



Simulation-Based Education on Knowledge and Skills Regarding Basic Life Support: Young Adults in Selected Higher Secondary Schools

Dharti Patel* and Swapnil Rahane

Department of Medical-Surgical Nursing, Parul Institute of Nursing, Parul University, Vadodara, Gujarat

*Email ID: dhartip208@gmail.com

ABSTRACT

An event such as Sudden Cardiac Death (SCD) is typically defined as a sudden, unpredictable cardiac death caused by the heart within one hour. A cardiac arrest is the leading cause of death and morbidity in the community. Everyone should know basic life support (BLS). The main objective is to determine the effectiveness of simulation-based education on basic life support knowledge and skills among young adults. Pre-experimental research design was used. Total 200 young adults of higher secondary school of Vadodara were selected by nonprobability convenience sampling technique. Sociodemographic, Self-structured knowledge questionnaire, and the checklist tool was used in this study. In the data collection, the knowledge and skills were assessed before and after the execution of Simulation-Based education on Basic Life Support (BLS). The session was last for 60 minutes. The tool was validated by clinical expertise and experienced teachers. Data were analysed by using SPSS software 25.0. The study showed statistically significant differences in sum score of the Pre-test and after executing simulation-based education on Basic Life Support for knowledge score [Pre-test: 10.71 (3.21), Post-test: 14.935 (2.43) ($p < 0.05$)] for skills score [Pre-test: 9.5 (1.428), Post-test: 13.46 (1.251) ($p < 0.05$)]. Simulation-based learning on Basic Life Support resulted in a significant improvement in each of the five assessment aspects ($p < 0.05$). Sociodemographic variables were significantly associated with knowledge score. There was no significant association between skills score and sociodemographic variables. The main inference of this present study was the young adults to learn and improve their knowledge, and skills to perform BLS through Simulation-Based education. Furthermore, students' knowledge, skills and confidence towards BLS improved after training program.

Keywords: Basic Life Support, Cardiopulmonary Resuscitation, Simulation-Based Education, Knowledge, and Skills.

Received 09.08.2023

Revised 30.10.2023

Accepted 22.11.2023

INTRODUCTION

Sudden cardiac failure may occur in people with or without pre-existing heart disease, a condition known as cardiac arrest [1]. It's possible that it'll occur suddenly or in association with other symptoms. If quick care is not taken during a cardiac arrest, the outcome is often death [2].

Sudden death is also caused by heart attacks, electrical shocks, drownings, chokings, suffocations, trauma, medication reactions, and allergies [3]. They have the highest chance of surviving if they receive emergency treatment known as cardiopulmonary resuscitation (CPR) [4].

Basic Life Support (BLS) refers to the emergency medical procedures of administering resuscitation and performing first aid on a victim of sudden cardiac arrest [5]. Recognizing respiratory and cardiac arrest and starting right cardiopulmonary resuscitation are essential first steps in keeping a person alive until transport to a hospital or the availability of more advanced life support [6].

A Sudden Cardiac Death (SCD) occurs when the heart suddenly stops beating within one hour of the onset of acute symptoms. The incidence of out-of-hospital cardiac arrest (OHCA) might range between 70 and 80 percent [7], which is linked with high morbidity and death [8].

Indians suffer from heart disease 10 years before the West. Sudden Cardiac Arrest (SCA) in children is growing due to sedentary lifestyles, diabetes, increased alcohol intake, smoking, stress, and hypertension. Some patients have no risk factors. Encourage kids to obtain frequent check-ups to raise SCA awareness [9]. Many young Indians have died from cardiac arrest. Kannad actor Puneet Rajkumar died after a morning exercise. Untimely deaths make us reconsider young coronary artery disease. India is a young nation. Unexpected deaths are more common. Heart illnesses cause the most deaths in India, and the number is rising [9].

Since Indians have CVD a decade higher than others, many cardiac attacks occur between 30 and 69. Nearly 30% of heart attacks are abrupt and unexpected in otherwise healthy persons. Experts are concerned about the Indian CVD epidemic's quick spread, early start, and high case fatality rate. "Between 1990 and 2015, the prevalence of CVD climbed by more than 50% in India, and 10 percent of a billion-person population may suddenly have a heart attack [9].

In India, male heart attack mortality jumped from 48 per 100,000 in 2000 to 61 per 100,000 in 2015. The rise was similarly dramatic in the 40-44, 45-49, 50-54, and 55-59 age groups (from 85 to 106 per 100K) (from 357 to 408) [9].

