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Original Article

Evaluation of Basic Life Support Knowledge and Skills of Healthcare and Non-healthcare Providers

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Abstract

Aim: Immediate bystander cardiopulmonary resuscitation (CPR) significantly improves survival after a sudden cardiopulmonary collapse. This study assessed the basic life support (BLS) awareness, knowledge, attitude, and performance of healthcare providers (HCP) and non-HCP before and after CPR training.

Materials and Methods: This study included 4625 participants. Participants completed a pre-test to assess their knowledge and 3 h training course that provided a theoretical background on sudden cardiac death and a hands-on CPR tutorial. They were asked to perform BLS on a manikin to simulate an unconscious scenario before the training. Afterward, participants encountered the same scenario and completed a questionnaire of their post-training knowledge.

Results: A total of 4625 participants were included in this study. Of which 56.54% (*n* = 2615) were HCP and 43.45% (*n* = 2010) were non-HCP. There is a significant increase in knowledge of BLS among non-HCP which is clearly evident in pre-training and post-training evaluation (written and hands-on). Only 0.62% employees are able to perform BLS in the correct sequence before the training and 76.7% employees after the training. None of the students performed BLS in the correct sequence before the training and 60.85% students performed well after the training. Among HCP, only 12.08% were able to perform BLS in the correct sequence before the training and 94.8% after the training.

Conclusion: Performing BLS and attending BLS training plays a key role in attaining BLS knowledge by both healthcare and non-HCP.

Key words: Basic life support, Cardiac arrest, Cardiopulmonary resuscitation, Evaluation, Rescue breaths, Training

INTRODUCTION

Cardiac arrest is an important acute emergency situation both within and outside the hospital setups and carries a high level of mortality risk. However, if early basic life support (BLS) – cardiopulmonary resuscitation (CPR) is initiated, the survival rate can be substantially improved.[1]

The aim of BLS is to maintain a distribution of oxygen-rich blood through survival organs, especially the brain and heart, through a temporary artificial circulation until normal cardiac activity and breathing are restored.[2-4] The history of BLS goes back many years. The first studies on the standardization of BLS practices started in America in 1974 and studies on BLS standardization and updates were continued and developed by the European Resuscitation Council, founded in 1989, which also updated and published guidelines on BLS and ALS practices every 5 years.[5] Sudden cardiopulmonary arrests in adults outside of a hospital setting occur due to cardiac causes, whereas cardiopulmonary arrests in hospitalized patients are usually caused by the underlying disease. It was reported that of the patients who experienced cardiopulmonary arrest in a hospital, approximately 84% had progressively different clinical findings in the past 8 h and that morbidity and mortality could increase within hospital mostly due to quick diagnosis and flaws in therapeutic approaches. For this reason, the primary approach in preventing cardiopulmonary arrests within a hospital setting is believed to be recognizing the patients that are under risk beforehand and taking care of preparations for their treatment and their early transfer into the intensive care unit. The knowledge and skill levels regarding CPR of healthcare personnel who discovers a patient with a progressive acute condition or

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cardiopulmonary arrest are the most important criteria in terms of providing a fast and accurate intervention.[6-8] BLS training includes exercises on recognizing cardiopulmonary arrest, acute myocardial infarction, seizure, and foreign body airway obstruction, performing CPR, and using an automated external defibrillator.[3] The most important factor in the success of BLS is time management. It is of vital importance to diagnose and start treatment in a timely fashion. In an organism, brain tissues can only tolerate not receiving oxygen for a few minutes. This time can be longer or shorter, depending on the patient's health condition during cardiac arrest. For instance, cerebral damage would occur within a shorter time if the patient had been in a hypoxemic condition previously. If the patient was in a hypothermic condition, the occurrence of cerebral damage would be delayed.[5] Cardiopulmonary arrest is defined as the time when breathing and/or circulation stops suddenly and unexpectedly for some reason. Clinically, an individual shows signs of blackout, absent pulse, and apnoea during the arrest. Circulatory failure that lasts for three or 4 min could cause irreversible cerebral damage. This duration could be shorter if the individual's hypoxemia developed earlier than noticed. Delay in performing BLS could result in a lower probability of a successful result after BLS.[5,9] On the other hand, there is no evidence to prove that the medications used in advanced life support reduce mortality and morbidity, whereas immediate and efficient BLS practices after cardiac arrest are reported to reduce mortality and morbidity.[10-12]

People who suffer from sudden cardiac arrest depend on prompt BLS. Patients who receive bystander CPR have a 2–3 time's higher survival rate (8.2% vs. 2.5% for patients who did not receive CPR).[13] Extensive education of the population in particular countries and regions led to high numbers of bystander CPR in cases of out-of-hospital cardiac arrests (OHCA).[13-15] However, studies show that often less than one-third of out-of-hospital witnessed cardiac arrest victims receive bystander CPR.[16,17] Furthermore, 50–65% of cardiac arrests happen at home.[8] Since these victims are less likely to receive bystander CPR, they have poorer outcomes than those who are subject to OHCA in other non-hospital locations.[18] In these cases, bystanders are usually family members and can include high school-aged students.

