Original Article

A cross-sectional study on awareness and perception about basic life support/ cardio-pulmonary resuscitation among undergraduate medical students from coastal South India

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Abstract

Background: Basic Life Support (BLS)/Cardiopulmonary Resuscitation (CPR) is an important part of emergency medical care. This study is done among medical undergraduate students, to know their knowledge and perceptions about BLS, as they are going to face such situations in future, as doctors. **Materials and Methods:** A questionnaire-based study was conducted among 377 medical undergraduate students. The questionnaire included the following parts: (1) Basic characteristics of the study participants, (2) Knowledge about BLS/CPR, (3) Perceptions about BLS/CPR. The components of knowledge and perception based questions were scored. The data was analyzed using SPSS version 12. Results were expressed as proportions in appropriate tables and graphs. Student's Independent '*t*' test was used to compare means between students who had undergone previous training if any and those who had no such training. **Results:** Out of 377 students, majority (84.6%) had heard of BLS/CPR. Some of them (30.6%) could give the correct order of performing CPR as per the AHA guidelines (Year 2010). Few (18.9%) had undergone prior training in BLS, whereas, only 17.7% had been in a situation that needed BLS/CPR. Nearly half (50.2%) were not confident of performing BLS/CPR. Comparison of the students revealed that students who had training had higher mean scores for 'response to a situation needing BLS/CPR' and 'signs of successful resuscitation', though there was little difference in their knowledge of 'indications for BLS/CPR. Overall perception was not favourable and the students were not confident of performing BLS/CPR. **Conclusions:** The students need to be taught and trained in the CPR/BLS early in the curriculum to improve their knowledge. Repeated training would increase their confidence.

Key words: Basic life support/cardiopulmonary resuscitation, Medical student's, knowledge and perception

INTRODUCTION

Training in Emergency Medical Services is reported to be poor in India.[1] There is a shortage of emergency medical professionals in India.[2] As such, a Master's degree in Emergency Medicine is not offered in most of the medical colleges in India. Hence, most of the emergencies are handled by doctors working in casualties of various private and government hospitals.[1] An appropriate response in an emergency situation depends on good technical knowledge, which decides the patient's outcome.[3] Therefore, teaching medical students and training doctors in emergency care is essential.

Basic life support (BLS)/Cardiopulmonary Resuscitation (CPR) is a part of emergency medical care. Timely provision of BLS/CPR saves lives. Low confidence among medical students in performing BLS has been reported from Europe.[4] Poor training among undergraduate medical students has also been reported from UK and Poland.[5,6] Inadequate knowledge of BLS has been reported from Switzerland and Pakistan.[7,8]

A study from South India reports poor knowledge of BLS among medical undergraduate students.[9] Usually BLS/CPR is taught in the final year of the medical curriculum in India. Few classes as a part of the curriculum to teach BLS/CPR do not seem to be adequate. This can be inferred from the review of the studies cited above. Therefore, additional training of the medical students for providing BLS/CPR is essential. Studies that explore the knowledge about BLS/CPR help in understanding the training needs and devising learning objectives for a BLS course. It also helps us to know the student's perceptions about BLS. So this study was undertaken with an objective to Know (1) The knowledge of BLS and (2) Perceptions about BLS among undergraduate medical students.

MATERIALS AND METHODS

Background

Kasturba Medical College, affiliated to Manipal University, has an annual intake of 250 students. The students are posted to hospitals starting from the second year of MBBS. These teaching hospitals attached to the college are referral tertiary care centers. Students are taught BLS/CPR only in the final year of the course, as a part of the curriculum.

Study design and sample size

This is a questionnaire based cross-sectional study. All the undergraduate medical students from first to final year of MBBS were considered for the study. We assumed that at least 50% of the medical students would have heard of the term 'Basic Life Support (BLS)/Cardiopulmonary Resuscitation (CPR)'. Using the formula for infinite population, that is, $N = Z^2PQ/d^2$, for 95% confidence intervals, at 85% power, a sample of 171 was computed. Accounting for a 10% non-response, the total sample size of 190 was arrived at. Any number of students above this minimum needed was considered adequate.

