

**Original Article****Impact of Basic Life Support Training on the Knowledge of Basic Life Support in Undergraduate Medical Students**Sanniya Khan Ghauri<sup>1</sup>, Hafsa Khan<sup>2</sup>, Mehnaz Ali Bangash<sup>1</sup>,  
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@gmail.com**ABSTRACT****BACKGROUND**

Basic life support (BLS) remains an essential lifesaving skill that every healthcare provider must have. The outcome of a cardiac arrest improves significantly if it is promptly and properly instituted. Basic life support sessions are done regularly for the doctors to improve the knowledge and skills, but medical students are usually not mandated to have BLS updated regularly and so are not aware of the new guidelines. This study aimed to assess the impact of basic life support training on the knowledge of basic life support among undergraduate medical students.

**METHODS**

One hundred and twenty eight medical students, mostly female (n=85, 66.4%) participated in this interventional study through convenience sampling. A 16-item validated questionnaire extracted from American Heart Association (AHA) guidelines was used to assess the knowledge before and after the BLS training session.

**RESULTS**

The pretest mean score (Standard deviation) came out to be 3.5 ( $\pm 1.25$ ) with a range of 1-6

out of a total score of 10. The post-test mean score was obtained as 6 ( $\pm 1.25$ ) with a range of 2-9. Statistically significant ( $P < 0.01$ ) difference was obtained which shows that undergraduate medical students' prior knowledge of BLS was poor which improved significantly after the commencement of the BLS training session.

**CONCLUSION**

This study revealed that the BLS training session significantly increased the knowledge of BLS amongst the medical students. It is therefore important that BLS training should not only be incorporated in the undergraduate curriculum of medical students but there should be multiple refresher courses on the subject to update the knowledge of BLS to be relevant and up to date.

**KEYWORDS**

Basic life Support (BLS), Cardiopulmonary resuscitation (CPR), Knowledge, Training

**INTRODUCTION**

With the advancement of health care facilities, there are a number of life saving modalities which can help in reducing mortality and preventing morbidity. However, Basic Life Support (BLS) skill is still one of the most effective tool with potential to save millions of lives worldwide. Maintenance of airway while supporting breathing and circulation is what constitutes as the Basic life support (BLS)<sup>1</sup>. It is also described as the medical procedures and skills that are employed to save a victim suffering from a life-threatening emergency until he is transported to get medical care at the hospital<sup>2</sup>. The American Heart Association (AHA) recommends five key steps in the basic chain of survival which include recognition

of cardiac arrest, activation of emergency response system, cardio pulmonary resuscitation (CPR), use of automated external defibrillator and transport to a hospital.<sup>3,4</sup> The most important step in the sequence of BLS is effective CPR which can be done by a lay-person and improve outcome of cardiac arrest.

Out of hospital cardiac arrest is a common occurrence and BLS is considered as a primary step which can be done by anyone who has proper knowledge and training. Hands-only CPR is the latest recommendation by the AHA for non-healthcare professionals which includes only cardiac compressions. Due to simplicity and effec-

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tiveness, it is recommended that every member in the community should be provided knowledge of BLS at some stage of their education.<sup>5</sup> A good CPR can increase the chances of survival, decrease prolonged hospital stay and reduce overall medical cost.<sup>6-9</sup> Importance of correct knowledge of BLS cannot be over-emphasized and it is imperative that this knowledge should be widespread in community. All individuals especially health care professionals should be adept in knowledge and skills required to provide BLS.<sup>10</sup>

Health care professionals are expected to have competence in resuscitation right from their first posting. In the United States, BLS training has been recommended for all health care professionals since 1966 especially for those who are frequently involved in resuscitation.<sup>11</sup> The General Medical Council of the United Kingdom also insist that preregistration house officers (interns) are required to have training in BLS before they begin their initial rotation and receive Advanced Life Support (ALS) training during their first year.<sup>12</sup> It signifies the importance of BLS and advocates the training of all healthcare professionals.<sup>13</sup> There could be legal implications and fatal consequences alike from lack of training and inability of a health professional to effectively manage emergencies.<sup>14</sup> Hence it is vital for medical and paramedical staff to be aware of current BLS guidelines since they encounter life threatening emergencies on a daily basis.<sup>15</sup> It is recommended by the American Heart Association (AHA 2015) that students and teachers be trained on basic life support<sup>16</sup> and these recommendations are no doubt contributing to the increased demand for such courses worldwide.<sup>17</sup>

Although Pakistan Medical and Dental Council (PMDC) requires all doctors to have a valid BLS certification at the time of registration, there is poor availability of data to determine the awareness and knowledge of basic life support among healthcare professionals and paramedical staff.<sup>18</sup> Medical students go through 3 years of clinical rotation but BLS is not a mandatory part of curriculum. This study therefore aimed to assess the impact of basic life support (BLS) training on the knowledge of a group of undergraduate medical students.