Data reported by WHO, Heart disease is the top cause of mortality globally over the past 20 years. More individuals than ever are dying from it. More than 2 million heart disease deaths have occurred since 2000, reaching approximately 9 million in 2019. 16% of all deaths are from heart disease. Over half of the 2 million extra deaths occurred in the WHO Western Pacific area. The European area has witnessed a 15% drop in heart disease deaths [10].

As report publish in 2020, more than 356,000 out-of-hospital cardiac arrests (OHCA) occur annually in the United States, with over 90% of these being deadly. The incidence of non-traumatic OHCA's assessed by EMS in people of any age is estimated to be 356,461, or about one thousand every day [11].

In recent years, the recurrence of Cardiac Arrest episodes in public places has prompted young adults to pay more attention to identifying emergencies [12]. If properly taught, young adults residing in hostels, traveling from school to home, attending tutoring sessions, and playing in playgrounds could conduct or assist with Basic Life Support (BLS) in cardiac arrest situations.

It was found that the majority of the domestic research on the current state of knowledge and practice of CPR has been directed at medical staff, medical students, and the general public. However, little is known about the current situation of the Knowledge and Practice of CPR among young adult higher secondary students.

MATERIAL AND METHODS

The Quantitative approach and one group pre-test and post-test research design were adopted to conduct this study. A total of two hundred young adults from higher secondary schools were calculated by Taro Yamane Formula, chosen by a non-probability convenience sampling technique from selected higher secondary schools, in Vadodara, Gujarat, India. Bertalanffy's General system theory-based conceptual framework model was implemented for the study. The Knowledge and skills of young adults were checked by using a Self- structured knowledge questionnaire and Skill checklist on Basic Life Support (BLS). The training program consisted of theoretical and hands-on sessions and was conducted by AHA certified trainer in basic and advanced life support. The 30-minute theory session covered the chain of survival (recognizing a cardiac arrest, call for an automated external defibrillator [AED], how to perform BLS, and the importance of public access to defibrillation by means of an AED).

Inclusion Criteria

All the young adults who are studying in the higher secondary schools of Vadodara. Those who don't have any physical health problems such as Hands fracture, or backaches, And Students who don't have previous knowledge of BLS.

Data Collection

The researcher developed the tool for the data collection which is divided into three sections. The questionnaire contain: 1) Socio-Demographic information 2) Self- structured knowledge questionnaire, and 3) Skill checklist on Basic Life Support. The researcher explained the goal and importance of the study to the participants and asked for their assistance. The questionnaire covers the five different aspects such as Anatomy and physiology of the heart, BLS / CPR and terminology, Indication BLS/ CPR, Procedure BLS/ CPR, and Scenario based questions on BLS/CPR. Skill checklist consist of skill-based questions on Basic Life Support. The self-structured questionnaire and skill checklist with demographic tool were sent to experts for the purpose of ensuring content validity. A total of 18 experts were selected based upon their clinical expertise, experience, and interest in the problem being studied. The experts were asked to evaluate the items on the tool to determine whether they were appropriate and relevant. The experts were from the field of nursing and medical. The tool was received from the 13 experts. The items have been simplified and arranged in a more logical manner.

Data Analysis

The data analysis was performed using SPSS Version 25.0 (Statistical Package for the Social Sciences). A descriptive and an inferential statistical approach was used to analyze the data. Demographic characteristics were presented using descriptive statistics. The frequency, percentage, mean, and standard deviation were used to assess the level of knowledge and skills. Inferential statistics were used (paired 't'-test to assess the effectiveness of Simulation based education and chi-square test was used to Find an

association between the pre-test levels of knowledge and skills on basic life support with the socio demographic variables of participants).

RESULT

SECTION I - Frequency and percentage distribution of participants as per demographic variables.