Study instrument development and pre-testing

A semi-structured anonymous questionnaire was developed to obtain the following components of information: (1) Basic characteristics of the study participants. (2) Knowledge about BLS/CPR: The questions were based on the guidelines of the American Heart Association.[10] (3) Perceptions about BLS/CPR. There were statements exploring their perceptions, which were graded on a five-point Likert scale (strongly disagree to strongly agree). This questionnaire was pretested. Based on the results of pretesting, certain changes were made. Some questions were changed to closed ended and some to open-ended. The order of the questions was changed. The final questionnaire had the following categories of questions about the knowledge of BLS (n = number of questions): (1) Indications for BLS [6]; (2) Response to a situation needing BLS [8]; (3) Order of performing BLS [1]; (4) Signs of successful resuscitation [4]; and (5) Setting where BLS is performed [3]. For each knowledge question depicting a series of responses to a hypothetical real life situation, Options of 'yes', 'no', and 'don't know' were provided. These responses were scored on a scale of two to zero. Thus, the range of maximum scores for the various components were as follows (Maximum score – Minimum score): Indications for BLS (12-0), Response to a situation needing BLS (16-0), Signs for successful resuscitation (8-0). There were five perception-related statements. The total scores for perceptions ranged from Zero 0-28.

Data collection

Permission was obtained from the Institutional Ethics Committee to conduct the study. Permission was obtained from the Dean of the college to approach the students in the classrooms. The purpose of the study was explained. It was made clear that the participation was voluntary. For those who did not want to participate, there was a provision to write the reasons for the same on the questionnaire. Twenty minutes were allotted for them to respond. The collected questionnaires were analyzed.

Data analysis

The data was analyzed using SPSS Version 12. The results were expressed as proportions, in appropriate tables. The mean scores, along with their standard deviations were computed for various knowledge categories and overall perceptions. A score of less than 50% for that knowledge category was considered inadequate. Similarly a score of <14 was considered as a negative perception. Comparisons were made between students who had undergone previous training, if any, and those who had no such training. The Student's independent 't' test was the test of significance used. $P < 0.05$ was considered significant.

RESULTS

A total of 377 students participated in the study. The proportion of males (53.3%) was slightly higher than females (46.7%). The breakup of the number of the students for each is as follows [n (%)]: First year [95 (25.2%)], Second year [95 (25.2%)], Third year [94 (24.9%)], Final year [93 (24.7%)]. Majority (84.6%) had heard of BLS/CPR.

Students did not have proper knowledge about the 'indications for BLS/CPR,' the results of which are presented in Table 1. Similarly the results pertaining to 'response to a situation that needs BLS/CPR' and 'signs of successful resuscitation' are presented in Tables 2 and 3, respectively, indicate that the students had good overall awareness. Airway Breathing Circulation (ABC) was the order familiar to majority (46.8%) of the students, even though the recent guidelines state CAB which was known to only 30.6%. Rest (22.6%) had given wrong responses. Majority (77.3%) of the students were aware that BLS/CPR was not limited to only hospital settings and that it could be performed anywhere. Some (33.3%) of the students had seen a CPR being performed. Few students (18.9%) had undergone prior training in BLS. About 17.7% of the students had been in a situation that needed BLS/CPR, although only 8.3% had attempted to provide BLS/CPR. Most (70.7%) of the students knew the correct emergency ambulance helpline number.

Table 1: Knowledge about indications for cardiopulmonary resuscitation

Indication	Number (%)
Unconscious person with no palpable pulses and no respiration (*n*=313)	
Yes	264 (84.3)
No	29 (9.3)
Don't know	20 (6.4)
Victim of road traffic accident with multiple injuries (*n*=296)	
Yes	88 (29.7)
No	148 (50.0)
Don't know	60 (20.3)
Unresponsive person with normal pulse and respiration (*n*=299)	
Yes	113 (37.8)
No	133 (44.5)
Don't know	53 (17.7)
Victim of drowning (*n*=308)	
Yes	260 (84.4)
No	28 (9.1)
Don't know	20 (6.5)
Burns victim (*n*=293)	
Yes	58 (19.8)
No	167 (57.0)
Don't know	68 (23.2)
Choking (*n*=301)	
Yes	129 (42.9)
No	115 (38.2)
Don't know	57 (18.9)
Total scores for knowledge about indications (12-0)	
Adequate (≥7)	165 (43.8)
Inadequate (≤6)	212 (56.2)

