

How much ambulance personnel know about basic life support (BLS)? A hospital-based study from Eastern India

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ABSTRACT

Background: Basic life support (BLS) is an important component of emergency medical management. Ambulance personnel play a key role in resuscitation to save a life before reaching the hospital. We do not have any published data about the level of knowledge on BLS among the ambulance personnel. **Objective:** This study was done with the objective to assess the level of knowledge on BLS among the ambulance personnel. **Materials and Methods:** A cross-sectional study was done in the emergency department (ED) of a tertiary care hospital. Universal sampling was done taking all the personnel of ambulances over the period of one month. Data were collected about the type of vehicle used for ambulance, the number of personnel in an ambulance, educational qualifications, and equipment present in their ambulances. The questionnaire to capture the level of knowledge were based on American Heart Association 2015 guidelines. **Result:** The total number of ambulance arrivals was 729 times. But data analysis was done from 104 ambulances excluding the repeat arrivals and those who did not give consent. There were 62 type-C and D ambulances, and 42 were type-B ambulances. Total of 210 personnel were there in 104 ambulances. Seventy-nine team leaders did not have any paramedical degrees. Fifty-eight team leaders were trained in BLS before working in an ambulance. In spite of this, 66 (63%) team leaders had poor performance (score of 0 to 4). **Conclusion:** The level of knowledge on BLS was poor in more than half of the ambulance personnel. They should be trained regularly on providing BLS.

Keywords: Ambulance, basic life support, pre-hospital care

Background

Prehospital care is an important part of the emergency medical management of a patient. Basic life support (BLS) is an important component of prehospital care. The sick patients are being carried to hospital from roadside, home, or another hospital.

Some patients are so sick that resuscitation is required during transport to the hospital. The ambulance personnel play a key role in resuscitation to save a life before reaching the hospital.

There is published data regarding the knowledge of BLS among the doctors, medical students, paramedical students, and school teachers.^[1-7] But we do not have any published data regarding the BLS knowledge among the ambulance personnel. With this background, the primary objective was to study the level of knowledge on BLS among the ambulance personnel. We also assessed the availability of resuscitation equipment in the ambulance.

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Materials and Methods

It was a single-center, cross-sectional study. After approval from the institutional ethics committee the study was done in the emergency department (ED) of a tertiary care teaching hospital. Universal sampling was done at the ED over a period of one month. All the personnel of ambulances bringing patients to ED was included. Those who refused to give consent for participation in this study were excluded. The repeat visits were not considered for the study. After handing over the patient to the ED staff, the ambulance personnel were given information about the study, and consent was obtained from the team leader (paramedics). If there was a single person in an ambulance, consent, and answer of the questionnaires were obtained from the driver. Data were collected about the type of vehicle used for ambulance, the number of personnel in an ambulance, the educational qualifications of the ambulance personnel, and the equipment present in their ambulances. Then a set of 10 questions was given to the team leader. The questions [Annexure1] were scenario-based and the multiple-choice type prepared on the basis of steps of BLS as per the American Heart Association 2015 guidelines^[8] and was validated. This questionnaire was then translated to the local language. The score of one for correct and zero for the wrong answer was awarded.

Results

The total number of ambulance arrivals was 729 times. Out of these, personnel of 11 ambulances did not give consent for participation and 23 ambulances have been missed for collection of data and assessment. Data were collected from the remaining 695 ambulance arrivals. Out of 695 ambulance arrivals, 591 were repeat data. So, data analysis was done from 104 ambulances [Figure 1]. There were 62 type C and D ambulances and 42 were type B ambulances. A total of 210 personnel were there in 104 ambulances. Including the driver, there were two personnel in six ambulances and three personnel in 56 ambulances. In 42 ambulances, only the driver was there [Table 1]. About the educational qualifications of the team leaders (driver in case of a single person), 22 were under matriculates, 20 matriculates, 37 intermediates, and 25 were graduates [Table 2]. Seventy-nine team leaders did not have any paramedical degrees, seventeen had a diploma in pharmaceutical science, and three had bachelors in pharmaceutical sciences. Rest

five had a Diploma in Medical Laboratory Technology (DMLT), Bachelor of Science in Nursing (BSc Nursing), Bachelor of Science in Operation Theatre Technology (BSc OTT), General Nursing Midwife (GNM) [Figure 2]. Fifty-eight team leaders were trained in BLS before working in an ambulance. In spite of this, 66 (63%) team leaders had poor performance (score of 0 to 4). Twenty-three had performed average (score of 5 to 6) and 15 had performed good (score of 7 to 10) [Table 3]. Equipment for BLS like automated external defibrillator (AED) was there in 53, the airway in 57, and the bag-mask device in 71 ambulances [Table 4].