The knowledge of BLS is a major determinant in the success of resuscitation and plays a key role in the final outcome of acute emergency situations. Knowledge of BLS is an absolute necessity for medical professionals to face acute medical emergencies in the hospital and for bystanders for out hospital acute emergencies. Healthcare professional skills should be analyzed according to their gap analysis to improve the patient survival rate and patient satisfaction.[19] In the present study, we aimed to assess the awareness, knowledge, and attitude about adult BLS among healthcare and non-healthcare providers (HCP).

MATERIALS AND METHODS

Sample Design

This study was a quasi-experimental study with pre-test and post-test design.

Data Collection

Data were collected by considering the pre- and post-evaluation of written and simulation test conducted before and after the training period.

Inclusion Criteria

All nurses and employees with more than 6 months experience and students of minimum undergraduate were included in this study.

Exclusion Criteria

All nurses and employees with <6 months experience and students of below undergraduate were excluded from this study.

Statistical Analysis

The Kruskal–Wallis test for independent measures was done.

RESULTS

The summary of the results is as follows.

1. A total of 4625 participants were included in this study
2. Of which 56.54% (n = 2615) were HCP and 43.45% (n = 2010) were non-HCP
3. Among those 29.83% (n = 1380) were males and 70.16% (n = 3245) females. Of total participants, 60.75% (n = 2810) were of <25 years age, 23.3% (n = 1078) were of age 25–40 years, and 15.9% (n = 737) were of age more than 40 years
4. Among non-healthcare providers, 55.52% (n = 1116) were employees and 44.47% (n = 894) were students
5. Among HCP, 60.19% (n = 1574) were of <2 years experience, 24.74% (n = 647) were of 2-years experience, and 15.06% (n = 394) were of more than 5 years experience
6. There is a significant increase in knowledge of BLS among non-HCP which is clearly evident in pre-training and post-training evaluation (written and hands-on). Only 0.62% employees are able to perform BLS in the correct sequence before the training and 76.7% employees after the training. None of the

students performed BLS in the correct sequence before the training and 60.85% students performed well after the training

7. Among HCP, only 12.08% were able to perform BLS in the correct sequence before the training and 94.8% after the training.
8. Knowledge of seeking help in case of any medical emergency is 68.8% in employees, 85.23% in students, 75.49% in HCP's before the training, 94.44% in employees, 95.45% in students, and 96.42% in HCP's
9. Knowledge on airway assessment and management while performing BLS such as opening the airway is 5.1% in employees, 1.35% in students, 56.79% in HCP's before the training, 84.7% in employees, 76.6% in students, and 94.26% in HCP's. Moreover, correctly performing ventilation is 2.77% in employees, 1.00% in students, 62.26% in HCP's before the training and 83.24% in employees, 68.57% in students, and 90.4% in HCP's
10. Knowledge on performing cardiac compressions while performing BLS such as hand position during chest compression is 1.52% in employees, 1.79% in students, 66.62% in HCP's before the training and 91.57% in employees, 74.72% in students, and 91.36% in HCP's. Moreover, correctly performing chest compressions is 1.25% in employees, 0.67% in students, 45.62% in HCP's before the training and 89.06% in employees, 67.45% in students, and 89.75% in HCP's.
11. The statistical analysis was performed using the Kruskal–Wallis test for independent measures. The parameters before and after training were tested for significance at $P = 0.05$. The analysis shows that the H statistic before training is 17.6232 (2, $n = 30$) and obtained $P = 0.00001$ for which the test is significant at 0.05. Hence, we accept the alternative hypothesis and reject the null hypothesis. The analysis shows that the H statistic before training is 25.551 (2, $n = 30$) and obtained $P = 0.00001$ for which the test is significant at 0.05. Hence, we accept the alternative hypothesis and reject the null hypothesis.

DISCUSSION

The present study analyzed BLS knowledge and skills among HCP and non-HCP. Each individual is assessed for individual BLS parameters and sequence of parameters which includes checks unresponsiveness, call for help, calls emergency number, assess breathing, opens airway, correctly performs ventilation, hand position, chest compression, combination of chest compression, and ventilation and following algorithm in the correct sequence.

