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"Impact of Simulation Based Training Programme on Knowledge and Practice Regarding Basic Life Support Among Undergraduate Nursing Students"

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Abstract

Basic life support (BLS) is the foundation for saving lives after cardiac arrest. Basic life support (BLS) with cardiopulmonary resuscitation (CPR) provided at the right time greatly improves survival following cardiac arrest.. The **aim o**f the study was to assess the impact of simulation based training programme on knowledge and practice regarding basic life support among undergraduate nursing students at nursing college Indore, M.P. **Methods and material :** A quantitative research approach with a pre-experimental one-group pre-test and post-test design was used for the study. The setting of the study was Index nursing college Indore Madhya Pradesh. By using the non-probability purposive sampling technique 60 undergraduate nursing students were selected. A self-structured questionnaire was used to assess the demographic data and knowledge and practice was observed by checklist regarding basic life support which was prepared based on American Heart Association Guidelines for BLS. **Result:** In the **pretest**, 35 (58.3%) participants had obtained poor knowledge grade; 20 (33.3%) had obtained average knowledge grade; 5(8.3%) had obtained good knowledge grade; and non of the participant had obtained excellent knowledge grade. In the **posttest**, none of the participants had obtained poor knowledge grade; 8 (13.3%) had obtained average knowledge grade; 25(41.6%) had obtained good knowledge grade; and 27 (45%) had obtained excellent knowledge grade. The intervention was helpful in improving the knowledge grade of the participants. In the **pretest**, 33 (55%) participants had obtained Inadequate practice score; 22 (36.66%) had obtained moderately adequate; and 5(8.33%) participant had obtained adequate score. In the **posttest**, none of the participants had obtained inadequate score; 12(20%) had obtained moderately adequate score; and 48 (80%) had obtained adequate score. The intervention was helpful in improving the practical skill of the participants. The statistically significant association was found between area of maximum experience, previous experience on BLS and the pretest knowledge grades (P>0.05). The statistically significant association was found between area of maximum experience, previous experience on BLS and the pretest knowledge grades (P>0.05).

Key Words: Basic life support (BLS), Training, Knowledge, Practice, Nursing Students

Introduction

Basic Life Support (BLS) is performed to support the patient's circulation and respiration through the use of cardiopulmonary resuscitation (CPR) until advanced life support arrives. Victims who have had early and correct BLS intervention will be better oxygenated and are more likely to respond to advanced techniques to revive them, thereby increasing their chance of survival **[1].** According to American Heart Association(AHA) Guidelines Cardiopulmonary Resuscitation(CPR) 2015 BLS is the foundation for saving lives after cardiac arrest. Fundamental aspects of adult BLS include immediate recognition of sudden cardiac arrest and activation of the emergency response system, early CPR, and rapid defibrillation with an automated external defibrillator (AED). **[2].**

Cardiopulmonary resuscitation (**CPR**) is an emergency procedure consisting of chest compressions often combined with artificial ventilation, or mouth to mouth in an effort to manually preserve intact brain function until further measures are taken to restore spontaneous blood circulation and breathing in a person who is in cardiac arrest **[3].** If a person has collapsed with possible cardiac arrest, a rescuer first establishes unresponsiveness and confirms absence of breathing or the presence of only gasping respirations. Then, the rescuer calls for help. Basic life support should be started immediately **[4].**

Need of the study

In India, it is estimated that about 5-6 lakh people die every year due to sudden cardiac death (SCD), and a good proportion of them are under the age of 50 **[5].** Worldwide about 6 million sudden cardiac deaths occur annually due to ventricular tachyarrhythmia. The survival rate from sudden cardiac arrest is less than 1% **[6].** Basic Life Support is characterized by its quick emergency cardiovascular care, rescue breathing, chest compressions, and even early defibrillation to restore normal breathing in adults and children (with the head tilt-chin lift maneuver).It This lifesaving system requires knowledge of Cardiopulmonary resuscitation (CPR), AEDs, and clearing airway obstructions **[7].**

Cardiopulmonary resuscitation (CPR) consists of the use of chest compressions and artificial ventilation to maintain circulatory flow and oxygenation during cardiac arrest **[8].** According to American Heart Association (AHA) for every minute CPR is delayed, a victim's chance of survival decreases by 10%. Immediate CPR from someone nearby could double or triple their chances of survival **[9]**.

