in school children about COLS. Also will teach school children and teachers about compression only lifesupport CPR. Study objective includes introduction of cols protocol in school curriculum.

Methods: This is a mixed - methods, prospective, interventional study conducted across schools. The study includes teacher training, student workshops, pre-training and post-training assessments and curriculum development. Quantitative data will be collected through structured questionnaires, while qualitative feedback from students, and teachers.

Expected Outcomes: The study anticipates that COLS training will significantly improve students' understanding and practical ability in performing CPR. Findings will inform policy recommendations for incorporating CPR training into school curriculum.

Conclusion: Equipping students with COLS CPR training through school-based programs has the potential to create a generation of first responder. This protocol sets the foundation for large-scale implementation and policy-level integration of lifesaving education in schools.

Keywords - Basic Life Support, Cardiopulmonary Resuscitation, Cardiac Arrest, Curriculum Emergency Medical Services, Health Education, Resuscitation, Schools Students, Public Health

INTRODUCTION:

The ability to survive of out-of-hospital cardiac arrest (OHCA) is dependent upon earliest provision of cardiopulmonary resuscitation (CPR) (1) as the victim's chances of survival decline with each minute of delay. CPR requires the right abilities and medical specialty-related knowledge. Compression only life supports (COLS) have been developed by the Indian Resuscitation Council, which was established by the Indian Society of Anaesthesiologists, in light of its limitations of CPR. Compression-only (COLS) CPR, which focuses just on circulation, is just as successful as traditional CPR, which addresses breathing, circulation, and the airway (2). This type of training is crucial for our nation since the rate of death from sudden cardiac arrest is 300–750 times higher in India than in the West. Many lives can be saved if the general population is aware of COLS protocol. The protocol algorithm designed by IRC in India for CPR is an Interim practice measure considering diversity and developmental issues of our country.

Children are future adults and form an integral part of community. School are the best venues for sowing collective values in children and teacher and children can act as a great vehicle to carry knowledge to every home and thus to the community. Abroad in various countries children are trained for CPR and automated external defibrillator (AED) considering its benefits (3).Various projects and training programme has been developed to train children for it. School tours are arranged many times for student's welfare but untoward events like simple injury leading to major blood loss, drowning, snake bite etc occur which can lead to cardiac arrest at times, so COLS protocol training can help us to buy time in emergency till the medical help arrives. Disaster management is one of the chapters for considering preparedness of children for future problems making them prepared for how to deal with it. Similarly we should make children aware of medical emergencies and focus to prepare them for it.

Recently, WHO has endorsed "Kids save lives" statement, which emphasize that an effective method of improving by standers CPR is to provide training in schools (4). COLS protocol designed by IRC experts for out of hospital cardiac arrest ,after a wide research so its inclusion in school curriculum may improve mortality rate due to sudden cardiac arrest as they may reach hospital early.

The current protocol is designed considering that COLS training will significantly improve students' understanding and practical ability in performing CPR. Findings will inform policy recommendations for incorporating CPR training into school curriculum. This study protocol aims to assess knowledge and attitude in school children about COLS. Also to teach school children and teachers about compression only life support CPR. Study objective includes introduction of COLS protocol in school curriculum.

Review and Gap in the present literature: Compression only CPR is as effective as conventional CPR for cardiac arrest. Randomized control trials have shown that compression only CPR is as just effective as conventional CPR performed by lay persons (2). The COLS protocol is simple, easy to remember and can be done by minimally trained person for cardiac resuscitation.The aim of COLS guidelines is to provide a stepwise approach for an optimal outcome for cardiac arrest patient..There are three core links for resuscitation by layperson (2) Early recognition and activation, Early chest compression and Early transfer.

Various international studies all over world have been done for OHCA. Europe has a greater OHCA survival rate (median 23.3% for witnessed shockable rhythm arrests). Such high rates are attributable to various pre-hospital improvements and public training initiatives. Norway, Sweden and Denmark, for example, have successfully mandated various school-based CPR and AED trainings over the years as part of their strategy to improve OHCA survival outcomes (5).

