Knowledge, Attitude and Awareness of Basic Life Support Among Health Sciences University Students

Nurhazirah Zainul Azlan[1]*, Nik Hartini Mohd Noor[1,2] & Noratikah Othman[1]
[1]*Department of Basic Medical Sciences for Nursing, Kulliyyah of Nursing, International Islamic University Malaysia, Pahang, Malaysia.*
[2]*Klinik Safwa Tumpat, Kelantan, Malaysia.*

ABSTRACT

Objective: Basic life support (BLS) refers to the skills that require no or few equipment to save cardiac or respiratory arrest patients and it is a skill that required by all healthcare providers including medical-based students in order to save the life-threatening victims. This study determined the level of knowledge, attitude and awareness of BLS among students at International Islamic University Malaysia (IIUM) Kuantan campus. **Methods:** A quantitative cross-sectional study with convenience sampling study was conducted among 167 students at IIUM Kuantan Campus, from November to December 2020. Data were gathered by using Google Forms which available in English Language and distributed to year 3, 4 and 5 students. The questionnaire was adapted from three sets questionnaires, which two sets questionnaires were from American Heart Association in 2015, and another set questionnaire from European Resuscitation Council (ERC) 2010 Resuscitation Guidelines. **Results:** The majority of the respondents have high awareness and positive attitude towards BLS but having below average score for knowledge on BLS. There is a significantly association between courses and previous exposure of BLS training with BLS knowledge ($p<0.05$). Age, courses and previous exposure of BLS training are significantly associated with awareness level of BLS ($p<0.05$). A significant association also observed between previous exposure of BLS training with positive attitude towards BLS training ($p<0.05$). **Conclusion:** Health sciences university students was concluded to having positive attitude and high awareness towards BLS training despite having below average level of BLS knowledge score. Therefore, the university may provide more BLS educational programs and even practical to the students to promote their knowledge and improve their skills on BLS.

Keywords: Basic Life Support, University Students, Knowledge, Attitude, Awareness.

INTRODUCTION

Sudden cardiac arrest is one of the leading causes of death worldwide. There have been recent cases of sudden cardiac arrest recorded in certain countries. This can be supported by Heart and Stroke Statistics in 2019 reported more than 356, 000 out-of-hospital cardiac arrests (OHCA) annually in the United State where nearly 90% of them fatal (1). The Statistics on Causes of Death in Malaysia in 2018 had reported that 15.6% of heart attack remains the leading cause of death in Malaysia for the 14th year from 2005 to 2018 with a total of 18, 267 deaths. Ischemic heart diseases remained as the leading causes of death for males aged 15 to 64 years at 17.8% while pneumonia remained as the principal causes of death for female at 12.8% followed by ischaemic heart diseases at 12.2% (2).

Globally, respiratory disease makes up 5th of the 30 most common causes of death where chronic obstructive pulmonary disease (COPD) is 3rd, lower respiratory tract infection is 4th, tracheal, bronchial and lung cancer is 6th, tuberculosis is 12th and asthma is 28th (3). Altogether, it is estimated more than one billion people suffer from either acute or chronic respiratory conditions. According to the WHO data published in 2018, death cause by related lung disease in Malaysia reached 3.48% (4899) of total deaths (4).

Generally, BLS is a lifesaving intervention as a premedical facility. The quality of CPR is important as it was associated with improved neurological outcome, better quality of life and

*Corresponding author:

Dr. Nurhazirah Zainul Azlan
Department of Basic Medical Sciences for Nursing,
Kulliyyah of Nursing,
International Islamic University Malaysia,
Jalan Sultan Ahmad Shah, Bandar Indera Mahkota,
25200 Kuantan, Pahang Darul Makmur, Malaysia.

