

Why and How Should High School Students Learn Basic Life Support?

Kriya Shah¹ and Deanne Yugawa[#]

¹Dhirubhai Ambani International School

[#]Advisor

ABSTRACT

Introduction:

Cardiovascular deaths (CVD) is the leading cause of mortality in India. Basic Life Support (BLS) training of target groups can help in reducing mortality and morbidity in out of hospital cardiac arrests. High school students are uniquely positioned for this training through a structured learning program, but very is known about high school students' awareness of BLS.

Aim: This study aims to understand the awareness about BLS and cardiopulmonary resuscitation (CPR) among high school students.

Methods: A questionnaire-based survey about awareness and willingness to learn BLS and CPR was sent online to 120 students of an urban high school.

Results: A total of 114 students with a mean age of 15.2 ± 1.8 years responded. 48 students were male (42%) and 66 students were female (58%). Only 38% of participants had previously heard about BLS. A vast majority of students correctly answered the full form of BLS (88%), Advanced Cardiac Life Support (ACLS) (94%), and CPR (99%). However, relatively few students (10%) had a BLS-certified family member and 64% of students chose the wrong option for national medical emergency helpline. Despite these numbers, this student population indicated willingness for training in BLS (79%) and willingness to perform CPR in future (78%). When asked who they would prefer to be trained in BLS by, 67.5% believed healthcare workers would be most appropriate.

Conclusion: Although there is an overall lack of awareness of BLS amongst high schoolers, they show signs of willingness to learn BLS and apply their skills in potential lifesaving situations.

Introduction

Cardiovascular deaths (CVD) continue to remain the leading cause of mortality in India with the age-standardized CVD death rate of 272/100,000 population in India, which is higher than the global average of 235/100,000¹. Of these, out of hospital cardiac arrest (OHCA) constitute a majority of sudden deaths from cardiac causes^{1,2}. A study³ to evaluate outcomes of OHCA showed that the survival rate to hospital admission was 32.5%, and the overall survival rate to hospital discharge was only 5.8%³. With increasing prevalence and rising incidence of cardiovascular diseases, mortality rates are only going to climb higher^{2,4}. Emergency medical attention immediately following a cardiac arrest thus will become an important determinant of survival.

Studies have shown that timely Cardio-Pulmonary Resuscitation (CPR) administered even by laypersons who are skilled in Basic Life Support (BLS) can improve survival and prevent long term neurological damage and other health consequences^{5,6}. In a developing country like India, even as healthcare infrastructure, emergency medical system (EMS) and overall health awareness is improving, there is a need to spread more awareness and train specific

population groups in BLS and emergency medical aid through both conventional and novel teaching methods^{2,3}. The American Heart Association (AHA) and International Liaison Committee on Resuscitation (ILCOR) emphasize that anyone aged 12 years and above can and should get BLS certified^{6,7}. With their basic scientific knowledge, higher learning abilities and enthusiasm, high school students lend themselves well to structured group learning through mass BLS certification programs that will allow for ample potential for future upskilling and reinforcement.

A key concept in such a situation is the “chain of survival” which includes early recognition of cardiac arrest and activation of the emergency response system, immediate high-quality cardio-pulmonary resuscitation, rapid defibrillation, basic and advanced EMS and advanced life support and, post arrest care⁷. Out of these, the ones that take place earlier in cardiac events - recognition of cardiac arrest and initiation of CPR (carried out by lay rescuers or bystanders) – have a significant impact on survival^{5,6}. The delivery of pre-hospitalization care and its effect on the neurological outcome is time sensitive; for every minute a person with OHCA does not receive CPR and defibrillation, the chance of survival reduces by 7-10%⁶. Thereby, bystander CPR becomes one of the cornerstones of management. Despite this, less than 1% of the general population can perform it effectively⁵. These numbers can be improved only if larger sections of the population get trained in BLS, which is difficult in resource limited country like India. In resource limited countries, BLS certification courses should be targeted to specific sections of the population such as police, transport personnel, school teachers and even high school students who would not only volunteer to perform CPR without much hesitation but also might be able to galvanize resources more efficiently for quicker assistance⁸.

Adequate BLS training, post training skill tests, certification and retraining at regular intervals revealed better performance from the participants in some of the studies⁹⁻¹¹. Dedicated national health programs, resource and budgetary allocation for training programs, initiatives of the education department, media campaigns and the use of novel methods can contribute to heightened and longitudinal dissemination of BLS and AED (Automated external defibrillator) knowledge and usage especially among high school students^{12,13}. Surveys have shown that high school students, who indicate a preference to learn BLS from doctors or other medical professionals, have been effectively trained in BLS by peers and school as shown by Chamdawala et al¹⁴ and Lukas et al¹⁵, who demonstrated peer and school teacher assisted BLS learning where groups of senior school students got trained in batches and subsequently imparted the same training to the junior batches. This parameter could serve as a relevant benchmark for developing nations where enough resources and funds are lacking.

