Knowledge on Basic Life Support among Nursing Students in a Nursing College

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ABSTRACT

Background: Basic life support (BLS) is the foundation for saving lives following cardiac arrest. It helps to maintain patients' circulation and respiration until advanced life support arrives. It is necessary to prevent sudden death due to life-threatening illnesses or injuries.

Methods: A descriptive cross-sectional research design was adopted to find out the knowledge on basic life support among nursing students in a nursing college. Data was collected using probability stratified random sampling technique. The structured self-administered questionnaire was used. Data was collected from 2078/12/20 to 2079/01/03 and analyzed using Statistical Package for Social Science (SPSS) version 16 with descriptive and inferential statistics.

Results: This study reveals that 35.4% had received basic life support training. 68.4% of the respondents had exposed to cardiac arrest cases and 63.3% of them performed cardio-pulmonary resuscitation. Only 17.1% of the respondents knew about the oro/nasopharyngeal airway as a method to open the airway for unconscious patients with no gag reflex. Only 27.2% of the respondents knew the correct sequence of using an automated external defibrillator. 65.2% had good knowledge of BLS. The level of knowledge of BLS was significantly associated with the nursing stream (P-value=0.004). There is no significant association between the level of knowledge and BLS training, time of last training, duration of training, exposure to cardiac arrest cases, and performance of CPR.

Conclusions: The nursing students have good knowledge of BLS. Despite inadequate knowledge about some components of BLS like the use of oro/nasopharyngeal airway and AED.

Keywords: *Basic life support, Knowledge, Nursing students*

INTRODUCTION

Basic life support (BLS), generally refers to the type of care that first responders, healthcare providers, and public safety professionals provide to anyone who is experiencing cardiac arrest, respiratory distress, or an obstructed airway[1]. Basic life support (BLS) is the cornerstone for resuscitating those who have suffered a cardiac arrest. Which includes; immediate recognition of sudden cardiac arrest (SCA) and activation of emergency response system (ERS), early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS[2].

BLS is indicated for sudden cardiac arrest, heart attack, stroke respiratory arrest, drowning, foreign body airway obstruction, drug overdose, etc[3]. Cardiovascular diseases (CVDs) are the leading causes of death worldwide, taking the lives of an estimated 17.9 million people per year. Heart attacks and strokes account for more than 4 out of 5 CVD deaths {World Health Organization[4]. Drowning is the 3rd leading cause of unintentional injury death worldwide, accounting for 7% of all injury-related deaths. In 2019, an estimated 236,000 people died from drowning worldwide. Over 90% of drowning deaths occur in low- and middle-income countries[5]. Timely resuscitation significantly improves survival in emergencies. High-quality BLS and ALS interventions increase survival and neurological recovery in out-of-hospital cardiac arrests, where global survival rates are 7–10%[6].

In Nepal, CVDs contributed to 26·9% of total deaths and 12·8% of total Disability Adjusted Life Years (DALYs) in 2017. Ischemic heart disease and stroke were the predominant CVDs, contributing 16·4%and 7·5% to total deaths and 7·5% and 3·5% of total DALYs, respectively[7].

A study report conducted in Nepal showed that 76% of the participants had encountered cardiac arrest situations in their clinical practice but they were managing those cases with limited knowledge of BLS. Less than 50% of the respondents answered correctly about BLS[8]. Among 95 participants, only 12% had adequate and 55% had moderate knowledge about Basic Life Support[9]. Most of the medical and dental graduates surveyed (81.3%) had heard about adult BLS and felt the need to know about it (94.7%). Some of them (58, 38.7%) had seen BLS being done. However, very few (2, 1.3%) had done BLS on a patient[10].

BLS is essential to prevent sudden death due to life-threatening illness or injuries and all healthcare professionals must possess adequate knowledge of BLS. Nurses play a vital role by promptly attending and initiating CPR for the management of patients with cardiopulmonary arrest. Being an integral part of the health care team, nurses should be competent to perform BLS. As a future nurse, nursing students should be prepared to address critical cases during their clinical posting. Thus, they should also have adequate knowledge and skills to perform BLS.

METHODS

A descriptive cross-sectional study design was conducted to find out the knowledge of Basic Life Support among 299 Bachelor level nursing students at Maharajgunj Nursing Campus (MNC), Kathmandu. Ethical approval was obtained from the Research Management Cell (RMC) of MNC and written informed consent was obtained from each respondent before data collection. Anonymity and confidentiality were maintained by using code numbers and information was used only for research purposes. A total of 158 samples were selected through probability stratified proportionate random sampling technique. Data was collected from 2078/12/20 to 2079/01/03 by using a self-administered questionnaire. The data was analyzed by using SPSS (16 versions) and using descriptive and inferential statistics.