Research study showed that the knowledge and psychomotor skills of nursing students in the area of cardiopulmonary resuscitation was increased. Findings showed that the average CPR knowledge score of the students was 9.3 ± 2.9 before the lecture, this average increased to 17.0 ± 1.8 one month after the CPR lecture and decreased by two points back to 14.9 ± 3.8 after six months. Skill score of the students one month after the CPR skills training was 18.4 out of 21, and that this average decreased to 13.8 after six months ($p<0.05$) (**Dal U. et al 2013) [10]**. Educational program on the knowledge, attitudes and practices related to BLS among undergraduate nursing students of college of nursing was also effective. Result showed that the mean posttest knowledge scores (6.9) was higher than their mean pre-test knowledge scores (6.6) with a mean difference of 0.3. The mean posttest practice scores (7.8) was higher than their mean pretest practice scores (2.9) with a mean difference of 4.9. Over all positive attitudes were seen in 55.6% of pre-BLS respondent and 74.8% of posttest BLS respondents (**Kabina Ratha et al 2014) [11]**.

Peer-assisted Education on the Knowledge and Performance of Nursing Students in Basic Cardiopulmonary Resuscitation was evaluated and findings showed that compared to the control group, a statistically significant difference was observed in the knowledge of the students in the intervention and control groups immediately after (P<0.001). Compared to the control group, the performance of the students in the intervention group significantly increased immediately after (P<0.001) (**Arasteh et al 2018) [12].** Nursing students' attitudes and self-efficacy on CPR were measured by self-reported questionnaires three times (before, immediately after, and 20 weeks post intervention). Result showed that attitude and self-efficacy scores of students on CPR significantly increased immediately after CPR training ($p < .001$) **(Seol J. 2020) [13]**.

A cross-sectional, descriptive, exploratory study with a quantitative approach was carried out from September to October 2018, knowledge rate of students of the nursing graduation course on Basic Life Support was explored and findings revealed that 62% of the students had a grade lower than 70 points and 19% scored less than 50 points (**Nogueira et al 2020) [14**]**.** Cardiopulmonary arrest as a life-threatening condition needs urgent interventions to protect individuals' life and prevent irreversible damages to vital organs. It requires knowledge and skills in cardiopulmonary resuscitation **[15]**.

In former research studies it was found that diploma nursing students had inadequate theoretical knowledge and practical skills regarding BLS. Hence, the researcher found important to assess the impact of simulation based training programme on knowledge and practice regarding basic life support among undergraduate nursing students. This strategy was empirically evaluated for its efficacy in increasing the knowledge and practical skills regarding BLS among undergraduate nursing students.

Problem Statement:

A study to assess the impact of simulation based training programme on knowledge and practice regarding basic life support among undergraduate nursing students in selected nursing college at Indore, M.P.

Objectives:

- To assess the pretest knowledge and practice score regarding basic life support among undergraduate nursing students.
- To assess the posttest knowledge and practice score regarding basic life support among undergraduate nursing students.
- To assess the impact of simulation based training programme on knowledge and practice regarding basic life support among undergraduate nursing students.
- To find out the association of pretest knowledge and practice score with selected socio-demographic variable.

Hypothesis:

- RH_1: There will be significant difference between pre test and post test knowledge score regarding basic life support among undergraduate nursing students at the level of $p \leq 0.05$.
- RH_2: There will be significant difference between pre test and post test practice score regarding basic life support among undergraduate nursing students at the level of $p \leq 0.05$.
- RH_3: There will be significant association of pre test knowledge score regarding basic life support with selected socio demographic variables at the level of $p \leq 0.05$.

- RH_4: There will be significant association of pre test practice score regarding basic life support with selected socio demographic variables at the level of $p \leq 0.05$.

Assumptions

- Undergraduate nursing students may have some knowledge regarding basic life support.
- Simulation based training programme may help to improve the knowledge and practice of undergraduate nursing students regarding basic life support.