## **MATERIALS AND METHODS**

### **Study Subjects**

This study was carried out on the day of Master-class in Emergency Medicine and Toxicology conducted by Department of Emergency Medicine, Shifa International Hospital on 1st July 2018, at Zaki Auditorium, Allama Iqbal Open University, Islamabad. One hundred and twenty-eight medical students belonging to different medical colleges participated in this study.

## **STUDY TOOLS**

This was an interventional study in which the knowledge of the students was assessed by using pre and post BLS training session questionnaires using convenience sampling method.

The 16-item validated questionnaire administered before and after the BLS training session was extracted from AHA guidelines 2015 and was used to assess the knowledge of the medical students.

The first three items of the questionnaire recorded demographic variables such as age, gender, and level of medical education. The next three items were about the source of information regarding BLS and any previous information about CPR; while the remaining 10-items consisted focused on testing practical knowledge of BLS. Each of these 10 questions was allotted 1 mark for the correct answer. No negative marking was given upon wrong answers.

The participants were further divided randomly into eight different groups so that small group teaching can occur with effective interaction and hands-on training. Each group consisted of approximately 16 students. Each training sessions consisted of twenty-five minutes consisting of a short lecture (5 minutes), Hands-on demonstration of chest compressions on manikin (2 minutes), followed by practical demonstration by each participant. The content of the lecture included the chain of survival of BLS emphasizing the key steps.

The instructors for BLS training session were nine emergency medicine residents, one senior medical officers, and four nurses. Three emergency medicine consultants supervised the sessions. All residents, medical officer, and nurses involved in training were ACLS certified and had previous experience of teaching BLS at other forums.

## **ETHICAL APPROVAL**

Informed consent was secured from each participant. The study was approved by the Institutional Review Board of Shifa International Hospital, Islamabad.

## **Data Collection and Analysis**

The data was collected by administering questionnaires which were subsequently statistically analyzed accordingly. Descriptive and inferential statistics were performed using Statistical Package for Social Science (SPSS), version 23.0 (IBM, Armonk, NY, USA). The knowledge of the participants was assessed through 10 questions and one mark was awarded for every correct answer making the maximum score 10. Pre-and post- workshop scores of the participants were analyzed through a paired t-test test

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Table 1: Socio-demographics characteristics

Variable	n	%
<b>Age Group</b>		
17-19	19	14.84
20-22	47	36.71
23-25	62	48.44
<b>Sex</b>		
Males	43	33.59
Females	85	66.41

<b>Year (MBBS)</b>		
1 <sup>st</sup>	02	1.56
2 <sup>nd</sup>	11	8.59
3 <sup>rd</sup>	26	20.31
4 <sup>th</sup>	37	28.91
5 <sup>th</sup>	52	40.62

and level of statistical significance was kept at 0.05.

RESULTS

The data was collected from 128 medical students with female predominance, 85 (66.41%) to male 43 (33.59%). The age range of participants was from 17 to 25 years. The medical students were included from those who were in their 1st year to final (5th) year in medical school. Majority of the student belonged to final year n=52,40,62 (40.62%) . as shown in table 1.

The students were asked about the source of their initial information on cardiopulmonary resuscitation and their responses are depicted in Figure 1. Close to half of the respondents, 58 (45.31%) said that the source of their information on CPR was from the university. The next major group, 53 (41.41%) stated internet as their source. Close to 10 (7.81%) and 5 (3.91%) students claimed relatives or friends and reading as their initial sources of information, respectively. Only 1 participant quoted movies and television as their source. None of the participants said their source of information on CPR were from the radio or other possible sources.

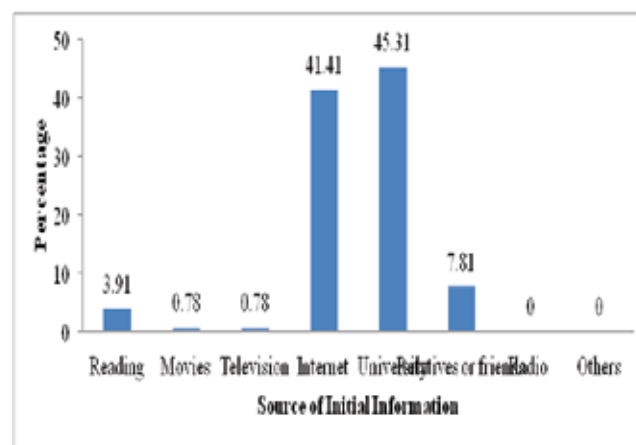
As observed in table 2, the mean score of the knowledge about BLS significantly improved from 3.5 (pre-test) to 6.0 (Post-test). Paired t-Test was applied to find the significance between two results.

