https://doi-ds.org/doilink/09.2024-81924257/GIJNR

Glorious International Journal of Nursing Research
(An International Peer-Reviewed Refereed Journal)
ISSN: 2583-9713 www.gloriousjournal.com

A study to assess the effectiveness of a demonstration on knowledge and practice regarding Basic Life Support of senior secondary school students in a selected school at Haldwani

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Article Information:

Type of Article: *Original Article* **Received On:** *27th August 2024*

Accepted On: 30st *August 2024* **Published On**: *10th September 2024*

Abstract:

Introduction: Basic Life Support (BLS) is a critical skill for emergency medical intervention, focusing on maintaining airway and supporting circulation during cardiac or respiratory arrest until advanced support is available. Teaching BLS in schools is essential for equipping students with fundamental life-saving skills. **Methods:** A quantitative quasi-experimental pretest-posttest design was employed to evaluate the effectiveness of a BLS training program among 100 senior secondary school students in Haldwani. Non-probability convenience sampling was used to select participants. Data collection involved a structured knowledge questionnaire, an observation practice checklist, and a socio-demographic proforma. The study was conducted in three phases: pre-test (to assess initial knowledge and practice), BLS demonstration over four days, and post-test (to evaluate changes in knowledge and practice) on Day 7. Pretesting, reliability testing, and validation of tools were completed prior to the main study, with a pilot study confirming methodological feasibility. **Results:** The study sample predominantly included students aged 15-17 years (70%) and males (59%). Notably, 83% of students initially lacked BLS knowledge, and 22% had previously assisted in emergency situations. There was no significant association between pre-test scores and socio-demographic variables. The mean percentage difference in pre-test and post-test knowledge scores showed a 3% improvement ($t = 15.99$, $p = 0.00$), and practice scores increased by 12.7% ($t = 32.76$, $p = 0.00$). Both improvements were statistically significant at the 0.05 level. **Conclusion:** The BLS demonstration program significantly enhanced both knowledge and practical skills among high

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school students. The results support the integration of BLS training into school curricula to better prepare students for emergency situations.

Key words: Demonstration, Knowledge, Basic Life Support, Senior Secondary school students.

Introduction:

Basic Life Support (BLS) is a critical care technique utilized by first responders, healthcare providers, and public safety professionals to assist individuals experiencing cardiac arrest, respiratory distress, or an obstructed airway. According to the American Heart Association (AHA), BLS encompasses the identification of signs associated with sudden cardiac arrest, heart attack, stroke, and foreign body airway obstruction, as well as the implementation of cardiopulmonary resuscitation (CPR) and defibrillation using an automated external defibrillator (AED). The goal of BLS is to ensure an open airway and maintain circulation until advanced medical support can be administered.[1]

Health emergencies necessitate prompt medical intervention to stabilize and potentially save lives, with Basic Life Support being crucial in these scenarios. The importance of learning BLS is underscored by its role in providing immediate care during emergencies. Defined as the practice of maintaining an open airway and supporting circulation without specialized equipment in cases of cardiac or respiratory arrest, BLS is fundamental to emergency medical interventions.[1] The heart, central to the cardiovascular system, is responsible for oxygenating the body and combating infections. The health of the heart is influenced by lifestyle factors such as diet and physical activity. Heart disease, which encompasses conditions like coronary artery disease, arrhythmias, and congenital defects, can often be mitigated through healthy lifestyle choices. Cardiac arrest, a severe form of heart disease, is characterized by the heart's sudden inability to pump blood effectively, leading to loss of consciousness and abnormal or absent breathing. Without immediate treatment, cardiac arrest typically results in death.[2]

In India, cardiovascular diseases (CVDs) are the leading cause of mortality, with ischemic heart disease and stroke accounting for over 80% of CVD-related deaths. The Global Burden of Disease study (2010) reveals that nearly 25% of all deaths in India are due to heart disease, with an age-standardized CVD death rate higher than the global average. Despite this, there remains a significant knowledge gap, particularly in rural areas. Basic Life Support is a crucial