Methods and material : A quantitative research approach with a pre-experimental one-group pre-test and post-test design was used for the study. The setting of the study was Index nursing college Indore Madhya Pradesh. By using non-probability purposive sampling technique 60, undergraduate nursing students were selected. Consent from the participants were obtained. The study consisted of Basic life support training included both theoretical and practical components. The students' knowledge and practices were assessed before administration of basic life support training A self-structured questionnaire was used to assess the demographic data and knowledge and practice was observed by checklist regarding basic life support which was prepared based on American Heart Association Guidelines for BLS.

Result and Discussion

Section I: Distribution of participants according to socio-demographic variables

Majority of the participants 24 (40%) were age group of 20 years; 35 (58.33%) were female; 45 (75%) had previous source of information regarding BLS from class room; 48 (80%) Students had interest in emergency care; and 35(58.33%) had area of maximum in general ward, 28 (48.66%) students had not witnessed experience in BLS.

Section II- To assess the effectiveness of simulation based training programme on knowledge and practice regarding basic life support among undergraduate nursing students.

Table No. 1

Comparison of pre- and post-test knowledge grades

(N=60)

S. No.	Knowledge Grades		Pretest		Posttest	
			No.	%	No.	%
1.	Poor	(0-7)	35	58.3	0	0.0
2.	Average	(8-14)	20	33.3	8	13.3
3.	Good	(15-21)	5	8.7	25	41.6
4.	Excellent	(22-28)	0	0	27	45
	Total		60	100.0	60	100.0

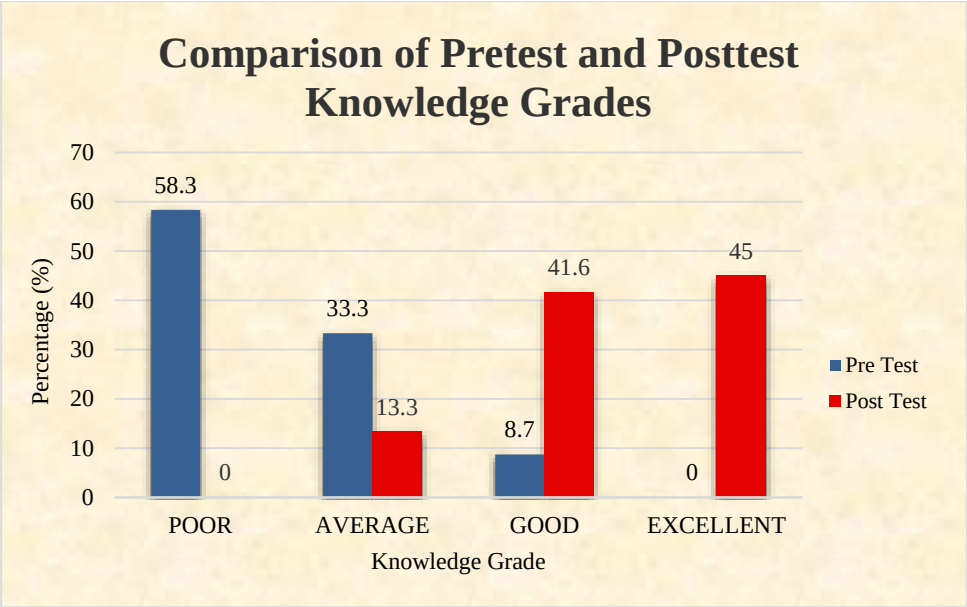

Fig No1 . Bar showing comparison of pre test and post test knowledge score

The above table and graph shows the comparison of pre- and post-test knowledge grades In the **pretest**, 35 (58.3%) participants had obtained poor knowledge grade; 20 (33.3%) had obtained average knowledge grade; 5(8.3%) had obtained good knowledge grade; and non of the participant had obtained excellent knowledge grade. In the **posttest**, none of the participants had obtained poor knowledge grade; 8 (13.3%) had obtained average knowledge grade; 25(41.6%) had obtained good knowledge grade; and 27 (45%) had obtained excellent knowledge grade. The intervention was helpful in improving the knowledge grade of the participants.