Although novel learning techniques like smart phone based learning applications, online courses, video modules, and AVATAR based virtual reality programs can be used to supplement conventional CPR learning techniques, mannequin based and physical interaction with instructors will continue to remain the gold standard method^{14,16}. Studies have also demonstrated barriers in implementation of BLS skill such as panic, fear of causing harm, contracting illness from the sick person, lack of confidence, the fear of making mistakes, legal issues and being uncomfortable with providing mouth to mouth resuscitation^{13,14,17}. Some of these barriers can be overcome by reassurance and retraining, while the alternative option of hands only (cardiac compressions only) CPR has also been approved by the American Heart Association (AHA)¹³.

Involving high school students in BLS training is anticipated to increase the number of adults who are trained in CPR in the future. Adolescents are not only a captive audience but are also often present at the scene of medical emergencies such as homes, malls, stadiums, theatres, airports and stations. Furthermore, high school is a time when students develop skills necessary for their future and BLS certification is certainly among the vital life skills. Schools provide excellent and regulated access to a large cross-section of the population and with the regimented and structured learning processes that are already in existence, BLS training accompanied by certification becomes an extension of the same process^{12,13}.

While some studies¹⁷⁻¹⁹ have shown poor awareness and knowledge about BLS among high school students, other studies²⁰⁻²² have demonstrated a higher knowledge of BLS and AED with willingness and motivation to learn and perform CPR. There is lack of data on the awareness about BLS amongst high school students in India and our study aims to evaluate this in an attempt to guide future strategies for BLS certification programs.

Methods

A survey in the form of a 10-point questionnaire was sent out to high school students from an urban school to understand their knowledge and awareness on the concept of Basic Life Support. The data was collected on Google forms and results were plotted as pie charts or bar charts using the same software. The survey was sent and responded anonymously to safeguard data privacy. The survey was deployed on January 2, 2022 and data was collected until February 2, 2022. All data shall be kept confidential until analyses were completed, and destroyed after the stipulated period.

Results

Our 10-question survey received 114 responses from 120 participants. 58% were females and 42% males, with 56.8% of the participants in the age group 14-16 years, 15.3% in 12-14 years, 10.8% in 16-18 years and 9% in 18-20 years group. 46.5% of the participants had never heard of BLS before, while 38.6% had previously heard about BLS, with the remaining (14.9%) unsure what BLS was (**Fig. 1**). A majority of the participants (87.7%) correctly guessed the full form of BLS as Basic Life Support while 6.1% chose the incorrect option “Basic Life Skill.” 93.9% of the participants knew the full form of ACLS correctly. Almost all of the participants (99.1%) correctly selected the full form of CPR as cardio-pulmonary resuscitation. For 60.5% of the participants, no one in their family was BLS certified, while 10.5% of the participants had a BLS certification in their family, with the remaining 28.9% unsure.

Only 31.6 % participants selected the correct national emergency number (112), 51.8% of the participants selected the incorrect option (108-disaster management), while 16.6 % wrongly selected 102 (ambulance). 77.3% of the participants would be willing to perform CPR as a bystander, while 12.8 % would base their decision on the situation, 5.9% were not certain and 4% of the participants said no to perform this (**Fig. 2**). 78.7% of the participants were willing to learn BLS if it was taught at school, while 10.5% were hesitant (**Fig. 3**). Upon questioning participants if healthcare workers would be most appropriate to learn from more than one response was allowed for this question, 67.5% responded yes, while 32.5% suggested school teachers, 23.7% participants selected government agencies and 19.3% selected fellow certified peers. 44.7% of the participants selected “maybe” when asked if they would hesitate to apply BLS after being properly trained, while 21.1% said yes and 34.2% of the participants would not hesitate, an increase over 22.8% who would perform CPR as a bystander based on the situation.

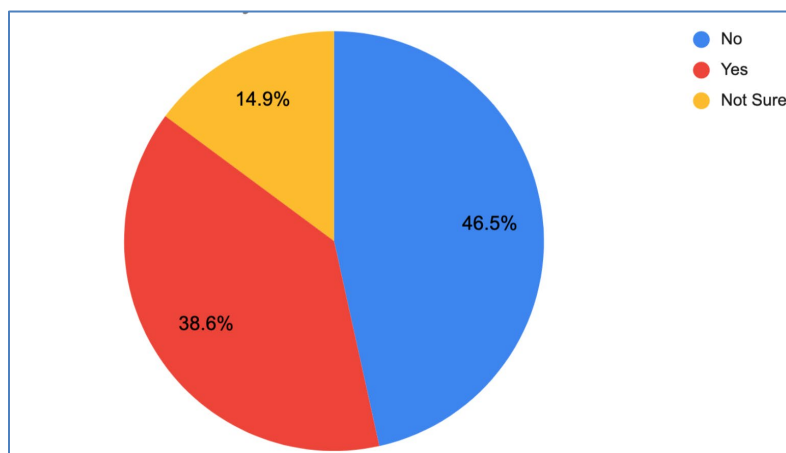


Fig. 1: Survey respondents awareness of BLS.