Table 2: Response to a situation when basic life support is needed

Response	Number (%)
Leave the person unnoticed (*n*=296)	
Yes	16 (5.4)
No	280 (94.6)
Check the victim for a response (*n*=313)	
Yes	297 (94.9)
No	16 (5.1)
Make sure the victim, any bystanders, and you are safe (*n*=298)	
Yes	258 (86.6)
No	40 (13.4)
Shout for help (*n*=301)	
Yes	252 (83.7)
No	49 (16.3)
Call for an ambulance (*n*=312)	
Yes	292 (93.6)
No	20 (6.4)
Do nothing till the help arrives (*n*=293)	
Yes	20 (6.8)
No	273 (93.2)
Keep the airway open, look, listen, and feel for normal breathing (*n*=317)	
Yes	298 (94.0)
No	19 (6.0)
Give chest compression with rescue breaths (*n*=309)	
Yes	248 (80.3)
No	61 (19.7)
Total scores for response to situation needing BLS (16-0)	
Adequate (≥9)	293 (77.7)
Inadequate (≤8)	84 (22.3)

Most (50.2%) of the students were not confident of performing BLS/CPR and would be uncomfortable to be in a situation that needed BLS/CPR, which are presented in Table 4. Comparison of the students who got trained with those who did not have any training [Table 5], revealed that students who had training had higher mean scores for 'response to a situation needing BLS/CPR' and 'signs of successful resuscitation'. These differences were statistically significant [Table 5]. However, training made little difference in their knowledge of 'indications for BLS/CPR' and the overall perception. Most of the students were not confident and or comfortable to perform BLS/CPR [Table 5].

Most (93.7%) of them were interested in learning BLS/CPR.

DISCUSSION

As 377 students participated in the study and the majority (84.6%) of the students had heard of BLS/CPR, the sample size was considered adequate for the interpretation of results. As we had studied knowledge according to separate components like, Indications, Response to a Situation, and Signs of Successful Resuscitation, we could not find comparative data on these aspects from the previous published reports. For example, the only study from India (Pondicherry) reports that 85% had obtained <50% marks without providing any specific information about the components.[10] Moreover, their study sample consisted of students from medical, dental, nursing, and homeopathy colleges, apart from doctors, which makes the comparison inappropriate.[9]

Majority (84.6%) of the students had heard of BLS/CPR. But lack of knowledge about indications for CPR could be inferred from that fact that about 37.8% felt that CPR should be administered to an unconscious person with normal palpable pulses and respiration [Table 1], and 39.5% only knew the correct order for performing CPR. The results reflect that students had adequate overall understanding about the 'response to a situation where CPR is needed' and 'signs of successful resuscitation'. Less than half (48.1%) of the students from Switzerland could give correct answers on knowledge based questions.[7] Similarly low levels (54.3%, and 25%) of knowledge have been reported from medical students in Poland and interns from southern India, respectively.[6,11] The apparent good knowledge observed in our study about 'response to a situation,' and 'signs of successful resuscitation' probably reflects 'guesswork/commonsense'. As the study subjects consist of students

Table 3: Signs of successful cardiopulmonary resuscitation

Signs	Number (%)
Spontaneous gasp or breathing (*n*=297)	
Yes	245 (82.5)
No	22 (7.4)
Don't know	30 (10.1)
Abdominal distention (*n*=276)	
Yes	64 (23.2)
No	114 (41.3)
Don't know	98 (35.5)
Chest rise and fall with each rescue breathing (*n*=292)	
Yes	204 (69.9)
No	33 (11.3)
Don't know	55 (18.8)
Return of normal pulse and normal heart beat (*n*=297)	
Yes	239 (80.5)
No	12 (4.0)
Don't know	46 (15.5)
Total scores for Signs of Successful Resuscitation (8-0)	
Adequate (≥5)	283 (75.1)
Inadequate (≤4)	94 (24.9)

from all the years of MBBS, it can be inferred that final year students would be in a better position to do guesswork. Lack of knowledge about specific aspects of CPR/BLS reflects the truth, which is similar to the situation reported from the other studies referred to above [Tables 2 and 3].