Table 1: No. of personnel in an ambulance

No. of persons in an ambulance	n=104
1	42
2	6
3	56

Table 2: Level of education of the team leaders

Level of education	No of persons
Illiterate	0
Under matriculate	22
Matriculate	20
Intermediate	37
Graduate	25
Post Graduate	0

Table 3: Scores

Score	n=104
Poor (0-4)	66
Average (5-6)	23
Good (7-10)	15

Table 4: Equipment available in ambulance, n=104

	Yes	No
AED	53 (51%)	51 (49%)
Airway	57 (55%)	47 (45%)
Bag and mask	71 (68%)	33 (32%)

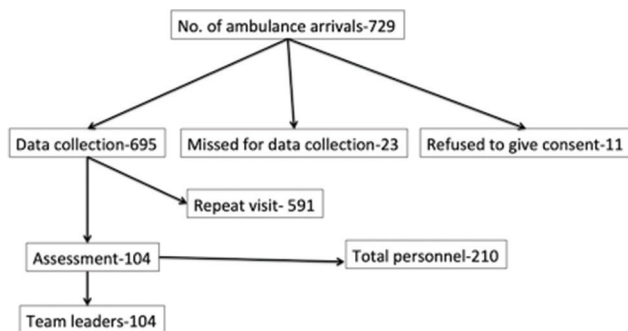


Figure 1: Number of ambulances arrived and the data obtained

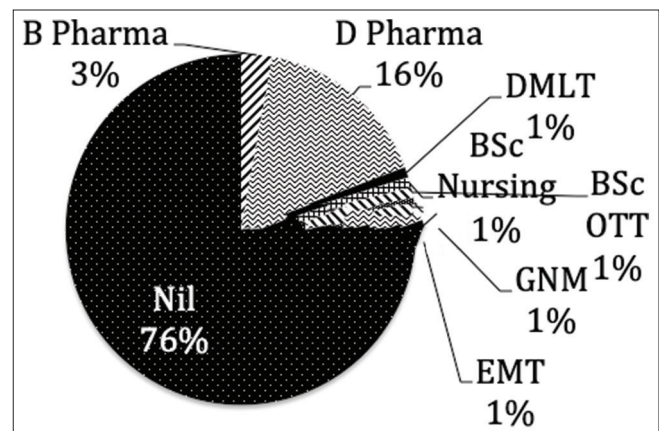


Figure 2: Team leaders having paramedical courses, n = 104

Discussion

High quality of cardiopulmonary resuscitation (CPR) is required for better survival outcome from cardiac arrest.^[9] Also, the early start of CPR improves the survival chance.^[10] The incidence of out-of-hospital cardiac arrest (OHCA) is more in comparison to in-hospital cardiac arrest.^[11,12] Patients with OHCA who received BLS had higher survival at hospital discharge and at 90 days compared with those who received ALS and were less likely to experience poor neurological functioning.^[13] In a retrospective observational study, 75 out of 787 patients received CPR before and during the transport of OHCA patients. They found that all the CPR during transport was not futile.^[14] So the role of ambulance personnel in providing CPR is very important before reaching the hospital.

The National Ambulance Code (NAC) 2013 only provides the guidelines for the constructional and functional aspects of the road ambulances; it does not cover the training of the ambulance personnel. As per the NAC, there are four types of road ambulances- type A (not able to transport patients in the supine position and provide any medical care), B (transport the patient who are not expected to become sicker), C (able to provide BLS) and D (able to provide Advanced Cardiac Life Support). In our study 62 (60%) ambulances were type C or D and 42 (40%) were type B. But we have not studied whether the type B ambulances were bringing sick emergency patients.

A consensus of experts mostly from Asian countries recommends that two to three personnel should be there to provide good quality CPR.^[12] Out of the three persons, at least one of them should be an Emergency Medical Technician (EMT). In our study, three personnel (including the driver) were there in 56 (54%) ambulances. But 40% of ambulances were having the driver only. So, there should be guidelines for adherence to the minimum number of personnel in the ambulance while transporting the sick. Otherwise, it's not feasible for the driver to provide BLS when the ambulance is on the move.

A study by Acharya *et al.*, found that 66% of the ambulance drivers were having a secondary level and 11% having a higher secondary level of education. They had not assessed whether the drivers were having any paramedical degree.^[15] In our study, there was great disparity about the level of education among the study participants, about 60% were having a higher secondary and above level of education. Also, we have assessed about the paramedical courses among the ambulance personnel. Seventy-six percentages of the personnel did not have any paramedical degrees. Only 1% was having the EMT qualification. So from this data, it indicates the status of prehospital care in our study setting is not adequate. Guidelines should be developed regarding the minimum qualification of the ambulance personnel. The minimum equipment needed for the provision of BLS is AED, airway, and bag-mask. About half of the ambulances were having AED, airway, and bag-mask devices in our study. But Acharya *et al.* found that only 37% of ambulances were having

a bag and mask devices. There was no AED in any ambulances in their study.^[15]