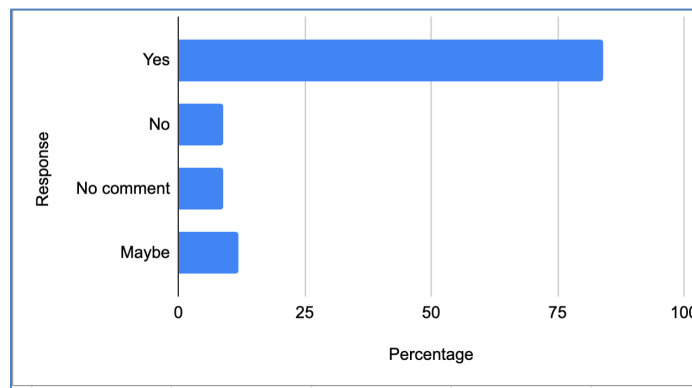


Fig. 2: Survey respondents willingness to perform CPR as a bystander.

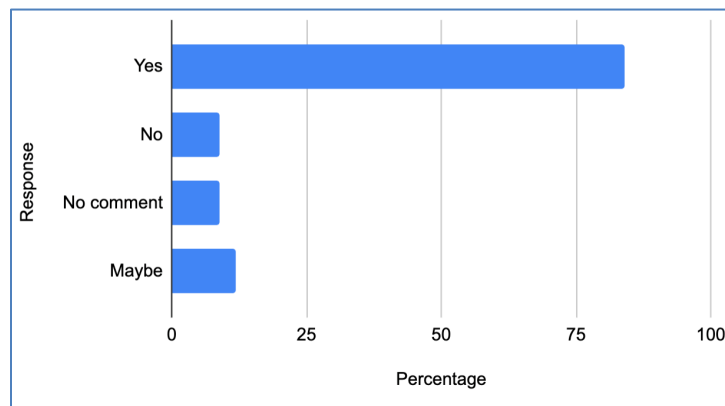


Fig. 3: Survey respondents self-declared readiness to learn BLS as part of curricular or extracurricular activity in school.

Discussion

This study comprised a cross-section of high school population, consisting mostly of urban inhabitants. There was mixed response to awareness about BLS which was similarly noted in studies from Netherlands¹⁷, Saudi Arabia¹⁸, Nigeria¹⁹. In contrast, while answering the multiple-choice questionnaire, more than 90% of respondents chose the correct option for the full form of BLS, ACLS and CPR suggesting that a well-designed BLS training program can yield better results.

Less than 10% respondent's family members or acquaintances were known to have a previous BLS certification which is in line with similar studies¹⁷⁻¹⁹ from developing countries where there is poor awareness and penetration of BLS certifications amongst the general public. Additionally, only 1/3rd of the respondents knew the correct national medical emergency number, once again highlighting the need for creating more awareness about this topic in the community.

Notably, only 19% of respondents showed unwillingness or ambiguity about learning CPR/BLS. Worldwide, most organizations including the AHA have stressed the need for inclusion of a CPR/BLS learning activity as an integral part of the school curriculum⁷. In our study, 78% respondents were willing to learn CPR/BLS if it was a part of regular or extracurricular activity within the school and 52% of these consented to learning this from their school teachers or fellow certified peers.

Studies have demonstrated that acceptance and retention rates are much better if this course is conducted by school teachers/peers^{12,14,15}. By implementing a BLS training program taught by school teachers and peers, policymakers could devise a self-sustaining learning program that can be pursued perpetually, expanding the number of students to be trained and allowing them to gain valuable teaching skills as they pass on the knowledge to their juniors.

55% of the respondents showed no hesitancy in applying their newly acquired skill in CPR/BLS if the situation demands. This was in contrast to other studies¹⁷⁻¹⁹ where the hesitancy rates were higher. Our study demonstrates a mixed response to awareness about the topic of BLS but highlights the participant's willingness to learn and implement BLS skills as needed.

Services of medical professionals or even BLS trained school teachers can be effectively utilized for the high school students in an effort to improve the outreach of BLS certified individuals in the community.

This study was limited by the relatively smaller sample size. In addition, semi-urban and rural participants were not included. A pre-survey information session was not done (unlike other similar studies)^{9,10,14,15} as our intention was to gauge the baseline knowledge of the participants. Knowledge about use of AED was also not included in the questionnaire. In the future, more conclusions can be drawn by including more participants, especially from semi-urban and rural areas.

Conclusion

High school students are capable of obtaining the required knowledge if effectively and regularly trained. Training the general public in BLS/CPR can make a huge impact in saving lives of those suffering from sudden cardiac arrest in a community setting. Since most high schoolers have the capacity and are open to learning about BLS, effective measures should be put in place to include BLS in the school curriculum or organize a certification course as an extracurricular activity. Meissner et al.⁹ and Fernandes et al.¹⁰ showed significant improvement in BLS skills with adequate training. As our study demonstrates, although there is some lack of awareness amongst high schoolers, they are an enthusiastic and captive crowd who are willing to learn a life skill that will actually save lives.

Limitation

The study population was selected from one urban area school and hence may not be representative of a larger cross-section of the population.

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Author

I, Kriya Shah, have avid interest in medical research especially translational research related to everyday clinical problems. I aspire to become a medical professional.

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