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component of the chain of survival and plays a key role in reducing mortality rates. The AHA estimates that immediate CPR could save between 100,000 and 200,000 lives annually, with 4% to 16% of patients who receive immediate CPR eventually being discharged from the hospital.[2]

Basic Life Support (BLS) is essential in emergency medical situations, not for treating the individual but for providing critical time until advanced medical help arrives. BLS involves maintaining adequate blood circulation, ensuring a clear airway, and supporting breathing. Effective BLS practices integrate critical thinking, problem-solving, communication, and teamwork to achieve the best possible outcomes for patients. These skills are integral to successful emergency interventions and underscore the need for widespread BLS education.

The primary objectives of this study are to evaluate the knowledge and practice of senior secondary school students regarding Basic Life Support (BLS), assess the impact of a BLS demonstration on their knowledge and practical skills, and investigate the association between their BLS knowledge and practice with selected socio-demographic variables.

Methods and Material:

Research Approach and Design

This study employs a quantitative approach to assess the effectiveness of a Basic Life Support (BLS) demonstration on senior secondary school students. The research design utilized is a quasi-experimental pre-test post-test design. This design is instrumental in allowing the researcher to select study participants, manipulate experimental variables, establish procedures for data collection, and determine the appropriate analysis methods for interpreting the data. Specifically, the design involves two groups: an experimental group that receives the BLS demonstration and a control group that does not. The pre-test is administered before the intervention (O1), followed by the BLS demonstration (X), and a post-test is conducted after the intervention (O2) to evaluate any changes in knowledge and practice.

Research Setting and Population

The research setting for this study is a school located in Haldwani. The population of interest consists of senior secondary school students from this selected school. The study aims to

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include a sample of 100 senior secondary school students who are representative of this population.

Sampling Techniques and Tools

To select the participants, a convenient sampling technique was employed, which involves choosing individuals who are readily available and willing to participate. The tools used for data collection include a Socio-Demographic Performa, structured questionnaires designed to gather data on students' demographic information; a Structured Knowledge Questionnaire, used to assess the students' knowledge of BLS; and an Observation Checklist, employed to evaluate the students' practical skills in performing BLS. These tools collectively facilitate a comprehensive assessment of both theoretical knowledge and practical application of BLS among the students.

Result:

Table No. 1: Frequency and percentage distribution of the Socio-demographic characteristics of the senior secondary school students

n=100

S.N0.	Variables	Frequency (f)	Percentage %
1.	**Age in years**		
	14-16	30	30
	17-19	70	70
2.	**Gender**		
	Male	59	59
	Female	41	41
3.	**Previous knowledge about BLS**		
	Yes	17	17
	No	83	83
4.	**Have experience of helping in health emergency**		
	Yes	22	22
	No	78	78

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Table 2: Area wise distribution of pre-test knowledge score of senior secondary school students regarding BLS

n=100

Sl. No.	Aspects of knowledge	No of items	Mean	Mean %	SD
1	Anatomy & physiology of the heart and lungs, Introduction of BLS	4	2.51	62.7	0.89
2	Meaning, definition and indication of BLS.	4	1.91	47.7	0.92
3	Cardiac arrest, steps include in BLS,	13	3.8	29.2	1.58
4	High quality adult CPR	10	2.63	26.3	1.72
5	Respiratory arrest, complication and recovery CPR.	5	1.24	24.8	1.06

Table 3: Area wise distribution of students on post-test knowledge score regarding BLS.

n=100

Sl. No.	Aspects of knowledge	No of items	Mean	Mean %	SD
1	Anatomy & physiology of the heart and lungs, Introduction of BLS	4	3.33	83.2	0.71
2	Meaning, definition and indication of BLS.	4	2.18	54.5	0.79
3	Cardiac arrest, steps include in BLS,	13	5.72	44	1.64
4	High quality adult CPR	10	4.30	43	1.62
5	Respiratory arrest, complication and recovery CPR.	5	2.35	47	1.31