Table no - 2

Comparison of mean pre- and post-test knowledge scores

(N=60)

Pre- and post-test	**Number**	**Mean**	**SD**	**'t' value, df**	**P value**
Pretest	60	9.97	3.30	11.95, df=59	0.001*
Posttest	60	18.63	4.60		

Paired 't' test applied. P value=0.001, Significant

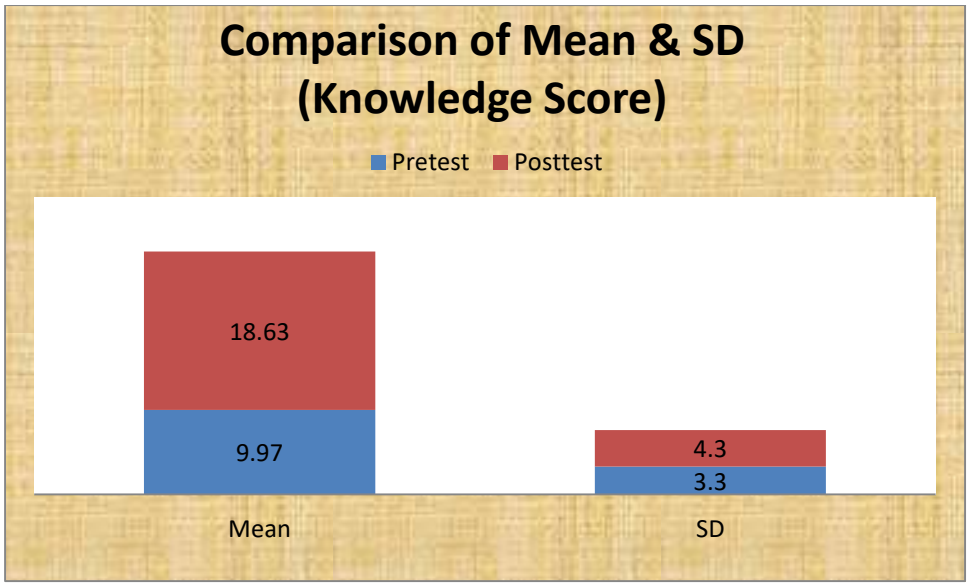

Fig No2 . Bar showing comparison of mean pre and post test knowledge score

The above table and graph shows the comparison of mean pre- and post-test knowledge scores. The mean pretest score was 9.97 ± 3.30 and mean posttest score was 18.63 ± 4.60. The difference was found to be statistically significant (P=0.001). The mean posttest score was significantly higher than the mean pretest score. The intervention was helpful in improving the knowledge of the participants. Hence **RH_1** is accepted.

Section III- To assess the effectiveness of simulation based training programme on knowledge and practice regarding basic life support among undergraduate nursing students.

Table No. 3

Comparison of pre- and post-test Practice Score

(N=60)

S. No.	Practice Score	Pretest		Posttest	
		No.	%	No.	%
1.	Inadequate (<3)	33	55	0	0
2.	Moderately Adequate (4 – 6)	22	36.66	12	20
3.	Adequate (>7)	5	8.33	48	80
	Total	60	100.0	60	100.0

