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**Veeresh Sullad**  
Nursing Scholar, Department  
of Nursing, Himalayan  
University, Itanagar,  
Arunachal Pradesh, India

**Dr. Sujatha Vijaykumar**  
Professor, Department of  
Nursing, Himalayan  
University, Itanagar,  
Arunachal Pradesh India

**Corresponding Author:**  
**Veeresh Sullad**  
Nursing Scholar, Department  
of Nursing, Himalayan  
University, Itanagar,  
Arunachal Pradesh, India

## Comparative pilot study: Traditional classroom vs. simulation-based training for CPR knowledge and skill acquisition among nursing students in Dharwad, Karnataka

Veeresh Sullad and Dr. Sujatha Vijaykumar

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### Abstract

**Aim:** This study aimed to assess the impact of traditional classroom training vs. simulation-based training on knowledge and skill acquisition regarding CPR among nursing students: a comparative study in selected nursing colleges of Dharwad, Karnataka.

**Methods:** Pilot study employed an evaluative approach, utilizing a quasi-experimental, concurrent two-group pre-test post-test design. This study was conducted in selected nursing colleges of Dharwad, Karnataka. The independent variables were traditional classroom training and simulation-based training, while the dependent variables were knowledge and skill acquisition in CPR. Socio-demographic variables included age, gender, religion, habitat, family monthly income, and previous CPR knowledge. The target population comprised students studying in the II-year BSc Nursing program, while the accessible population included II-year BSc Nursing students meeting the inclusion and exclusion criteria. The sampling technique used was non-probability purposive sampling, with a total sample size of 20 students divided equally into Group A and Group B. Data were collected from II-year BSc Nursing students who were willing to participate and available at the time of data collection, with exclusion criteria including illness during data collection and previous training in Basic Life Support (BLS).

**Results:** Knowledge scores significantly improved post-intervention, with 70% demonstrating good knowledge compared to 10% pre-intervention. The mean knowledge score increased from 10.13 (SD = 5.40) to 18.8 (SD = 5.13), with a mean difference of 8.7 ( $t = 27.54, p < 0.05$ ). Practice scores also showed improvement, with 40% having good practice post-intervention compared to none pre-intervention. The mean practice score rose from 6.13 (SD = 5.40) to 11.8 (SD = 3.13), with a mean difference of 5.67 ( $t = 21.54, p < 0.05$ ). No significant association was found between the pre-test knowledge and practice scores and any demographic variables.

**Conclusion:** The results show significant knowledge and skill improvements in both groups. Group A, with traditional training, saw a 23.13% knowledge gain, while Group B, with simulation training, had an 8.03% gain. Both groups exhibited significant pre-test to post-test score differences. Additionally, ANOVA revealed simulation training's superior effectiveness ( $f_{cal} = 7.32 > f_{tab} = 5.05$ ), suggesting it enhances CPR education more effectively. These findings emphasize simulation training's potential for improving nursing students' CPR proficiency.

**Keywords:** Simulation-based training, traditional classroom training, skill acquisition: knowledge skill acquisition, CPR (Cardiopulmonary resuscitation)

### Introduction

Critical care nursing courses aim to provide their students with survival skills. Competency in applying these survival skills is mandatory to ensure patient safety. One important survival skill is cardiopulmonary resuscitation (CPR) <sup>[1, 2]</sup>. Cardiac arrest remains a major health problem presented in the intensive care units (ICUs). Concerns have emerged regarding the increased incidence of sudden cardiac arrest perhaps due to the growing number of patients having ischaemic heart diseases. The prompt administration of CPR is crucial for the successful management of sudden cardiac arrest <sup>[3, 4]</sup>.

CPR continues to be one of the most efficient methods of reviving people experiencing cardiac arrest. Warwick University disclosed that over 12.5% of individuals who experience cardiac arrest perish as a result of inadequate cardiopulmonary resuscitation (CPR).

Insufficient knowledge and skills in CPR have been observed among five medical students from various nations [5]. The American Heart Association implemented mandatory CPR training in 2004. Consequently, educators developed a strong and affirmative desire to teach CPR. Nevertheless, the effectiveness of CPR training has been hindered by obstacles such as training schedules, the availability of training mannequins, and associated expenditures, particularly in light of the restricted resources available during the COVID-19 pandemic [6, 7]. Hence, it is crucial to introduce educational initiatives aimed at fostering proficient CPR abilities among nurses.