In 2016, Tetsushia Kitamura et. al. in a study in Japan concluded, Systematic chest compression-only CPR training helped elementary school students to improve their attitude towards CPR(6).

In 2018, Kua PHJ et. al. did a study, "Knowledge and attitudes of Singapore school children learning cardiopulmonary resuscitation and automated external defibrillators skills" which

concluded that the training programme imparted new information and skills, and improved attitudes towards providing CPR and using AED. However, some concerns persisted about hurting the victim while performing CPR (5).
In 2020, Dhansura et. al. did study on recall of CPR after 3 months in school in Mumbai, which concluded that COLS protocol can help in lowering the attrition in knowledge of CPR and periodic revision can help it(7). Various studies are present with CPR and AED in school, but there is no follow up of the training which intends students to forget stepwise approach (7). Therefore considering the present gap in the literature, we need to introduce COLS protocol in such a way that it is easy to understand and recollect for school students.

Rationale and Significance - Millions of people worldwide lose their lives to sudden cardiac arrest every year. Due to a lack of awareness, self-assurance, and training, the bystander CPR rate in India is still shockingly low. Many people believe that traditional CPR is too complicated for laypeople. COLS provide a useful solution that is uncomplicated to learn, maintain, and execute with minimal hesitation.
Literature have demonstrated that school-based CPR education significantly increases bystander intervention and improves survival outcomes. The World Health Organization (WHO) has endorsed the **"Kids Save Lives"** initiative, recommending that children aged 12 and above receive CPR training as part of their education.(4)
Despite these global efforts, India has yet to implement a nationwide policy for CPR training in schools. This study aims to bridge that gap by generating evidence on the effectiveness and practicality of COLS training for schoolchildren.

3. Objectives

Primary Objective

- To evaluate the effectiveness of COLS-CPR training in improving the **knowledge**, **skills**, and **confidence** of school students in performing CPR, measured through structured pre- and post-training assessments.

Secondary Objectives

1. To assess the **retention** of COLS-CPR skills.
2. To explore the **feasibility** of integrating COLS into the existing school curriculum through feedback from educators, students, and policymakers.
3. To compare students' **confidence levels** before and after training using standardized tools.
4. To identify **barriers and facilitators** to successful implementation through interviews and surveys with stakeholders.

Methodology

Study Design - This is a **prospective, and interventional** study to be conducted in selected urban and rural schools. It includes quantitative assessments of knowledge and skills, along with qualitative insights gathered from participants and stakeholders.

Study Population - This study will be carried out in various schools at Nagpur, Maharashtra. Students of 8, 9 and 10 class (Age:-13-16) was considered for the training. School authorities will be approached and explained regarding the study. As the school children considered for study are less than 18 years, After taking prior permission from the authorities, the study will be conducted.

Sample Size - The study will include approximately **542 school children and 100 teachers** across 10 schools, selected using stratified random sampling to ensure representation from different regions and socioeconomic backgrounds.

Intervention

The intervention consists of: **COLS training session (**1 hour approximately) led by certified instructors, Visual aids, mannequins for hands-on practice, and printed materials and post-training skill demonstration and Q&A session.

To keep various steps of conventional CPR or COLS CPR is little tedious for lay person and thus we recommend simple formula of compression hand protocol to recollect 5 major things of compression only life support that are

A. **AREA**: Centre of Persons chest between nipple, place heel of one hand and another hand on top of previous hand with fingers interlacing
B. **RATE**: Maintain rate of 100-120 compression per minute
C. **DEPTH**: Depth of 2inch(5cm) in adults
D. **RECOIL**: Allow chest to come to normal position after each compression
E. **NON-STOP**: Try to do it uninterrupted without taking any pause

Data Collection will be done using pre-test (Table 1) and post- test (Table 1) for the students and questionnaire for teachers. (Table 2) external Validation of questionnaire will be done by the independent subject experts.