RESULTS

Regarding demographic information of the respondents, among 158 respondents 44.3% of the respondents belonged to the age group 23-27 years. The mean age of the respondents and standard deviation was 24 years±3.30 years. Majority (80.4%) were unmarried, 66.5% were BNS and 39.2% of the respondents were 3rdyear students.

Regarding the professional information of the respondents, 35.4% of the respondents had received BLS training and among them, 35.7% had received BLS training 1 year ago, and 53.5% had attended 1 day of BLS training. Majority (68.4%) of the respondents had been exposed to a patient with cardiac arrest and among them, 35.1% had involved in case management. 63.3% had performed CPR and among them, 75% had practiced CPR in a hospital.

TABLE 1: Respondents' knowledge on basic life support

n=158

Variables	Number	Percent
BLS is care provided to victims experiencing life-threatening illnesses or injuries	106	67.1
BLS helps to maintain patient's circulation and respiration until ALS arrives	125	79.1
Indications of BLS *		
Cardiac arrest	156	98.7
Respiratory arrest	123	77.8
Drowning	98	62.0
Heart attack	97	61.4
Foreign body airway obstruction	73	46.2
Stroke	58	36.7

Multiple responses

Table 1 shows that two-thirds (67.1%) of the respondents had given correct responses on the meaning of BLS. The majority (79.1%) of the respondents answered the purpose and 98.7% answered cardiac arrest as the indication of BLS.

TABLE 2: Respondents' knowledge on steps of basic life support   **n=158**

Variables	Number	Percent
Initiate BLS immediately after recognition of cardiac arrest	144	91.1
Correct algorithm of BLS: recognition of cardiac arrest, activation of EMS, early CPR and rapid defibrillation	106	67.1
Ensure scene safety at first, when someone is unresponsive in the middle of the road	103	65.2
Check responsiveness of a victim by gently shaking shoulders and shouting, "Are you okay?"	128	81.0
Activate EMS, if victim doesn't respond, activate EMS	58	36.7
Check carotid pulse in an unconscious person	151	95.6
Maximum time for checking pulse is 10 seconds	82	51.9
Put cheeks close to nose and mouth of victim to check breathing	110	69.6
Head tilt-chin lift maneuver is used to open airway in patient with no suspected cervical spine injury	134	84.8
Oro/nasopharyngeal airway is used to open airway in unconscious patients with no gag reflex	27	17.1
Jaw thrust maneuver is used to open airway in patient with suspected cervical spine injury	85	53.8

Table 2 shows that most (91.1%) of the respondents knew initiation of BLS. The majority (67.1%) correctly answered about the algorithm of BLS. Majority of them answered to ensure scene safety, the correct way of checking to breathe, and the maximum time for checking the pulse of the victim which was 65.2 %, 69.6%, and 51/9% respectively. Most of the respondents correctly responded about checking the responsiveness of a victim, the site of checking pulse in an unconscious person, correct method of opening the airway in cardiac arrest patients with no cervical injury which were 81%, 95.6%, and 84.8% respectively. However, 82.9% didn't answer the correct method of opening the airway in cardiac arrest patients with no gag reflex. Only 36.7% of the respondents knew how to activate EMS and 17.1% answered about the use of the oro/nasopharyngeal airway to open the airway for unconscious patients without gag reflex.

TABLE 3: Respondents' knowledge on steps of basic life support   **n=158**

Variables	Number	Percent
Place patient in supine position on a firm flat surface prior to resuscitation	149	94.3
CAB is the correct sequence of CPR acc. to AHA 2020	99	62.7
Location of chest compression for CPR is mid chest	59	37.3
Correct depth of chest compression is at least 5 cm (2 inches)	72	45.6
Chest compression rate is 100-120 times/min	90	57.0
Ratio of chest compression to rescue breath is 30:2	126	79.7
Rescuers switch roles after every 5 cycles of CPR in 2 rescuers CPR	48	30.4
AED stands for Automated External Defibrillator	67	42.4
Correct placement of electrodes of AED set is 1st one on right side of sternum, below clavicle; 2nd one on left side on 5th intercostal space of mid-axillary line	120	75.9
Correct sequence of using AED is switch on the AED, apply electrodes, analyze rhythm, make sure no one touches victim, discharge shock	43	27.2
Resume CPR immediately after delivering a shock with AED	62	39.2

Table 3 shows that the majority (94.3%) of the respondents gave correct answers on the proper position of the victim before resuscitation. Majority of the respondents answered CAB as the correct sequence of BLS, rate of chest compression, ratio of chest compression to rescue breath, and placement of electrodes of AED which were 62.7%, 57% 79.7%, and 75.9% respectively.