Most (71%) of the students wanted to avoid/were uncomfortable and about 50.2% were not confident of performing CPR/BLS [Table 4], although the total perception scores were higher (78.5%). Similar findings have been reported from Europe.[4]

Very few (18.9%) had undergone training. Low levels of training have been reported from Pakistan and UK.[8,5] Comparison of students who had undergone training with those who had not undergone training [Table 5] revealed that training improved knowledge, but did not improve the confidence or alter the perceptions of the students. A study from Netherlands reported that only 38% of the clinical picture and diseases and 69% of the skills were mastered by the students after the training.[12] As the skills deteriorated over a period of time, the students did not have confidence or have a favorable perception about CPR/BLS. Although training improves the knowledge, the loss of skills with time highlights the need to have repeated training over a period of time. This is possible only if the training is introduced at the beginning of the curriculum rather than in the final year, which is the current practice. As most (93.7%) of the students wanted to learn about it from the beginning of the course, it reflects the 'felt needs' of the students.

This being a questionnaire based study; response bias might have been present. But, it is common to most of the questionnaire based studies. Furthermore, a certain amount of guesswork from students could have resulted in higher levels of certain components of knowledge about CPR/BLS, as discussed earlier in the text. By

Table 4: Perception of the students toward basic life support

Variable	Number (%)	Mean score (Standard Deviation)
I am confident of performing CPR independently in an emergency situation (*n*=301)		2.5 (1.1)
Strongly disagree	62 (20.6)	
Disagree	89 (29.6)	
Neutral	89 (29.6)	
Agree	45 (15.0)	
Strongly agree	16 (5.3)	
BLS training should be given in the first and second years of MBBS (*n*=367)		4.4 (0.8)
Strongly disagree	9 (2.5)	
Disagree	7 (1.9)	
Neutral	17 (4.6)	
Agree	113 (30.8)	
Strongly agree	221 (60.2)	
General population needs to be trained in BLS (*n*=367)		4.2 (0.8)
Strongly disagree	4 (1.1)	
Disagree	9 (2.5)	
Neutral	44 (12.0)	
Agree	156 (42.5)	
Strongly agree	154 (42.0)	
Self-assessment of BLS knowledge on a scale of 10 (*n*=300)		
Score≤5	211 (70.3)	4.3 (2.4)
Score≥6	89 (29.7)	
Attitude toward a situation where a person needs		
BLS (*n*=358)	36 (10.1)	2.2 (0.6)
Avoid the situation	218 (60.9)	
Uncomfortable	104 (29.1)	
Comfortable		
Total scores for perception about BLS/CPR (28-0)		
Adequate (≥15)	296 (78.5)	17.7 (4.7)
Inadequate (≤14)	81 (21.5)	

BLS=Basic life support, CPR= Cardiopulmonary resuscitation

Table 5: Comparison of students who are trained and not trained in BLS

Total scores of various components of knowledge and perception characteristics	Are you trained in BLS (SD)		't' value (*p*)
	Yes mean	No mean	
Indications for BLS/CPR	1.67 (0.47)	1.60 (0.46)	0.4 (0.97)
Response to a situation needing BLS/CPR	1.98 (0.13)	1.9 (0.3)	1.99 (0.04)
Signs of successful resuscitation	1.98 (0.13)	1.87 (0.33)	2.54 (0.01)
Perception toward BLS/CPR	1.95 (0.22)	1.93 (0.25)	0.56 (0.58)

BLS=Basic life support, CPR= Cardiopulmonary resuscitation

exploring the awareness and perceptions of various components, it was possible to get an overall idea, thereby, reducing the impact of guesswork.

CONCLUSIONS

The students need to be taught and trained in the CPR/BLS early in the curriculum, to improve their knowledge. Repeated training would increase their confidence.

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