The results depicted above reveal the following:

1. Lack of professional training of BLS was regarded as the most common hindering factor responsible for poor BLS knowledge among non-HCP

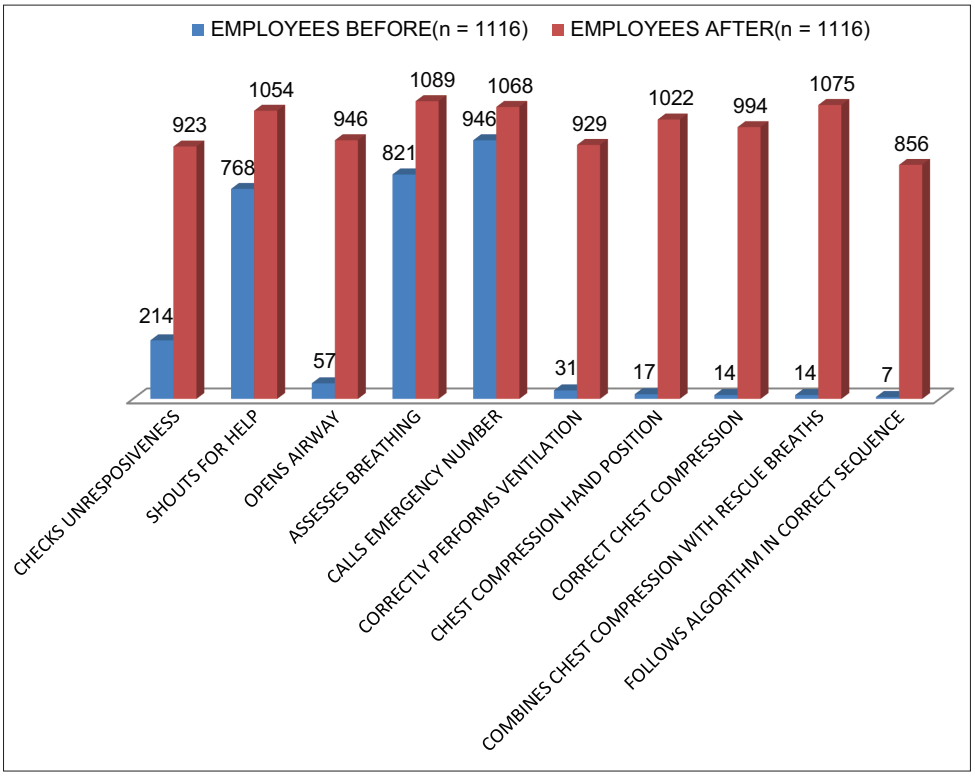

Figure 1: No. of employees and their response to each basic life support parameter