TABLE 4: Respondents' level of knowledge on basic life support   **n=158**

Level of Knowledge	Number	Percent
Excellent (>75%)	22	13.9
Good (50-75%)	103	65.2
Below average (<50%)	33	20.9

Table 4 represents the majority (65.2%) of the respondents who had good knowledge about BLS.

TABLE 5: Association between level of knowledge regarding basic life support and selected socio-demographic variables   **n=158**

Variables	Level of knowledge		X^2	P Value
	High level No. (%)	Low level No. (%)		
Age of respondents				
≤24 years	23 (14.6)	66 (41.8)	3.030	0.082
>24 years	10 (6.3)	59 (37.3)		
Marital status				
Unmarried	29 (18.4)	98 (62.0)	1.487	0.223
Married	4 (2.5)	27 (17.1)		
Nursing programme				
BNS	15 (9.5)	90 (56.9)	8.253	0.004*
B.Sc. nursing	18 (11.4)	35 (22.2)		

P-value significant level at <0.05

Table 5 shows there is a significant association between the level of knowledge and the stream of the students (p=0.004).

TABLE 6: Association between level of knowledge regarding basic life support and selected profession related variables   **n=158**

Variables	Level of knowledge		X^2	P-value
	Adequate No. (%)	Inadequate No. (%)		
BLS training				
Yes	9 (5.7)	47 (29.7)	1.217	0.270
No	24 (15.2)	78 (49.4)		
Time of last training (n=56)				
≤1year ago	5 (8.9)	16 (28.6)	-	0.294*
>1 year ago	4 (7.1)	31 (53.4)		
Duration of training (n=56)				
1 day	4 (7.1)	26 (46.4)	1.510	0.470
>1 day	5 (8.9)	21 (37.5)		
Exposure to cardiac arrest cases				
Yes	19 (12.0)	89 (56.3)	2.240	0.134
No	14 (8.9)	36 (22.8)		
CPR performed				
Yes	17 (10.8)	83 (52.5)	2.490	0.115
No	16 (10.1)	42 (26.6)		

Fisher's Exact test

Table 6 shows there is no significant association between the level of knowledge and BLS training, time of last training, duration of training, exposure to cardiac arrest cases, and performance of CPR.

DISCUSSION

Regarding professional information, 35.4% of the respondents had received BLS training; among them, 35.7% had received BLS training 1 year ago, and 53.5% had attended 1 day of BLS training. Majority (68.4%) of the respondents in this study had been exposed to a patient with cardiac arrest, with 35.1% involved in case management. Among them, 63.3% had performed CPR, and 75% had practiced CPR in a hospital setting. While all respondents were aware of BLS, 86% had never attended any BLS training. Similar findings were observed in a study where 86% of participants had witnessed CPR being performed, and 58% had carried it out themselves[11]. Comparable findings were noted in another study, where only 4 out of 49 participants had received BLS training[12].

Additionally, 32.5% of participants in a related study reported no formal BLS training[13].

Regarding knowledge, the majority of the respondents answered correctly about the meaning (67.1%) and purposes (79.1%) of BLS. 98.7% answered cardiac arrest as the indication of BLS, which is consistent with the findings where 90% of respondents responded cardiac arrest as the indication of CPR[11].

Most (91.1%) of the respondents knew the initiation of BLS. However, a study revealed that 40% of the respondents said that starting CPR as an immediate action if somebody is not responding[11].

The majority (67.1%) of them correctly answered about the algorithm of BLS. 67.1% of them correctly answered about the algorithm of BLS. 65.2 % scene safety, 81.0 % check responsiveness by gently shaking shoulders and shouting, "Are you okay?" 95.6% answered about checking carotid pulse in an unconscious person and the maximum time is 10 seconds (51.9%), and 69.6% answered that putting cheeks close to the nose and mouth of the victim to check breathing, The respondents answered about the method of open airway by using head tilt-chin lift maneuver (84.8%) for non-trauma case and jaw thrust maneuver (53.8%) for a patient with suspected cervical spine injury. These findings were supported by a study which shows that 62% stated circulation, airway, and breathing as the latest CPR sequence, 94.3% answered supine position on a firm flat surface as the position of the patient during resuscitation and 62% of the respondents stated CAB as the latest CPR sequence. 76% of the respondents said head tilt, chin lift, or jaw thrust (10). 63.3 % of the respondents gave the correct answer to ensure scene safety[12].