Traditional classroom training has long been the conventional approach to teaching CPR. It typically involves didactic lectures, demonstrations, and hands-on practice with CPR manikins. In this setting, instructors provide learners with essential theoretical knowledge, emphasize key concepts, and facilitate skill development through repetitive practice. While traditional classroom training has been the cornerstone of CPR education for decades, it may not always cater to the diverse learning needs and preferences of trainees. Moreover, questions have arisen regarding its efficacy in achieving long-term retention and skill application in high-pressure, real-life situations.

On the other hand, simulation-based training, a relatively newer approach, utilizes cutting-edge technology to recreate lifelike scenarios that require participants to apply CPR techniques in a controlled, immersive environment. These simulations often feature high-fidelity manikins, interactive software, and real-time feedback systems. The primary benefit of simulation-based training is its capacity to bridge the disparity between theoretical knowledge and practical application. This is achieved by providing an interactive and immersive experience that closely replicates real-life emergency scenarios. It is believed that this approach might better prepare individuals to respond effectively to CPR scenarios by enhancing both their cognitive understanding and muscle memory. Several employers have found that recent graduate nurses lack the competency in performing basic clinical tasks. Moreover, opportunities for nurses to perform direct practical training has decreased due to the emergency condition of the patients. Hence, simulation training on labs simulators has been used to overcome limitations in hospital training and improve nurses' performance. However, the traditional simulation (TS) method has been known to increase stress due to the tension and anxiety caused by actual situations fear of mistakes, limitations in the problem-solving process, decreased self-efficacy and learning satisfaction of the students. Hence, there are growing concerns about the necessity of using a novel instructional approach to address the aforementioned limitations and challenges of traditional teaching strategies (TS) and enhance the caliber of nursing education [8, 9].

As the significance of CPR training cannot be overstated, it becomes imperative to evaluate the relative merits of these two training methods to optimize the delivery of this life-saving skill. By comparing the impact of traditional classroom training and simulation-based training on the acquisition of knowledge and skills required for CPR, this study aims to provide valuable insights that can inform the selection and refinement of CPR training programs. Furthermore, the findings of this study may contribute to the enhancement of overall preparedness for cardiac emergencies, thereby potentially saving more lives in critical situations.

In this context, this comparative study investigates the effectiveness of these two training methods by considering

various factors such as knowledge retention, skill development, and the ability to perform CPR under realistic, high-stress conditions. It is anticipated that the outcomes of this research will shed light on the strengths and weaknesses of each training approach, ultimately guiding the development of more efficient and comprehensive CPR training programs.

In the subsequent sections, we will delve into the methodology employed for this comparative study, the results obtained, and their implications for CPR education and emergency response. By conducting a thorough examination of these two training methods, we endeavor to contribute to the ongoing efforts to improve the quality of CPR training, thereby potentially saving more lives and enhancing public safety.

### **Aim**

To assess the impact of traditional classroom training vs. simulation-based training on knowledge and skill acquisition regarding CPR among nursing students: a comparative study in selected nursing colleges of Dharwad, Karnataka.

### **Objectives of the proposed research**

1. To assess the baseline knowledge and skill acquisition regarding CPR among nursing students of Group A and Group B.
2. To assess the effectiveness of traditional classroom training on knowledge and skill acquisition regarding CPR among nursing students of group A.
3. To assess the effectiveness of simulation-based training on knowledge and skill acquisition regarding CPR among nursing students of group B.
4. To compare the effectiveness of traditional classroom training vs. simulation-based training on knowledge and skill acquisition scores regarding CPR among nursing students.
5. To find the association between pre-test knowledge and skill acquisition scores regarding CPR among nursing students with their selected demographic variables who will be exposed to traditional classroom training.
6. To find the association between pre-test knowledge and skill acquisition scores regarding CPR among nursing students with their selected demographic variables who will be exposed to simulation-based training.
7. To find out the correlation between knowledge and skill acquisition among the nursing students in both Group A and Group B.