Table 1 shows that out of 200 participants, 102 (51%) were 15-16-year-olds, while 98 (49%) were 17-18-year-olds. There are 108 males (54%) and 92 females (46%). 189 (94.50%) are Hindus, 10 (5%) are Muslims, and 1 (0.50%) are Christian. In total, 172 (86%) are rural and 28 (14%) are urban. Family incomes were as follows: 86 (43%), 61 (31%), 27 (13.50%), and 26 (13%), respectively. A total of 39 (19.5%) had graduated, 46 (23%) had higher secondary, 108 (54%), and 7 (3.5%) had no education. 20 (10%), 65 (32.5%), 111 (55.5%), and 4 (2%), respectively, participants, are Government Employees, Private Employees, Self-Employed, and Unemployed. There were 114 nuclear families (57%) and 86 combined families (43%). 76.3% of participants had previous knowledge of Basic Life Support and Cardiopulmonary Resuscitation, whereas 124 (62%) did not. 42 (21%), 16 (8%), 3 (1.5%), and 18 (9%) had previous knowledge of the information source. 164 (82%) of participants considered Basic Life Support and Cardiopulmonary Resuscitation essential, whereas 36 (18%) did not.

Table 1: Frequency Distribution of participants as per Demographic Variables (n=200)

No.	Demographic Variable	Frequency	Percentage (%)
1	Age		
	15 - 16 Years	102	51%
	17 - 18 Years	98	49%
2	Gender		
	Male	108	54%
	Female	92	46%
3	Religion		
	Hindu	189	94.50%
	Muslim	10	5%
	Christian	1	0.50%
4	Type of Residential Area		
	Urban	28	14%
	Rural	172	86%
5	Monthly Income of The Family (In Rs)		
	Below 10000 Rs	86	43%
	10001-20000 Rs	61	31%
	20001-30000 Rs	27	13.50%
	30001 Rs - Above	26	13%
6	Education Status of Parents		
	Illiterate	7	3.50%
	Primary	108	54%
	Higher Secondary	46	23%
	Graduate	39	19.5%
7	Occupation Status of The Parents		
	Government Employee	20	10%
	Private Employee	65	32.50%
	Self-Employee	111	55.50%
	Unemployed	4	2%
8	Type of Family		
	Joint Family	86	43%
	Nuclear Family	114	57%
9	Previous Knowledge About BLS & CPR		
	Yes	76	38%
	No	124	62%
10	If Yes, Source of Information Through		
	No any Information Source	121	60.50%
	Media	42	21%
	Books	16	8%
	Relatives	3	1.50%
	Friends	18	9%
11	Do You Feel BLS & CPR Things We Need to Learn		
	Yes	164	82%
	No	36	18%
12	Do You Have Any Healthcare Professional Members in Your Family?		

	Yes	46	23%
	No	154	77%
13	Have You Ever Seen a Collapsed Victim Previously?		
	Yes	82	15%
	No	118	85%
14	If Yes, Have You Tried to Help Him or Check His Condition?		
	Not Applicable	118	59%
	Yes	48	24.00%
	No	34	17.00%
15	Did You Participate in Any Lifesaving or Emergency Management Training Previously?		
	Yes	22	10%
	No	178	90%

SECTION II - Comparison of Pre and Post-test Knowledge and Skill Scores of participants by Frequency and percentage

Data presented in Table 2 depicts- Comparison of Pretest and Post-test Knowledge Scores participant. It is worth noting from data that, in posttest 5(2.5%) had Poor Score, 115(57.5%) had Average Score 78(39%) participants had good knowledge and 2(1%) participants had excellent knowledge, whereas in the pretest 103(51.5%) had Poor Score, 76(38%) participants had Average knowledge, 21(10.5%) had good knowledge and none of the participants had excellent knowledge. Similarly, Comparison of Pretest and Post-test Skills Scores participant were stated. It is worth noting from data that, in posttest 187(93.5%) had Average Score, and 13(6.5%) participants had good Score, whereas in the pretest 146(73%) had Poor Score, 54(27%) participants had Average Score, and none of the participant had good and excellent Score.

Table 2 - Comparison of Pre and Post-test Knowledge and Skill Scores of participants by descriptive analysis (Frequency and Percentage)(n=200)

Level of Score	Knowledge score		Skills score	
	Pre-Test F (%)	Post-test F (%)	Pre-Test F (%)	Post-test F (%)
Poor Score (≤10)	103(51.5%)	5(2.5%)	146(73%)	0(0%)
Average Score (11- 15)	76 (38%)	115 (57.5%)	54 (27%)	187 (93.5%)
Good Score (16 - 20)	21 (10.5%)	78 (39%)	0 (0%)	13 (6.5%)
Excellent Score (21 - 25)	0 (0%)	2 (1%)	0 (0%)	0 (0%)

F- Frequency ;%- Percentage

The data presented in Table 3 shows that maximum knowledge gained (25.5%) by the participants was in area of Scenario based questions on BLS/CPR. The second highest knowledge gained is in the area of Anatomy and physiology of the heart. Also reveals that in the area of Procedure BLS/ CPR knowledge (16.12%). Least knowledge gained in the area of Indication BLS/ CPR.