Email: nurhazirah@iium.edu.my
Telephone: +609-5707331

increase in return-to-work for sudden cardiac arrest (SCA) patients (5, 6). Besides, it also increases the return of spontaneous circulation (ROSC) rate for life-threatening patients thus, increasing patient's survival chance (7). BLS refers to the skills that almost require no or few equipment to save cardiac or respiratory arrest victims (8). BLS includes cardiopulmonary resuscitation (CPR), the use of an automated external defibrillator (AED) and the clearance of obstructed airways for people of all ages. Adequate knowledge with professional attitude and awareness on BLS is mandatory for students especially for medical healthcare students. It is one of the skills that students should develop during their study to be prepare them for emergency life-saving conditions during working later on.

The lack of BLS skills often becomes one of the reasons why the students or future healthcare providers become incompetent and cannot perform well in emergency situation. Some graduated physicians were expected to perform poor CPR techniques as the achievement of BLS knowledge and attitude was not emphasized in medical schools (9). In Nepal, the mean knowledge score of the postgraduate dental residents was lower than dental faculties due to lack of BLS training and the residents who still in learning phase. Overall, the participants had a negative attitude and poor practice of BLS (10). Therefore, the knowledge and skills on BLS are important in order to determine the success rate of CPR (11). BLS skills are not only important for the healthcare providers, in fact public community can also learn by attending the BLS training (12). Thus, health sciences students are not excluded from learning BLS as the skills can be improved by training. The chances of patient survival are doubled when BLS techniques are implemented quickly (8).

Despite the current research that reported the importance of BLS to the life-threatening patients in order to sustain life, it is always given least priority compared to other interventions such as blood taking, dressing and suctioning. The reason BLS was given least priority are because it is not compulsory for the students and the students are not expected to encounter a life-threatening situation. Previous research reported that initiation of BLS by a layperson is very rarely even though it can increase survival rate (13). Research on the level of knowledge, attitude and awareness on BLS among health sciences university students are also limited in Malaysia. Therefore, this study is conducted to determine the level of knowledge, attitude and awareness of BLS among students of IIUM in Kuantan campus. It is crucial to inculcate the theoretical aspect to improve their BLS skills in order to reduce the mortality rate caused by the life-threatening condition. Limited number of trainings, limited number of certified instructors and not a compulsory undergraduate curriculum are some of the problems that faced by university students to meet the certain level of competencies in BLS.

MATERIALS AND METHODS

The study has been conducted using a quantitative cross-sectional study which carried out between November to December 2020. This involved 167 students from five different Kulliyyah (faculties); Kulliyyah of Medicine, Kulliyyah of Dentistry, Kulliyyah of Pharmacy, Kulliyyah of Nursing and Kulliyyah of Allied Health Sciences. Convenience sampling method has been applied in this study. The Raosoft sample size calculator was used in this study, with the 5% of margin error, 80% confidence interval, 3715 of total population size and 50% response rate. The required minimum sample size for this study was 158 participants, however, the researcher recruited 167 participants. The inclusion criteria were year 3, 4 and 5 undergraduate IIUM Kuantan health sciences students who were willing to participate. The year of study was chosen as this study would like to highlight the senior student as they already exposed to clinical postings and they will be a healthcare provider.

The exclusion criteria were postgraduate students at the same Kulliyyah. The questionnaire was adapted from three sets questionnaires, with two sets questionnaires were from American Heart Association in 2015. These questionnaires use Cronbach's alpha value of 0.81 from pilot-tested among 30 female health students with no changes were made and the second questionnaire use face and content validity which were evaluated by the experts respectively (14, 21). The third set questionnaire use the correct cardiac arrest findings and algorithms of BLS that were determined from European Resuscitation Council (ERC) 2010 Resuscitation Guidelines (13). The researcher obtained permission to use the questionnaire prior starting the study. The researcher utilized Google Form to distribute the final questionnaire that contained 28 questions.