Most of the respondents (82.9%) didn't answer the correct method of opening the airway in cardiac arrest patients with no gag reflex. Only 36.7% of the respondents knew to activate EMS and this is similar to another finding, which was 30.6% of the respondents knew to activate EMS[12].

The majority (94.3%) of the respondents gave correct answers on the proper position of the victim before resuscitation. 62.7% of the respondents answered CAB as the correct sequence of BLS, 57.0% answered that 100 to 120 times/minute was the correct rate of chest compression, the ratio of chest compression to rescue breath (79.7%) was 30:2 and 75.9% answered correct placement of electrodes of AED. This finding was supported by another study which shows that 82% of the respondents said that the number of compressions done

in 1 min is 100. Regarding depth of compression 66% of the respondents said that the depth of compression during CPR is 1.5-2 inches, 52% of the respondents said 30:2 as the ratio of CPR, single rescuer[11] (11). Ratio of cardiac compression was 73.75%, location of compression 77.24%, sequence of BLS 71.78% and depth of CPR 71.32% (13). 65.3% of participants were aware of high-quality CPR, and only 49% knew the exact location of chest compression. The chest compression to ventilation ratio for every single rescuer and two rescuers was known as 40.8% and 57.1% participants respectively[12].

The majority (94.3%) of the respondents gave correct answers on the proper position of the victim before resuscitation. 62.7% of the respondents answered CAB as the correct sequence of BLS, 57.0% answered that 100 to 120 times/minute was the correct rate of chest compression, the ratio of chest compression to rescue breath (79.7%) was 30:2 and 75.9% answered correct placement of electrodes of AED. Contrast findings show that 44.9 % of the respondents were able to answer the correct rate of chest compression, 41.9% knew 10 sec. as the maximum time for checking pulse, 49% of the respondents said mid-chest as the location of chest compression, whereas 81.6% couldn't answer the correct sequence of using AED (12). Only 26.6% answered to ensure scene safety at first, 12.0% of the respondents answered to activate EMS and 18.5% knew the correct rate of chest compression[13]. 82% of the respondents said that the number of compressions done in 1 minute is 100, Regarding the depth of compression 66% of the respondents said that the depth of compression during CPR is 1.5-2 inches, 52% of the respondents said 30:2 as the ratio of CPR, single rescuer[11]. Ratio of cardiac compression was 73.75%, location of compression 77.24%, sequence of BLS 71.78% and depth of CPR 71.32% (14). 65.3% of participants were aware of high-quality CPR, and only 49% knew the exact location of chest compression. The chest compression to ventilation ratio for every single-rescuer and two rescuers was known 40.8% and 57.1% respectively[12].

In this study, majority (65.2%) of the respondents had good knowledge of BLS. Other study shows that 87.9% of the participants had very poor knowledge[13] (13), 84.1% had good knowledge[14] (14), 55% had a moderate level of knowledge, and 66 % had inadequate knowledge of BLS[11].

There is a significant association between the level of knowledge and with nursing stream (p=0.004). Another study shows that there was an association between the level of knowledge and practice with p = 0.0319[14]. There is no significant association between

the level of knowledge and BLS training, time of last training, duration of training, exposure to cardiac arrest cases, and performance of CPR. In contrast, there is a significant association between dependent and independent variables[9]. Another study's results show that students who had previously received BLS training had significantly higher knowledge scores (P <0.001)[13]. There was an association between the level of knowledge and practice with p = 0.0319[15]. The association between knowledge and nursing stream reflects the influence of formal healthcare education, while the link between knowledge and practice highlights the role of hands-on experience. The lack of association with BLS training or exposure may result from variations in training quality or frequency. Other studies suggest that regular training and practical exposure are key to maintaining BLS competence.

CONCLUSIONS

The study found that nursing students have good knowledge of basic life support (BLS), with gaps in EMS activation, airway management, and AED use. A significant association exists between knowledge and nursing stream, but no significant association was found with BLS training, training duration, exposure to cardiac arrest, or CPR performance. Clinical exposure and regular updates should be provided to ensure students remain informed on the latest BLS guidelines.

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