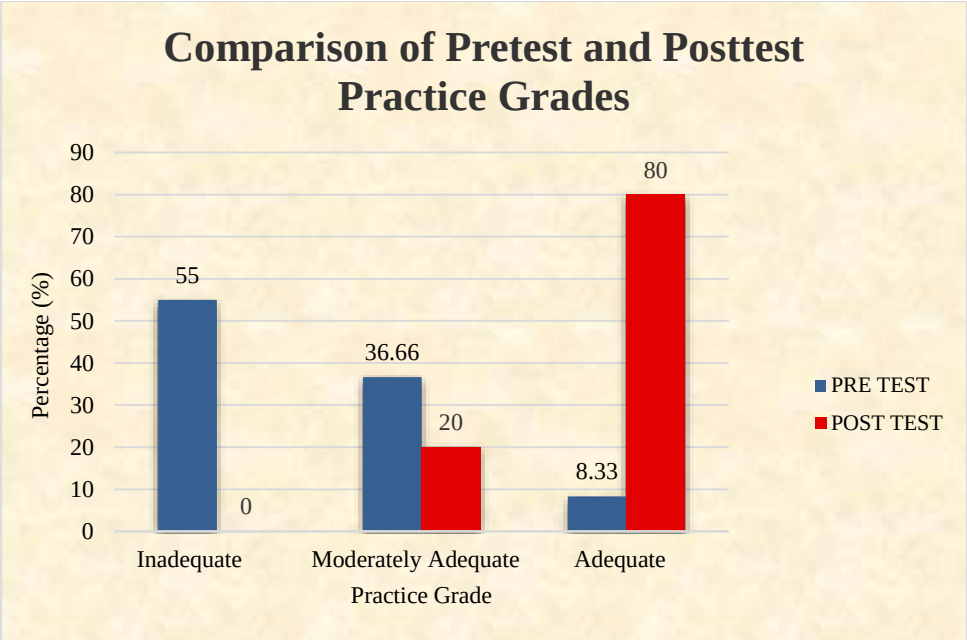

Fig No3 . Bar showing comparison of pre test and post test practice score

The above table and graph shows the comparison of pre- and post-test practice score. In the **pretest**, 33 (55%) participants had obtained Inadequate practice score; 22 (36.66%) had obtained moderately adequate; and 5(8.33%) participant had obtained adequate score. In the **posttest**, none of the participants had obtained inadequate score; 12(20%) had obtained moderately adequate score; and 48 (80%) had obtained adequate score. The intervention was helpful in improving the practical skill of the participants.

Table No - 4

Comparison of mean pre- and post-test Practice scores

(N=40)

Pre- and post-test	Number	Mean	SD	't' value, df	P value
Pretest	60	3.56	1.53	15.60, df=59	0.001*
Posttest	60	7.15	1.25		

Paired 't' test applied. P value=0.001, Significant

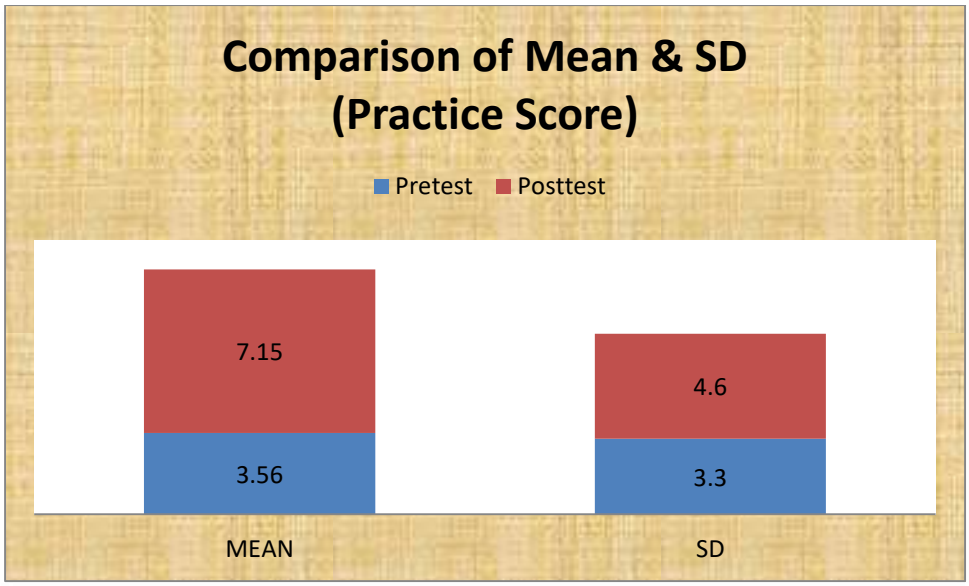

Fig No4 . Bar showing comparison of mean pre test and post test practice score

The above table and graph shows the comparison of mean pre- and post-test practice scores. The mean pretest score was 3.56 ± 1.53 and mean posttest score was 7.15 ± 1.25 . The difference was found to be statistically significant (P=0.001). The mean posttest score was significantly higher than the mean pretest score. The intervention was helpful in improving the practical skill of the participants. Hence **RH_2** is accepted.

Section IV- Association between selected socio-demographic variables and pretest knowledge grades

The statistically significant association was found between area of maximum experience, previous experience on BLS and the pretest knowledge grades (P>0.05), while no statistically significant association was found between age; gender; source of information, interest in emergency unit, and the pretest knowledge grades (P>0.05).