The questionnaire comprised of four sections which was available in English Language only. Section one consists of sociodemographic data which include age, gender, current year of study, kulliyyah and previous exposure to BLS. Participants were categorized to high and low level based on their total marks for correct answers for each section. One mark given for the correct

answer and no mark given for the wrong answer. Accordingly, section two consists of 14 knowledge questions on BLS regarding cardiac arrest, CPR in adult and infants, and the participants were categorized as below average (0 to 7 marks) and above average (8 to 14 marks). Section three consists of 4 awareness questions of students regarding BLS and the participants were categorized as low awareness (1 to 2 marks) and high awareness (3 and 4 marks). Section four consists of 5 attitudes questions of students towards BLS training and the participants were categorized as having negative attitude (0 to 2 marks) and positive attitude (3 to 5 marks) towards BLS training.

Ethical approvals were obtained from Kulliyyah of Nursing Postgraduates and Research Committee (KNPGRC) and IIUM Research and Ethical Committee (IREC) with approval number of IREC 2020-KON2/25 prior to data collection. Next, the informed consent was taken from the participants and each of the participant were provided with information sheet about the objectives and background of this study. The participants were assured that the information given to the researcher were protected as confidential and solely for academic purposes. Furthermore, the participants have right to withdraw from the study at any time.

Statistics

Data was analyses using Statistical Package for Social Science (SPSS) version 21.0. Descriptive statistical tests were used to measure the frequency and percentage. The differences in the distribution of variables were assessed by using non-parametric test of Fisher exact test and chi-square test with p-value less than 0.05 was considered statistically significant. Normality test of Kolmogorov-Smirnov showed that the value of 0.000 which was below than 0.05, thus the non-parametric test was the suitable tools to be used to analyze the data since the sample size (n) used in this study is more than 100.

RESULTS

Table 1 displays the sociodemographic data of the participants. Majority of participant were below 24 years old, with 153 participants (91.6%). Out of 167 participants, 139 (83.2%) were female while the rest were male. The data showed that 20 (12.0%) participants were year 3 students, 134 (80.2%) were year 4 students and 13 (7.8%) were fifth year students; with majority from year 4 students. In this study, 68 participants from Kulliyyah of Nursing (40.7%), followed by 31 participants from Kulliyyah of Medicine (18.6%), 24 participants from Kulliyyah of Pharmacy (14.4%), 23 participants from Kulliyyah of Dentistry (13.8%) and 21 participants from Kulliyyah of Allied Health Sciences (12.6%); with majority from Kulliyyah of Nursing. Around 92 participants (55.1%) had previous exposure to BLS training and the remaining never had previous exposure to BLS training (44.9%).

Knowledge, attitude and awareness on BLS

Table 2 showed that 119 participants have below average score on BLS knowledge (71.3%) and only 48 participants have above average score on BLS knowledge (28.7%). Majority of the respondents 158 (94.6%) have positive attitude towards BLS training and only 9 (5.4%) respondents have negative attitude towards BLS training. Around 85 of the participants have high level of awareness towards the BLS (50.9%) and 82 of the participants having low level of awareness towards the BLS (49.1%).

According to Table 3, majority of the respondents answered correctly on sign of sudden cardiac arrest and pulse to be felt in adult patient 89.8% and 79.6%, respectively. However, only minority of respondents answered correctly on depth of compression in neonates during CPR and absence of respiration which recorded 11.4% for both. Overall, 71.9% of respondents know the correct sequence of resuscitation in BLS which is airway, breathing and compressions. Around 40.8% of the participants answered wrongly for correct depth of chest compressions for adults and 53.9% of the participants answered correctly for ratio of chest compressions to rescue breaths for adult. Around 40.7% of the participants know the correct location for chest compression in infants. In contrast, most of respondents did not know how to give rescue breathing in infants (38.9%), depth of compression in children (55.7%) and neonates (68.3%) during CPR. Majority of respondents also did not know the newborn chest compression and ventilation ratio (62.3%).

According to Table 4, a total of 45.5% of the students had never received BLS training. Overall, students reported wanting more BLS training (92.8%). Majority of participants answered the reason of wanting more BLS training is due to it is important for their future work (61.7%), followed by avoiding unnecessary deaths in the community (25.7%) and a family history of heart disease (3.6%). A total of 56.3% participants agreed that high school as the first place suitable to provide BLS training and 94% participants also agreed that BLS training should be mandatory in the curriculum.