Table 3: Item wise Knowledge Score of participants regarding Basic Life Support (BLS)(n=200)

Knowledge Question	Maximum Possible Score	Mean		Mean %		Gain %	
		Pretest	Posttest	Pretest	Posttest	Actual Gain	Possible Gain
1) Anatomy and physiology of the heart	3	2.465	2.98	82%	99%	17%	18%
2) BLS / CPR and terminology	1	0.74	0.9	74%	90%	16%	26%
3) Indication BLS/ CPR	2	0.56	0.865	28%	43%	15%	72%
4) Procedure BLS/ CPR	16	5.505	8.02	34%	50.12%	16%	66%
5) Scenario-based questions on BLS/ CPR	3	1.44	2.205	48%	73.50%	26%	52%

%- Percentage

Comparison of overall Knowledge and Skills Scores of participants on Basic Life Support (BLS) (paired t-test)

Data presented in Table 4 comparison of the Pretest and Posttest Knowledge and skills Scores of participants. The knowledge and skills score of participants improved in the posttest after the intervention of Simulation-Based Education on Basic Life Support (BLS) as compared to the pretest. As per the paired

't' test, the Calculated 't' value at 199 degree of freedom [knowledge 17.231, and skills 30.139 (1.96) is <0.05 level of significance]. Simulation-Based Education is significant in increasing the knowledge of young adults of higher secondary school.

Table 4- Comparison of overall Knowledge and Skills Scores of participants on Basic Life Support (BLS) (paired t-test)(n=200)

	Test	Mean Score	Standard Deviation	df	Calculated 't' Value	't' Table Value	p-value
Knowledge Score	Post-test	14.94	2.43	199	17.231	1.96	0.000
	Pre-test	10.71	3.21				
Skills Score	Post-test	13.46	1.251	199	30.139	1.96	0.01*
	Pre-test	9.8	1.428				

df- Degree of Freedom

Comparison of Pretest and Posttest Knowledge Scores of participants on various aspects of knowledge questionnaire on Basic Life Support

In Table 5, participants' knowledge scores on various aspects of the Basic Life Support knowledge questionnaire are compared. The calculated 't' value is greater than the tabulated 't' value of 1.96 at 199 degrees of freedom, which indicates that Simulation-Based Education significantly increases participant knowledge in all aspects of the Basic Life Support Knowledge questionnaire.

Table 5- Comparison of Pretest and Posttest Knowledge Scores of participants on various aspects of the knowledge questionnaire on Basic Life Support (n=200)

Area	Test	Mean Score	Standard Deviation	df	Calculated 't' Value	't' Table Value	p-value
Anatomy and physiology of the heart	Post-test	2.94	0.24	199	9.482	1.96	0.002*
	Pre-test	2.47	0.72				
BLS/CPR and terminology	Post-test	0.91	0.29	199	5.683	1.96	0.00*
	Pre-test	0.74	0.44				
Indication BLS/CPR	Post-test	0.87	0.65	199	6.703	1.96	0.00*
	Pre-test	0.56	0.647				
Procedure BLS/CPR	Post-test	8.02	1.96	199	14.926	1.96	0.00*
	Pre-test	5.51	2.282				
Scenario- based questions on BLS/CPR	Post-test	2.21	0.772	199	6.703	1.96	0.002*
	Pre-test	1.44	0.774				

df- Degree of Freedom

SECTION III -

Table 6 - Association of the demographic variables with the pretest knowledge score

Data presented in the Table 6 as per the Chi-square analysis revealed that the calculated p-value is < 0.05 level of significance hence there was a significant association between young adult's knowledge regarding Basic Life Support and socio-demographic variables (Type of residential area, monthly income of the family, education status of parents, previous knowledge about BLS & CPR, source of information, seen a collapsed victim previously, and helps collapsed victim). If the calculated p-value is greater than 0.05 level of significance hence, there was no significant association between young adult's knowledge regarding Basic Life Support and socio-demographic variables like Age, Gender, Religion, Occupation status of the Parents, type of family, samples feel BLS & CPR things we need to learn, Healthcare professional members in their family, Participated in lifesaving and emergency management training previously.