The statistically significant association was found between age and area of maximum experience of BLS and the pretest practice grades. (P>0.05), while no statistically significant association was found between gender, source of information, interest in emergency unit, previous experience on BLS and the pretest knowledge grades (P>0.05).

Discussion

Majority of the participants 24 (40%) were age group of 20 years; 35 (58.33%) were female; 45 (75%) had previous source of information regarding BLS from class room; 48 (80%) Students had interest in emergency care; and 35(58.33%) had area of maximum in general ward, 28 (48.66%) students had not witnessed experience in BLS.

The above table and graph shows the comparison of pre- and post-test knowledge grades In the **pretest**, 35 (58.3%) participants had obtained poor knowledge grade; 20 (33.3%) had obtained average knowledge grade; 5(8.3%) had obtained good knowledge grade; and non of the participant had obtained excellent knowledge grade. In the **posttest**, none of the participants had obtained poor knowledge grade; 8 (13.3%) had obtained average knowledge grade; 25(41.6%) had obtained good knowledge grade; and 27 (45%) had obtained excellent knowledge grade. The intervention was helpful in improving the knowledge grade of the

participants. The mean pretest score was 9.97 ± 3.30 and mean posttest score was 18.63 ± 4.60. The difference was found to be statistically significant (P=0.001). The mean posttest score was significantly higher than the mean pretest score. The intervention was helpful in improving the knowledge of the participants. Hence **RH_1** is accepted.

In the **pretest**, 33 (55%) participants had obtained Inadequate practice score; 22 (36.66%) had obtained moderately adequate; and 5(8.33%) participant had obtained adequate score. In the **posttest**, none of the participants had obtained inadequate score; 12(20%) had obtained moderately adequate score; and 48 (80%) had obtained adequate score. The intervention was helpful in improving the practical skill of the participants. The mean pretest score was 3.56 ± 1.53 and mean posttest score was 7.15 ± 1.25 . The difference was found to be statistically significant (P=0.001). The mean posttest score was significantly higher than the mean pretest score. The intervention was helpful in improving the practical skill of the participants. Hence **RH_2** is accepted.

The statistically significant association was found between area of maximum experience, previous experience on BLS and the pretest knowledge grades (P>0.05), while no statistically significant association was found between age; gender; source of information, interest in emergency unit, and the pretest knowledge grades (P>0.05).

The statistically significant association was found between area of maximum experience, previous experience on BLS and the pretest knowledge grades (P>0.05), while no statistically significant association was found between age; gender; source of information, interest in emergency unit, and the pretest knowledge grades (P>0.05).

The present study is supported by **Demirtas A. et al. (2021)**, conducted a study to assess the effectiveness of simulation-based cardiopulmonary resuscitation training programs on fourth-year nursing students. Result showed that the mean pretest CPR knowledge score of the students before the simulation-based CPR training was 5.66 ± 1.97 out of 10.0. The mean posttest CPR knowledge score (8.38 ± 1.30) increased significantly after the simulation ($p < 0.001$). In addition, the mean posttest CPR skills score was significantly higher than the mean pretest CPR skills score ($p < 0.001$). Simulation-based CPR training improved the levels of knowledge and skills of nursing students **[16].**

The study is also supported by **Habibli et al., (2020),** evaluated the simulation-based education on nursing students' knowledge and performance of adult basic cardiopulmonary resuscitation and the findings revealed that the students' knowledge in the intervention group immediately after ($p<0.001$) and three months after the intervention ($p<0.05$) were significantly higher than the control group. The mean scores of performance immediately after ($p<0.001$) and three months after the intervention ($p<0.001$) were significantly higher than the control group. Simulation-based education increased the knowledge and performance of nursing students in the field of BLS-CPR **[17].**

Conclusion

The findings of the study revealed simulation based training programme on knowledge and practice regarding basic life support among undergraduate nursing students was an effective method to enhance the knowledge and practical skills of undergraduate nursing students. So the study concluded that simulation based training programme had a great potential for improving the knowledge and practical skills of undergraduate nursing students.

Limitations

The main limitations of study were that the non-probability sampling method was used and there was less sample size for generalization of the findings. The practice of BLS was assessed in a simulated environment rather than observing actual performance of subjects in real life situation which can add to the bias.

Recommendation

The results strongly recommend the need for regular basic life support training sessions for nursing students.

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