Table 4: Distribution and comparison of pre-test and post-test knowledge score of senior secondary school student regarding BLS.

n=100

Sl. No.	Aspects of knowledge	Maximum score	Pre-test		Post-test	
			Mean	Mean %	Mean	Mean %
1	Anatomy & physiology of the heart and lungs, Introduction of BLS	4	2.51	62.7	3.33	83.25
2	Meaning, definition and indication of BLS.	4	1.91	47.7	2.18	54.5
3	Cardiac arrest, steps include in BLS	13	3.8	29.2	5.72	44

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4	High quality adult CPR	10	2.63	26.3	4.30	43
5	Respiratory arrest, complication and recovery CPR.	5	1.24	24.8	2.35	47

Table 5: Area wise distribution of students on pre-test practice score regarding BLS.

n=100

Sl. No.	Aspects of practice	No of items	Mean	Mean %	SD
1	Assess the victim	6	1.69	28.2	0.81
2	Compression	8	1.25	15.6	0.79
3	Airway	4	0.79	19.8	0.62
4	Breathing	4	0.56	14	0.51
5	Adequate rate	4	1.64	41	0.73

Table 6: Area wise distribution of students on post-test practice score regarding BLS.

n=100

S. No.	Aspects of practice	No of items	Mean	Mean %	SD
1	Assess the victim	6	4.10	68.3	0.88
2	Compression	8	5.01	62.7	1.17
3	Airway	4	2.5	62.5	0.79
4	Breathing	4	2.5	62.5	0.95
5	Adequate rate	4	2.5	62.5	0.85

Table 7: Distribution and comparison of pre-test and post-test practice score of senior secondary school student regarding BLS.

n=100

S.No	Aspects of knowledge	Maximum score	Pre-test		Post-test	
			Mean	Mean %	Mean	Mean %
1	Assess the victim	6	1.69	28.2	4.10	68.3
2	Compression	8	1.25	15.6	5.01	62.7
3	Airway	4	0.79	19.8	2.5	62.5
4	Breathing	4	0.56	14	2.5	62.5
5	Adequate rate	4	1.64	41	2.5	62.5

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Part-G: Distribution of pre-test & post-test knowledge scores

n=100

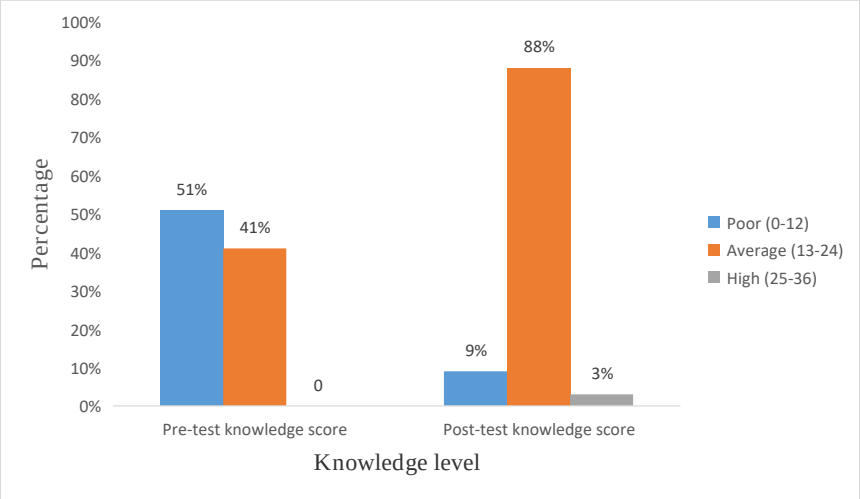

Figure No. 5: Bar diagram showing the percentage of pre-test & post-test knowledge scores