Table 1: Sociodemographic data (n=167)

Variable		Frequency (n)	Percentage (%)
Age	Below 24 years old	153	91.6
	Above 24 years old	14	8.4
Gender	Male	28	16.8
	Female	139	83.2
Education year	Year 3	20	12.0
	Year 4	134	80.2
	Year 5	13	7.8
Kulliyyah	Medicine	31	18.6
	Nursing	68	40.7
	Dentistry	23	13.8
	Pharmacy	24	14.4
	Allied Health Sciences	21	12.6
Previous exposure of BLS training	Yes	92	55.1
	No	75	44.9

*Descriptive analysis

Table 2: Level of knowledge, attitude and awareness on BLS (n=167)

Variables		Frequency (n)	Percentage (%)
Knowledge of the students	Total score		
Below average	0-7	119	71.3
Above average	8-14	48	28.7
Attitude of the students	Total score		
Negative	1-5	9	5.4
Positive	6-10	158	94.6
Awareness of the students	Total score		
Low	0-2	82	49.1
High	3-4	85	50.9

*Descriptive analysis

Table 3: BLS knowledge among participants (n=167)

	Questions	Frequency, n (%)		
		Correct	Wrong	I don't know
1	Which of the following may be a sign of	150 (89.8)	15 (8.4)	3 (1.8)
2	How can the consciousness state of the	114 (68.3)	54 (31.7)	0 (0)
3	How can the absence of respiration be	19 (11.4)	144 (85.6)	5 (3.0)
4	How can the absence of circulation be determined?	85 (50.9)	79 (46.7)	4 (2.4)
5	Correct sequence of resuscitation in BLS is	120 (71.9)	103 (17.9)	17 (10.2)
6	Which artery to be felt for a pulse in an	133 (79.6)	25 (14.4)	10 (6.0)
7	What is the correct depth of chest	46 (27.5)	69 (40.8)	53 (31.7)
8	The correct ratio of chest compressions to	90 (53.9)	24 (13.8)	54 (32.3)

*Descriptive analysis

Table 3: BLS knowledge among participants (n=167) cont.

	Questions	Frequency, n (%)		
		Correct	Wrong	I don't know
9	What should be the number of breaths/minutes for adults?	77 (46.1)	72 (42.5)	19 (11.4)
10	What is the location for chest compression in infants?	36 (21.6)	69 (40.7)	63 (37.7)
11	How do you give rescue breathing in infants?	43 (25.7)	60 (35.4)	65 (38.9)
12	Depth of compression in children during CPR is ….	35 (21.0)	40 (23.3)	93 (55.7)
13	Depth of compression in neonates during CPR is…	19 (11.4)	35 (20.3)	114 (68.3)
14	In a newborn the chest compression and ventilation ratio are ….	30 (18.0)	34 (19.7)	104 (62.3)

*Descriptive analysis

Table 4: Attitude towards BLS training (n=167)

QUESTION	Answer	Frequency, n (%)
Have you had previous BLS training?	Yes	91 (54.5)
	No	76 (45.5)
Do you want more BLS training?	Yes	155 (92.8)
	No	1 (0.6)
	I don't know	11 (6.6)
If yes, why do you want more BLS training?	A family history of heart disease	6 (3.6)
	Avoiding unnecessary deaths in the community	43 (25.7)
	Important for my future work	103 (61.7)
	No answer	15 (9.0)
When do you think BLS training should first be provided?	High school	94 (56.3)
	1st year of college	28 (16.8)
	3rd year of college	27 (16.2)
	Just before graduation	15 (9.0)
	I don't know	3 (1.8)
Do you think BLS training should be mandatory in the curriculum?	Yes	157 (94.0)
	No	3 (1.8)
	I don't know	7 (4.2)