Table 6: Association of the demographic variables with the pretest knowledge score (n=200)

Sr. No.	Demographic Variable	F	Knowledge Score			χ^2 Value	df	p-Value
			Poor	Average	Good			
1	Age							
	15 - 16 Years	102	50	40	12	0.647	2	0.72
	17 - 18 Years	98	53	36	9			
2	Gender							
	Male	108	52	44	12	1.06	2	0.58
	Female	92	51	32	9			
3	Religion							
	Hindu	189	94	74	21	7.871	4	0.09
	Muslim	10	0	1	9			
	Christian	1	0	1	0			
4	Type Of Residential Area							
	Urban	28	9	13	6	6.681	2	0.03*
	Rural	172	94	63	15			
5	Monthly Income of The Family (In Rs)							
	Below 10000 Rs	86	52	31	3	27.659	6	0.0001*
	10001-20000 Rs	61	36	20	5			
	20001-30000 Rs	27	11	11	5			
	30001 Rs - Above	26	4	14	8			
6	Education Status of Parents							
	Illiterate	7	5	2	0	54.627	6	0
	Primary	108	78	28	2			
	Higher Secondary	46	9	28	9			
	Graduate	39	11	18	10			
7	Occupation Status of The Parents							
	Government Employee	20	6	9	5	7.568	6	0.27
	Private Employee	65	35	23	7			
	Self-Employee	111	60	42	9			
	Unemployed	4	2	2	0			
8	Type of Family							
	Joint Family	86	44	31	11	0.909	2	0.63
	Nuclear Family	114	59	45	10			
9	Previous Knowledge About BIs & CPR							
	Yes	76	26	37	13	15.891	2	0.0003*
	No	124	77	39	8			
10	If Yes, Source of Information Through							
	No Any Information	121	75	38	8	16.931	8	0.03*
	Source							
	Media	42	17	19	6			
	Books	16	5	8	3			
	Relatives	3	1	2	0			
	Friends	18	5	9	4			
11	Do You Feel BIs & CPR Things We Need to Learn							
	Yes	164	80	64	20	4.053	2	0.13
	No	36	23	12	1			
12	Do You Have Any Healthcare Professional Members in Your Family?							
	Yes	46	21	21	4	1.502	2	0.47

13	No	154	82	55	17			
	Have You Ever Seen a Collapsed Victim Previously?							
	Yes	82	52	29	1	15.485	2	0.0004*
	No	118	51	47	20			
14	If Yes, Have You Tried to Help Him or Check His Condition?							
	Not Applicable	118	51	47	20	16.69	4	0.002*
	Yes	48	28	19	1			
	No	34	23	7	0			
15	Did You Participate in Any Lifesaving or Emergency Management Training Previously?							
	Yes	22	10	8	4	1.582	2	0.45
	No	178	93	68	17			

*F- Frequency ; χ^2 - Chi-square ; df- Degree of Freedom; * Significant*

Association of the demographic variables with the pretest skills score

Findings related to the association of the demographic variables with the pretest Skills score. The calculated p-value is > 0.05 , hence there was no significant association between young adult's skills regarding Basic Life Support and the socio-demographic variable.

DISCUSSION

Study findings revealed that students who participated in this study and received simulation-based education on basic life support gained significant knowledge and skills. In addition, the results are supported by a survey research study conducted by Rishit Chilappa in 2021 on basic life support awareness among high school students. 105 high schoolers were surveyed about basic life support awareness. About 70% of students correctly answered questions about basic life support but lacked in skills of basic life support steps. In addition, many students would like to take basic life support training in higher secondary school [13].

According to the findings of the study, basic life support practice is also assessed by an observational study conducted in 2019 by Sobitha Bansal. 60.8 % of the 100 participants were higher secondary students between the ages of 17-18, and the majority were males. The majority of male participants 83.3% showed strong understanding of basic life support, with 95.7% familiar with cardiopulmonary resuscitation. Neither sex nor age distribution were associated with students' knowledge of basic life support in this study. In spite of this, there is a significant association between the academic year and the source of basic life support information. It was also concluded that students need the right training program to gain in-depth knowledge and skills about basic life support [14].