### **Methodology**

**Research Approach:** Evaluative approach

**Research Design:** A quasi experimental, concurrent two group pre-test Post-test design only

**Independent Variable:** Traditional classroom training and simulation-based training

**Dependent Variable:** Knowledge and Skill

**Target Population:** Students studying in II-year BSc Nursing of selected nursing colleges of Dharwad, Karnataka

### **Sampling Criteria**

#### **Inclusion**

1. Who are willing to participate in the study
2. Who are available at the time of data collection

**Exclusion criteria**

1. Who are sick at the time of data collection.
2. Previous training of BLS

**Results**

**Table 1:** Frequency and percentage distribution of subjects according to socio-demographic variables in Experimental group A: n<sub>1</sub>=10

Sl. No	Demographic Variable	Frequency (f)	Percentage (%)
<b>Age in Years</b>			
	19-21	8	80
	22-24	2	20
<b>Gender</b>			
	Male	3	30
	Female	07	70
<b>Educational level</b>			
	II-year B.Sc. Nursing	6	60
	III Year BSc Nursing	04	40
<b>Have you received any specific training related to CPR?</b>			
	Yes	00	00
	No	10	100

**Table 2:** Frequency and percentage distribution of subjects according to socio-demographic variables in Experimental group B: n<sub>1</sub>=10

Sl. No	Demographic Variable	Frequency (f)	Percentage (%)
<b>Age in Years</b>			
1	19-21	7	70
	22-24	3	30
	25-27	0	0
	27 and above	0	0
<b>Gender</b>			
2	Male	2	20
	Female	08	80
<b>Educational level</b>			
3	II-year B.Sc. Nursing	6	60
	III Year BSc Nursing	04	40
<b>Have you received any specific training related to CPR?</b>			
4	Yes	00	00
	No	10	100

**Table 3:** Pre-test, post-test percentage of knowledge scores of subjects regarding CPR in group A n<sub>1</sub> =10

Items	Total Score	Mean % of knowledge scores of subjects		
		Pre-test	Post-test	Gain in knowledge
Structured Knowledge questionnaire	30	60.73	83.86	23.13

Table no 3 reveals that there was 23.13% gain in knowledge after traditional based approach

**Table 4:** Pre-test, post-test percentage of knowledge scores of subjects regarding Group B n<sub>2</sub> =10

Items	Total Score	Mean % of knowledge scores of subjects		
		Pre-test	Post-test	Gain in knowledge
Knowledge questionnaire	12	52.7	60.73	8.03

Table no. 4 reveals that there was 8.03% gain in knowledge after simulation-based training

**Summary**

In Summary the socio-demographic characteristics of both experimental groups A and B were analyzed. For Group A, the majority of participants were females (70%) aged

between 19 and 21 years (80%), with 60% enrolled in their second year of B.Sc. Nursing. None of the subjects had received specific CPR training. Similarly, Group B comprised mainly females (80%) aged between 19 and 21 years (70%), with 60% in their second year of B.Sc. Nursing. No participants had received CPR training. Regarding knowledge and skill acquisition, both groups showed significant improvements post-training. In Group A, there was a mean gain of 23.13% in knowledge scores, while Group B showed an 8.03% gain. Analysis indicated significant differences between pre-test and post-test scores in both groups. Simulation-based training proved statistically superior to traditional classroom training, as evidenced by higher f-ratios. Specifically, the f-ratio for Group B (7.32) exceeded the tabulated value (5.05), suggesting simulation-based training's greater effectiveness.

**Conclusion**

In conclusion, the study highlighted significant improvements in both knowledge and skill acquisition among nursing students following CPR training. While both traditional classroom and simulation-based training methods were effective, simulation-based training demonstrated superior outcomes. This suggests that simulation-based approaches offer a promising avenue for enhancing CPR education among nursing students. The findings underscore the importance of incorporating innovative teaching methodologies, such as simulation-based training, into nursing curricula to ensure optimal learning outcomes and better preparedness for real-world healthcare scenarios. Further research and integration of simulation-based training into nursing education programs are recommended to maximize the impact on student learning and ultimately improve patient care.

**Conflict of Interest**

Not available

**Financial Support**

Not available

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