*Descriptive analysis

Table 5: Awareness towards BLS (n=167)

QUESTION	Answer	n (%)
Have you heard about BLS?	Yes	148 (88.6)
	No	19 (11.4)
In which year BLS Guidelines have been revised?	Correct	19 (11.4)
	Wrong	46 (27.5)
	I don't know	102 (61.1)
Full form of AED abbreviation?	Correct	97 (58.1)
	Wrong	35 (21.0)
	I don't know	35 (21.0)
What is the number to be called in case of emergency?	Correct	131 (78.4)
	Wrong	33 (19.8)
	I don't know	3 (1.8)

*Descriptive analysis

Table 5 showed that only 11.4% of respondents never heard about BLS. A total of 61.1% of the respondents did not know in which year BLS Guidelines was revised. About 58.1% of the respondents were aware the full form of AED abbreviation which was automated external defibrillator. Most of respondents (78.4%) also aware that the correct number to call in for emergency situation compared to only 19.8% answered wrongly.

Association between sociodemographic characteristic and knowledge, attitude and awareness on BLS

Table 6 showed that there was a significant association between age, courses and previous exposure of BLS training with knowledge level on BLS ($p<0.05$). However, there is no significant association between gender and year of study with knowledge level on BLS. There is a significant association between previous exposure of BLS training with attitude level towards BLS training ($p<0.05$). However, age and gender are not significantly associated with attitude towards BLS training. Age, courses and previous exposure of BLS training are significantly associated with awareness level of BLS ($p<0.05$). However, gender and year of study are not significantly associated with awareness level of BLS.

Table 6: Association between sociodemographic characteristic and the knowledge, attitude and awareness on BLS (n=167)

Variables	Knowledge level (*p*-value)	Attitude level (*p*-value)	Awareness level (*p*-value)
Age	0.026**	1.000	0.030*
Gender	0.452	1.000	0.259
Year of study	0.975		0.653
Courses	0.009*		0.000*
Previous exposure of BLS training	0.004*	0.011**	0.000*

** Fisher Exact Test, $p < 0.05$
*Chi-square test, $p < 0.05$

DISCUSSION

In this study, most of the respondents (50.9%) have high awareness level towards the BLS and 49.1% of respondents have the low awareness level towards the BLS. Previous study had reported that the awareness score of BLS to be at average level on medicine, dentistry, nursing and pharmacy students in Saudi Arabia (14). Other previous study also reported the same findings in India (11, 15, 16) and Iran (17). Although the majority of the respondents had heard about BLS in this study, most of them did not aware about in which year of BLS Guidelines were revised. However, most of the respondents were aware about the full form of AED abbreviation and the correct number to call in for emergency situation, which is important step in life-threatening situation. This finding was similar with previous local study among college students that reported 70% of the respondents knew the correct emergency number in Malaysia (18). In contrast, majority of junior doctors (85.8%) in Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II, Malaysia stated that they were not confident of managing a resuscitation case. Thus, up to 77.1% respondents suggested that BLS should be re-certified every two years (19).

The participants level on BLS knowledge was determined by the summation of the total score of the 14 questions. None of the respondents answered all the questions correctly. The findings showed that 71.3% of students have below average of BLS knowledge score and only 28.7% of students have above average of knowledge score. Thus, majority of IIUM Kuantan students have poor knowledge of BLS, which is alarming.

This might be due to almost half of the participant did not have previous BLS training (45.5%) and majority of the participants reported wanting more BLS training (92.8%). Other studies also reported a significant lack of knowledge among dental interns in four dental colleges of Mangalore City, India with below average knowledge of BLS and medical emergencies (20); and poor knowledge score among healthcare interns of medicine, dentistry, nursing and pharmacy faculties in Saudi Arabia (14, 21). However, in Jazan University, Saudi Arabia, the students of emergency medical services were reported to have high BLS knowledge score which might be due to their practices that required the BLS knowledge (22).