The overall knowledge of undergraduate medical students was assessed pre-BLS workshop and post-BLS workshop by a 10 item test questionnaire. When asked the meaning of CPR pre-workshop, 74.22% got it correct as compared to 100% post the BLS workshop. There was also a significant increase among participants who felt they had sufficient knowledge on BLS from 7.03% pre-workshop to 90.63% post workshop. Only 5 (3.90%) participants pre-workshop knew what to do when they saw an unresponsive individual as compared to 47 (36.71%) participants post workshop. Overall, there was

Figure1: Source of information about CPR

Intervention	Mean Scores	SD	P
Pre-BLS workshop	3.5	±1.25	<0.01
Post-BLS workshop	6.0	±1.25	

Table 2: Paired t-test of BLS knowledge for undergraduate medical students



significant increase in every item used to assess the knowledge of the participants pre-workshop to post BLS workshop as depicted by Table 3 below.

DISCUSSION

This study was done among medical students, studying in various public and private medical colleges of the country. Majority of the students were in their final year who would soon become health professionals. Our study showed that there was paucity of knowledge among medical students on basic life support before they participated in the basic life support training. This poor knowledge among students and healthcare personnel is supported by various other studies<sup>15,19-21</sup>. AHA recommends that every member of the society can be a resource when it comes to providing basic life support. Worldwide, programs have been developed to teach CPR in schools so that even children can provide effective resuscitation, but it is alarming to see that medical students who are in close contact with sick people did not have the required knowledge.<sup>22</sup>

A study done in New Dehli showed similar results with a mean pretest score of 3.5/10 among the undergraduate medical students before the BLS training<sup>23</sup>. A community study carried out in Bangladesh to impart first responder skills including BLS in a rural setting revealed that 90% of the individuals passed the post-training test but there was deterioration in knowledge and skills of CPR on re-as-

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assessment after few months.<sup>24</sup> Another study clearly showed that the inadequate knowledge about CPR among health professionals was a direct result of lack of training.<sup>14</sup> On the contrary, another study revealed that despite

of other factors, the knowledge of trained students remained better than those who were not trained.<sup>25</sup> This indicates the need of frequent training sessions so that the individuals remain in practice. Currently there are

**Table 3: Undergraduate medical students' knowledge on CPR**

Items	Pre- BLS Workshop Assessment				Post- BLS Workshop Assessment			
	Correct		Incorrect		Correct		Incorrect	
	n	%	n	%	n	%	n	%
Meaning of the abbreviation CPR	95	74.22	33	25.78	128	100	0	0
Do you feel that your BLS knowledge is sufficient?	09	7.03	119	92.97	116	90.63	12	9.37
Have you ever taken a CPR training course?	65	50.78	63	49.22	128	100	0	0
How will you recognize someone in need of CPR?	23	17.99	105	82.03	55	42.97	73	57.03
What do you do when encounter a situation that requires resuscitation? (assume no scene danger)	05	3.90	123	96.09	47	36.71	81	63.28
Number the following steps of CPR in the correct sequence.	04	3.12	124	96.88	61	47.66	67	52.34
What is the chest compression to ventilation ratio in adult CPR?	39	30.47	89	69.53	76	59.37	52	40.63
What is the rate of chest compression in adult CPR?	22	17.19	106	82.81	49	38.28	79	61.72
What should be the location of hand during chest compression in	31	24.22	97	75.78	51	39.84	77	60.16

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few organizations in the country which are providing BLS courses which cannot cope for the masses if demand is created now. Community programs, print and electronic media, and social media can be an effective way of imparting knowledge on large-scale.

This study also shows that there was a significant rise in the knowledge of BLS among medical students after the workshop (Mean score improvement of 2.5,  $p < 0.01$ ). Similar studies done by Chaudhari A et al<sup>26</sup> and Hassan et al<sup>18</sup> also showed the deficiency of knowledge of BLS among medical students, significant improvement after simulation-based workshops and the need to incorporate BLS courses into the curriculum. Most of the undergraduate medical students (45.31%) reported that they received their knowledge about CPR from university but poor test scores pre-workshop emphasize the need of robust BLS workshops in medical schools to improve this deficiency. Pillow et al<sup>27</sup> found that 98.2% of the students were in favor of BLS inclusion in the medical student curriculum. Zaheer and Haque<sup>28</sup> also reported a consensus of 79% of respondents that training in BLS should be part of the undergraduate curriculum. Arsati et al<sup>29</sup> showed that the lack of training in undergraduate curriculum was the common cause for the lack of knowledge. Thus to improve on the knowledge and skills of BLS, frequent workshops are necessary as part of the undergraduate curriculum.

## LIMITATIONS

1. The study was carried out at an emergency medicine workshop where convenience sampling was done which could have resulted in selection bias
2. Self reporting questionnaires were used. A better method would have incorporated assessment through simulation scenarios.

## CONCLUSION

This study has shown a deficiency in the knowledge of BLS among medical students with a significant increase following a BLS training workshop. It is recommended that a Basic Life Support training course should be incorporated into the curriculum of undergraduate medical students along with periodic training sessions so that the knowledge remains current.

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