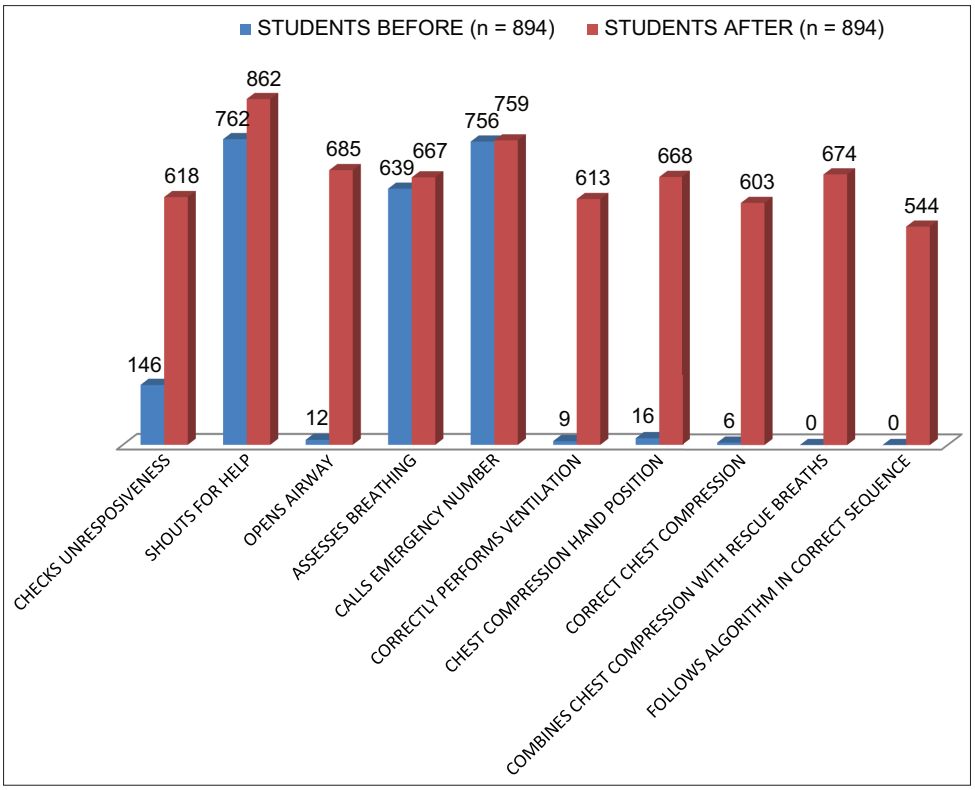

Figure 2: No. of students and their response to each basic life support parameter

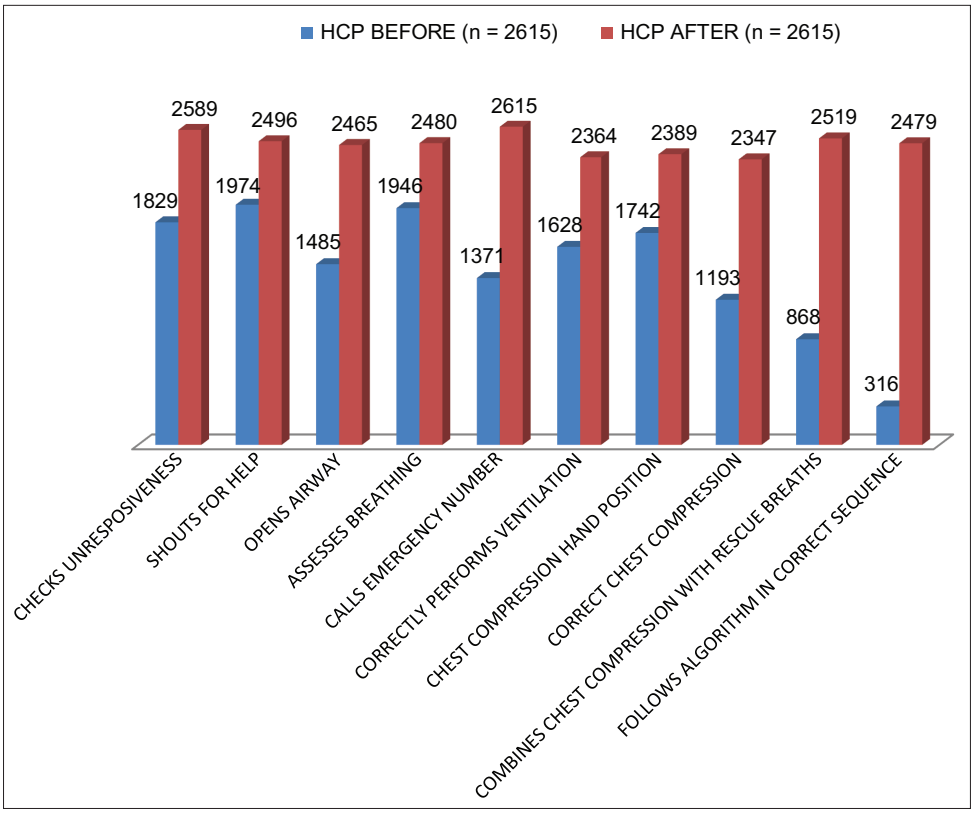

Figure 3: No. of healthcare providers and their response to each basic life support parameter

2. Knowledge on calling for help in case of an emergency is common among HCPs and non-HCPs
3. Knowledge on calling on emergency number in case of OHCA is less among HCPs when compared to non-HCPs, this might be due to HCPs are more concentrating on performing CPR
4. Knowledge on positioning the airway is less in non-HCPs when compared to HCPs
5. There is a complete lack of knowledge on performing compressions among non-HCPs when compared to HCPs
6. Figure 1 depicts there is an increase in knowledge among employees after training
7. Figure 2 depicts there is an increase in knowledge among students after training
8. Figure 3 depicts there is an increase in knowledge among HCP after training.

CONCLUSION

Performing BLS and attending BLS training plays a key role in attaining BLS knowledge by both healthcare and non-HCP. There is a need for structured training of BLS for every individual. This will go a long way in improving the outcome of BLS delivery by healthcare providers and non-HCP, thus immensely benefitting the society and also boosting the morale of the BLS providers. There should be regular refreshing sessions on BLS to all.

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