In the present study, most participants scored average on basic life support skills. Stemi Stanly et al. conducted an interventional study in high school students to assess their Basic Life Support skills, which supported this finding. We used convenience sampling to pick 160 high school students. Using high-fidelity manikins and skill assessment checklists, participants' skill performance was assessed on CPR training based on cardiac arrest scenarios. Study Results showed that Pre-training scores averaged $2.6 (\pm 1.9)$. Post-training and one-week recall scores were $12.44 (\pm 0.89)$ and $12 (\pm 1.05)$. Post-training scores differed ($p < 0.001$). One-week recall scores and post-training scores were similar, showing high short-term retention of BLS skills. High school students lack basic life support skills. Hands-on training helps them learn. It is important to conduct a similar training program for higher secondary school students to improve skills [15].

The basic life support training that is provided to young adults seems to be highly effective, especially when you consider how little prior knowledge they have. We observed a significant improvement in knowledge and skill. In the community, more trained young adults may minimize the reluctance to perform bystander CPR and improve outcomes after the sudden cardiac collapse.

CONCLUSION

The major conclusion of this current research was that young adults are able to learn how to conduct Basic Life Support (BLS) through the use of instruction that is based on simulation. It has the potential to improve their knowledge as well as their skills about Basic Life Support (BLS), hence increasing their confidence in their ability to execute Basic Life Support (BLS). In addition, by the end of the training program, students had significantly increased their BLS knowledge and skills.

REFERENCES

1. American Heart Association. About Cardiac Arrest. www.heart.org. <https://www.heart.org/en/health-topics/cardiac-arrest/about-cardiac-arrest>. Published 2022. <https://www.heart.org/en/health-topics/cardiac-arrest/about-cardiac-arrest>
2. Matthew Hoffman. Chamber of the heart. <https://www.webmd.com/heart/picture-of-the-heart>. Published 2019. <https://www.webmd.com/heart/picture-of-the-heart>
3. American Heart Association. (2022). Hypertrophic Cardiomyopathy (HCM). American Heart Association. Published May <https://www.heart.org/en/health-topics/cardiomyopathy/what-is-cardiomyopathy-in-adults/hypertrophic-cardiomyopathy>
4. JAMA. Standards and guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC). *JAMA*. Published online 1980:244,453-509.
5. Law insider. Definition of Basic Life Support. Law insider. Published July 2021. <https://www.lawinsider.com/dictionary/basic-life-support>
6. skills training group. Adult Basic Life Support (BLS): Assessment, steps, Algorithm. skills training group. Published 2020. <https://www.skillstg.co.uk/blog/adult-basic-life-support/>
7. Berdowski J, Berg RA, Tijssen JGP, Koster RW. Global incidences of out-of-hospital cardiac arrest and survival rates: Systematic review of 67 prospective studies. *Resuscitation*. 2010;81(11):1479-1487. doi: 10.1016/j.resuscitation.2010.08.006
8. who.int. Cardiovascular Diseases (CVDs). World Health Organization. Published 2021. [https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds))
9. M W. Digital Newspaper & Magazine . Press Reader.com (2022). Published 2022. <https://www.pressreader./search?query=sudden%20cardiac%20death%20among%20young%20indian%20&orderBy=Relevance&searchFor=Articles>
10. WHO reveals leading causes of death and disability worldwide. World Health Organization. Published 2020. <https://www.who.int/news/item/09-12-2020-who-reveals-leading-causes-of-death-and-disability-worldwide-2000-2019>
11. Virani SS, Alonso A, Benjamin EJ, et al. (2020). Heart Disease and Stroke Statistics—2020 Update: A Report From the American Heart Association. *Circulation*.;141(9). doi:10.1161/CIR.0000000000000757
12. Strategies to Improve Cardiac Arrest Survival. (2015). National Academies Press; doi:10.17226/21723
13. Chilappa R, Waxman MJ. (2021). Basic Life Support Awareness and Knowledge in High School Students. *Kans J Med*. 14:38-41. doi:10.17161/kjm.vol1414611
14. Sobitha Bansal. (2019). Knowledge, Attitude and Practice of CPR among Higher Secondary Students. *International Journal of Research in Engineering, Science and Management*. 2(8):145-147.
15. Stemi Stanly, Akhila Babu, Ramesh Unnikrishnan. (2017). Basic Life Support Skills for high school students pre and post-cardiopulmonary resuscitation training- An interventional study. *Indian Journal of Respiratory Care* . 2017;6(1):90-98

CITATION OF THIS ARTICLE

Dharti Patel and Swapnil Rahane. Simulation-Based Education on Knowledge and Skills Regarding Basic Life Support: Young Adults in Selected Higher Secondary Schools. *Bull. Env. Pharmacol. Life Sci.*, Vol 12 [12] November 2023: 20-27