The test considered questions following three parts:

- Attitude – question 1,2,3
- Basic knowledge – question 4 – 9
- Curriculum – question - 10

Data Analysis

Data entry will be carried out using Microsoft Excel followed by data analysis will be performed using SPSS version 16. Descriptive statistics, will be including frequencies, percentages, means, and standard deviations, were utilized to summarize the data. Inferential statistics, specifically the Chi-square test, will be employed to examine associations between different variables. Statistical significance was determined at a p-value of less than 0.05.

Expected Outcomes

- Significant improvement in students' **understanding** of cardiac arrest and COLS-CPR.
- Demonstrated **skill acquisition** and retention over 6 months.
- Increased **willingness and confidence** among students to perform CPR in emergencies.
- Clear evidence to support **policy recommendations** for integrating CPR training in schools.

Feasibility and Sustainability - COLS training is designed to be cost-effective, culturally appropriate, and easy to implement. Schools can integrate it into existing health or physical education curricula with minimal resources. Teachers can be trained as trainers to ensure program continuity. Government partnerships, NGOs, and health institutions can provide ongoing support and materials.

The study will also explore strategies for scaling up the initiative nationally, including the development of online modules, mobile applications, and collaborations with educational boards.

Ethical Considerations - The study will be conducted in compliance with ethical standards. Approval will be obtained from the institutional ethics committee. Parental consent and student assent will be secured before participation. Data confidentiality and the right to withdraw from the study at any point will be ensured.

Conclusion

The inclusion of Compression Only Life Support (COLS) training in school education has the potential to transform the landscape of emergency response in India. By equipping students with the

knowledge and confidence to act in life-threatening situations, we empower a new generation of lifesavers.

This study protocol lays the groundwork for assessing the educational impact, retention of skills, and the long-term feasibility of embedding COLS in the school curriculum. If successful, it could lead to a national movement in resuscitation education, saving countless lives in the years to come.

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Table 1 - Students PRE-TEST/ POST TEST

School -

Class -

Age -

Dear Student, this is a simple 10-question survey about your knowledge, attitudes and beliefs about CPR (Cardio-Pulmonary Resuscitation) today

Q#	Question	Options	Responses
1	Are you likely to perform CPR on a collapsed person today?	- No - I am not sure - Yes	
If answer is "No" or "I am not sure", go to Q2; if "Yes", go to Q3			
2	Why are you less likely to do CPR on a collapsed person today?	- I am scared I might accidentally hurt the victim - I feel my duty is to call and wait - I have never been taught - I don't want to be scolded- Others (specify):	
3	Why are you likely to do CPR on a collapsed person today?	- I feel I am more likely to help than harm - It is my duty - I have been taught CPR	

		- I have been encouraged to help - Others (specify): ___	
4	What is the first thing you should do if someone collapses?	- Check for danger and move them - Call for help - Start chest compressions - Use an AED- I don't know	
5	What is the correct emergency ambulance number?	a) 100 b) 106 c) 108 d) 110 e) I don't know	
6	What should you do after contacting the emergency dispatcher?	- Shout 'help' and hang up - Give location and hang up - Stay on line and follow CPR instructions - Do not stay on line - I don't know	
7	How deep should chest compressions be?	- 1 cm - 5 cm - 10 cm - No specific depth - I don't know	
8	How fast should chest compressions be?	- 30 per minute - 80 per minute - 120 per minute - No specific rate - I don't know	
9	Where should chest compressions be applied?	- Upper chest bone - Centre of chest bone - Lower chest bone - I don't know	
10	Should CPR training be included in the school curriculum?	- Yes - Mock drill every month - Chapter in book - No	

	Table 2 - Teachers Questionnaire **School -**	
Q#	**Question**	**Options**
1	Do you have any class or chapter on medical emergency?	- Yes - No
2	Did you face any medical emergency during school timings or school picnic anytime?	- Yes - No
3	Do you know COLS protocol of cardiopulmonary resuscitation?	- Yes - No
4	Do you wish to learn how to handle medical emergency and COLS Protocol?	- Yes - No
5	Do you feel COLS protocol should be introduced in school curriculum as a short course or chapter?	- Yes - No