A study by Nielsen *et al.* was similar to our study where they assessed the BLS and AED skill of ambulance personnel. They found that the ambulance personnel achieved 70% of the maximal points of the skill,^[16] which is contrary to our result. A study by Shrestha *et al.* found that 48% (n = 121) of the medical and paramedical staff had scored <7 out of 15.^[3] This is similar to our study that 63% of ambulance personnel have performed poorly on assessing knowledge on BLS. In our study, 56% of the team leaders were trained on BLS previously, but still, the performance was poor in 63%. The western study had shown high levels of proficiency amongst personnel who have undergone BLS training. However, the results found here are contrary and those who had undergone courses in BLS had fared poorly. This emphasizes course restructuring or repeated validation to keep up the skill levels. Regular training on BLS is the need of the hour. Nielsen *et al.* had assessed the skill of BLS and the use of AED among the ambulance personnel in a simulated cardiac arrest situation, but in our study, due to logistic issues, we could not do it. This may be a reason for the low score among the ambulance personnel in our study. One may score low in answering the questions but may perform the skill very well.

We have not assessed the attitude of ambulance personnel towards BLS, unlike other studies that have captured the attitude of participants,^[2-5,7] as we felt that all ambulance personnel should be skilled in providing BLS as and when needed and they should have a positive attitude towards BLS. The patients needing BLS lose a vital time during their transport from one center to another. This gap can be filled up if the ambulance personnel provide BLS during transport, hence increasing the chance of survival of the patient.

Limitation of the study

This study has been done in a single center. So, it cannot represent the status of prehospital care all over the country. When more than one person was present in the ambulance, we took the team leader (paramedical personnel) as our study participant, which excluded a large portion of the original sample size. But this was done due to some practical issues like only one person was allowed with the patient to enter into the ED. The data about the equipment present in their ambulances needed for BLS were obtained only by asking the team leaders. The physical verification for presence and functionality has not been checked. The ambulance personnel have only been assessed regarding cardiopulmonary resuscitation; they have not been assessed about the management of victims of drowning or foreign body aspiration, electrocution, burn injury, polytrauma, etc.

Strength of the study

This is the first study done among the ambulance personnel about the level of knowledge on BLS. Most of the patients needing higher modalities of treatment come to the primary care physicians first, from where they are referred to higher centers

for further evaluation and treatment. During the transfer, care of the patients needing BLS is crucial. Hence ambulance personnel having skill in providing BLS is of paramount importance. This article will provide an insight into the amount of work needed to train these ambulance personnel on BLS.

Conclusion

The present study carries importance in terms that the ambulance personnel play a vital role in providing BLS. But as the study revealed that the level of knowledge on BLS was poor in more than half of the ambulance personnel, and also the knowledge was poor among those who had undergone BLS training, it indicates that there is a need of BLS training for them at regular intervals. Though there are guidelines on the number of persons required to be present and type of ambulance to be used to transport the patients, no guidelines are available about the minimum educational qualification of ambulance personnel. The development of guidelines on minimum educational qualification of the ambulance personnel and strict adherence to the guidelines should be ensured at all levels.

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Conflicts of interest

There are no conflicts of interest.

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Annexure

Q-1: When you arrived to pick up a patient, you found the patient lying still. How you check the responsiveness of that patient? Ans: a) pinch the victim, b) tap the patient's shoulder and ask loudly from front "Are you alright", c) shaking head of the patient and shout, d) do not know. Q-2: Why do we perform chest compression during cardiopulmonary resuscitation (CPR)? Ans: a) to restart the heart beat, b) to pump out blood from heart to brain manually, c) to help in breathing, d) do not know. Q-3: You are transporting a patient in your Ambulance. You suspect the patient is becoming more serious. You want to check the pulse. Where you will check the pulse? Ans: a) radial pulse, b) femoral pulse, c) carotid pulse, d) do not know. Q-4: What is the site of chest compression in an adult patient during CPR? Ans: a) left side of the chest, b) lower half of the chest in midline, c) right side of the chest, d) do not know. Q-5: You want to start CPR in a 30-year-old patient. At what rate you will give chest compressions? Ans: a) 60-80 per minute, b) 80-100 per minute, c) 100-120 per minute, d) do not know. Q-6: What is AED (Automated External Defibrillator) machine? Ans: a) to give CPR, b) to give shock, c) to give breathes, d) do not know. Q-7: What is the depth of chest compression during CPR? Ans: a) 3-4 cm (1.2-1.6 inch), b) 4-5 cm (1.6-2.0 inch), c) 5-6 cm (2.0-2.4 inch), d) do not know. Q-8: A 53-year-old man suddenly fell down on the ground and became unresponsive in front of you. What is your next action? Ans: a) start high quality CPR, beginning with chest compression, b) start providing rescue breaths, c) verify that the scene is safe for you, d) do not know. Q-9: You are called for transferring an accident patient from roadside. The patient is not able to breath properly, what is the preferred method for opening the airway? Ans: a) head-tilt, chin lift, b) jaw thrust, c) inserting your fingers into the mouth of the patient and clear any obstruction, d) do not know. Q-10: You found a patient who is having a palpable pulse, but not breathing. What you will do? Ans: a) start chest compression, b) give breaths at the rate of 10 per minute, c) use AED, d) do not know.