Part-H: Distribution of pre-test & post-test practice scores

n=100

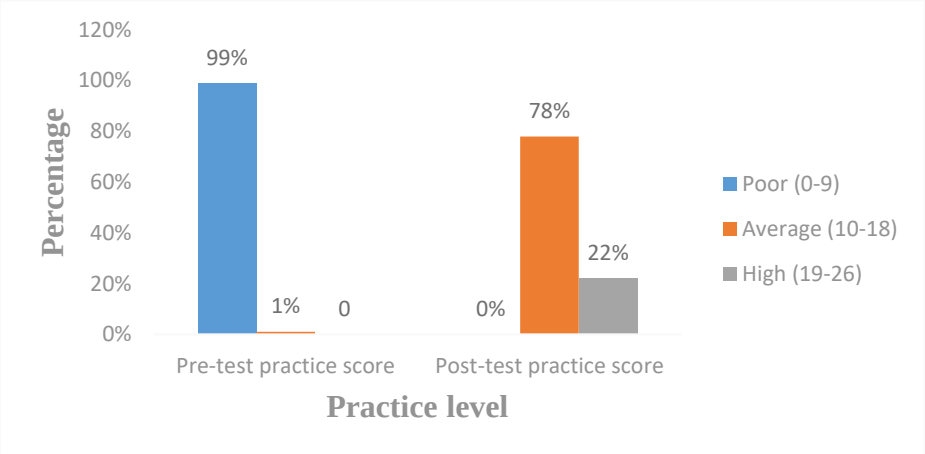

Figure No. 6: Bar diagram showing the percentage of pre-test & post-test practice scores

Table No 8: Effectiveness of BLS demonstration program on knowledge of senior secondary school students.

n=100

Knowledge Score	Mean	Mean %	SD	Enhanc-ement	Enhanc-ement %	Df	'p' value	't' value	Infer ence
Pre- test Knowledge score	12.1	60.5	3.31	5.8	3	99	.00	15.99	S

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Post-test knowledge score	17.8	63.5	3.6						

*Significant at 0.05 level.

Table No 9 Effectiveness of BLS demonstration on practice of senior secondary school students

n=100

Practice Score	Mean	Mean %	SD	Enhancement	Enhancement %	df	'p' value	't' value	Inference
Pre- test Practice score	5.9	59	1.48	10.6	12.7	99	0.00	32.76	S
Post-test practice score	16.5	71.7	2.6						

Table No 10: To find association between knowledge of senior secondary school students regarding BLS with selected socio-demographic variables.

n=100

S.N.	Variables	Knowledge score			df	Chi-square	Inference
		Median & its below (12)	Above median (12)	Total			
1.	Age in years a.14- 16 b.17 – 19	 19 40	 11 30	 30 70	df= 1	2= 0.33	NS
2.	Gender a. Male b. Female	 36 23	 23 18	 59 41	df= 1	2=0.24	NS
3.	Knowledge about BLS a. Yes b. No	 8 51	 9 32	 17 83	df= 1	2=1.20	NS
4.	Have experience of helping in health emergency a. Yes b. No	 11 48	 11 30	 22 78	df=1	2=0.94	NS

*Significant at 0.05 level. S=Significant and NS=Not Significant.

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Table No11: Association between the practice of the senior secondary school students regarding BLS demonstration with their selected socio-demographic variables.

n=100

S.N.	Variables	Pre-test practice score			df	Chi-square χ^2	Inference
		Median & its below (6)	Above median (6)	Total			
1.	Age in years						
	14 - 16	22	8	30	df= 1	2=1.30	NS
	17 – 19	43	27	70			
2.	Gender						
	Male	40	19	59	df= 1	2=0.49	NS
	Female	25	16	41			
3.	Knowledge about BLS						
	Yes	9	8	17	df= 1	2=1.30	NS
	No	56	27	83			
4.	Have experience of helping in health emergency						
	Yes	14	8	22	df= 1	2=0.02	NS
	No	51	27	78			

Discussion

The present study was conducted with an aim to identify effectiveness of a demonstration on knowledge and practice regarding Basic Life Support of senior secondary school students in a selected school of Haldwani.

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