Based on this study, the majority of participants showed low BLS knowledge level related to CPR newborn and children. Around 68.3% of the respondents did not know how to give rescue breathing in infants and depth of compression in children during CPR and 62.3% did not know the newborn chest compression and ventilation ratio. In previous study in Saudi Arabia, only 4.4%

health sciences student answer the correct depth of compression in children during CPR and 29.1% aware on the newborn chest compression and ventilation ratio (21). This result may due the BLS training only emphasized on basic airway management such as correct techniques CPR on adult and choking in infants and adult. This also showed that the BLS training should emphasize on the newborn and children as well, and not just on the adult.

Majority of the participants in this study having the positive attitude towards the BLS training and only 5.4% participants having the negative attitude towards the BLS training. This similar to other studies that reported the positive attitude towards BLS training among the students in India (22) and Saudi Arabia (23, 24). Regarding the reason of BLS training, most of participants answered BLS as important for their future work and to avoid unnecessary deaths in the community. High school was the most recommended answer from the participants for the most suitable time to provide BLS training. Around 94.0% of the respondents think BLS training should be compulsory in the curriculum. In previous study, 97.7% participants think that BLS training should be mandatory (21). Besides, majority of health science students agreed that the BLS training should include in curriculum (14). This showed that IIUM Kuantan students have positive attitude towards BLS training.

The findings from this study also revealed that age, courses and previous exposure of BLS training are significantly associated with awareness level on BLS. The findings were similar with the study in Saudi Arabia that showed the mean awareness scores differ significantly across the Medicine, Dentistry, Nursing and Pharmacy faculties (14). In terms of age, the findings showed that the respondents with age above 24 years old (78.6%) have high awareness level of BLS. The finding on this study also indicates the gender, either female or male and higher year of study does not influence the level of awareness even though they have more experience of clinical posting in hospital. In contrast, the gender and awareness level were associated significantly among the Medicine, Dentistry, Nursing and Pharmacy faculties where female has high awareness level compared to male in Saudi Arabia (14).

Based on the findings, a significant association was observed between knowledge level of BLS with age, courses and previous exposure to BLS training. Students above 24 years old and Kulliyyah of Medicine students have the highest score of knowledge level on BLS, followed by Kulliyyah of Dentistry and Kulliyyah of Nursing. In addition, the students who have previous exposure to BLS training have high BLS knowledge level compared to those who not exposed to BLS training. This result was supported by previous study that reported significant association between students who had previously received BLS training and BLS knowledge scores at Saudi Women's University (22). In terms of gender and year of study, there was no significant difference were demonstrated with the BLS knowledge level. In previous study, female was reported to achieved higher score than male and third year dental students have higher mean knowledge scores than fifth year (14, 23). In another study, year 6 medical students scored the highest mean of total correct answers compared to year 3, 4 and 5 medical students (25).

This study demonstrated that there was a significant association between previous exposure of BLS training with the positive attitude towards BLS training. This maybe because of the understanding on the importance of BLS knowledge, which can save many lives during life-threatening situation. There was no significant association between age and gender with the attitude level towards BLS training in this study which showed that the importance of BLS training on the students despite of their age and gender. The findings on this study that showed a positive attitude among participants was also found to contradict with a previous study that reported a decrease in attitude towards BLS training among medical students in year 3, 4 and 5 in Saudi Arabia (25).

CONCLUSION

The findings from this study suggest that more BLS training is necessary as majority of the respondents have below average score of BLS knowledge despite of majority of them had attended BLS training. Most of the participants also reported having high awareness level and positive attitude towards BLS training. The university may need to implement the BLS curriculum as compulsory course with regular reassessment annually that includes theory and skills for the university students to increase their competencies in BLS. This can improve their knowledge and skills before graduating in preparing them as a competent healthcare provider. Therefore, this can help to increase the patient's survival rate.

LIMITATION

This study only assesses the theory part of BLS knowledge and not the skills of the participants. Therefore, the skills on BLS among health sciences university students can be further determine in the future.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare with regard to this work.

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