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EFFECTIVENESS OF SIMULATION-BASED LEARNING AMONG NURSING STUDENTS: EVIDENCE PRACTICE (EBP) PROJECT ON CARDIOPULMONARY RESUSCITATION SKILLS CPR

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Abstract

Background and Aim: *Cardiopulmonary resuscitation is a critical and life-saving skill in a nursing practice, and every nurse should be competent in performing CPR at a time of medical emergency. Traditional methods of teaching CPR often lack hands-on practice, competence, and confidence for nursing students. Simulation-based learning (SBL) has emerged as an innovative educational strategy to provide a realistic, risk-free environment for practicing clinical skills. The aim of this evidence-based project is to evaluate the effectiveness of simulation-based learning in enhancing CPR skills among nursing students.*

Methods: *This project was conducted in the nursing department on 12 students of the 7th semester of BSc Nursing. A pre- and post-interventional study was conducted using a standard American Health Association (AHA) checklist for CPR skill. PubMed and CINAHL databases were used for a comprehensive literature review.*

Results: *Data was analyzed through SPSS version 23. A paired T-test was used, which showed that the mean of post-intervention was 17.33, which is about three times more than that of pre-intervention, which were 6.50.*

Conclusion: *Simulation-based learning is more effective in improving the competency level of nursing students in clinical practices.*

INTRODUCTION

Evidence-based practice (EBP) is a fundamental aspect of the current nursing profession that integrates patient preferences, professional expertise, and the most current research evidence to provide high-quality care (Munten et al., 2010). Through the incorporation of EBP into nursing education and practice, healthcare providers can be confident that their interventions are efficient, effective, and in line with the most recent research findings. EBP is essential to nursing because it improves clinical decision-making, patient outcomes, and an environment of continuous education and creativity (Horntvedt et al., 2018).

In nursing, simulation-based learning (SBL) is an instructional strategy that teaches and assesses nursing knowledge, skills, and critical thinking through interactive, realistic scenarios (Oh et al., 2015). This approach simulates real-life clinical scenarios in a safe, regulated, and encouraging setting by using instruments like mannequins, virtual

reality, standardized patients (actors), and computer-based simulations (Lee et al., 2019). This project examines the use of EBP in educational settings by analyzing how well simulation-based instructions are effective and improve nursing students' cardiopulmonary recitation (CPR) abilities.

1. Prioritization of the problem

During the Education practicum and MS Nursing Course work author studied different methods of teaching clinical skills like

1. Python model of Teaching Clinical skills
2. One minute preceteptorship model of learning
3. Bedside case teaching model of learning.
4. Just in Time Teaching Methods
5. Simulation Based Learning of clinical skills

Then after discussion with faculty members and using voting strategy author chose the evidence based project of Simulation based learning for a skill of Cardio pulmonary Resuscitation, CPR.

Problem

Nursing Education mostly based on competency that Nursing Students should be competent in both knowledge and clinical skills. Although CPR is an essential skill for nursing students, Research indicates traditional methods of teaching frequently fail to develop long-term competence and self-confidence. Since inadequate CPR skills can have fatal consequences in real-life scenarios, it is essential that education should be improved in this area. Simulation- based learning addressed this gap by providing an appropriate environment for students to improve CPR skills.

2. Justification of the Problem

Nursing profession mostly based on competency means they should be competent in both knowledge and a practice and in order to be a competent nurse they should be updated with a research and evidence based Practice. Traditional lecture-based strategies are less effective in developing the advanced practical skills essential to CPR. When nursing students proceed from academic study to clinical practice, they frequently lack competence and confidence. Simulation- based learning has been proved to improve performance under stress, critical thinking, and skill retention. Because CPR proficiency has an important effect on patient outcomes, it is important to use teaching strategies that assure skill mastery and competence.

3. Current Teaching Methodology

Currently, CPR training in many nursing programs relies on a combination of:

- Didactic lectures to provide theoretical knowledge in a classroom.
- Demonstrations by instructors using mannequins in a skill lab.
- Limited opportunities for hands-on practice on a CPR.
- Periodic skill assessments, which may not accurately reflect long-term retention or real-world application.
- Hence the above methods are not sufficient, fully accurate and unsuitable to prepare nursing students to deal with medical emergency in real life situation. In order to make the nurses competent and ready for handling an emergency they should provide a virtual environmental scene so as to train for real life interventions and response. Simulation based Learning methodology was used for EBP project of Cardio Pulmonary Resuscitation (CPR) skills.

6. PICOT Question

Picot Format helps in to identify a proper population, Interventions, comparison group for a study, expected time required for a study to complete and expected outcomes for a study.

Because of these benefits this format was used in the study in order to investigating the effectiveness of Simulation based learning for competency of a CPR Skills.

P (Population): Nursing students of 7th Sem SUIT.
I (Intervention): Simulation-based learning for CPR skill training.
C (Comparison): Pre and Post interventions.
O (Outcome): Improvement in CPR skill performance, confidence, and knowledge retention.
T (Time): Over a period of 4 weeks.

6. Purpose

This project aims to assess how simulation-based learning affects nursing students' CPR skill proficiency, confidence, and knowledge retention. The results will be used to support the inclusion of simulation-based Learning in nursing curriculum, policies and future research works.

Review of Evidence Based Literature

A comprehensive literature review was conducted regarding the effectiveness of Simulation based learning in a skill of Cardiopulmonary Recitation CPR using different Research data bases like Google Scholar, PubMed and CINAHL.

A simulation-based training program was conducted in United State US in 2022 to improve cardiopulmonary resuscitation skills in which 18 participants were given the American Red Cross Basic Life Support Training through the simulation method. The participants were of different specialties, like medical technicians, physicians, and nurses. The results showed the significant improvement of the mean score of CPR Skills, with a pre-simulation mean score of 45.42 and a post-simulation score of 89.21. Simulation also improved the patient safety teamwork perceptions with a mean score of 4.61 to a post-simulation mean score of 4.86.(Laco & Stuart, 2022)

Another study was conducted in the United States that evaluated the combination of simulation-based resuscitation skills training with a clinical practicum for assessing the nursing student's knowledge, psychomotor skills, and self-efficacy. A total of 255 participants participated in a study in which two hours of simulation-based training of CPR skills was given, and the results show that participant knowledge, psychomotor skills, and self-efficacy improved through a simulation-based method combined with clinical practicum.(Roh et al., 2016)

Similarly another study a randomized comparative pre- and post-Study was conducted on 29 3rd-year emergency technicians in Korea, in which simulation-based teaching was compared with traditional lecture-based teaching for teaching advanced cardiac life support, including cardiopulmonary resuscitation (CPR). In that study, simulation-based teaching was given through a constrtuctivistic method, and traditional-based teaching was given through teaching strategies. The result showed that the knowledge and performance of constructivist simulation- based teaching were higher than traditional lecture-based teaching. Knowledge SBT 33.3 $\pm$ 5.03 and TLBT 29.5 $\pm$ 5.33 and performance of SBT was 12.20 $\pm$ 1.85 and TLBT was 8.85 $\pm$ 3.54.

Hence, it concluded that simulation-based teaching is more effective in improving knowledge acquisition and performance than traditional lecture-based learning.(Yoo et al., 2012)

Likewise a qualitative review of the evidence base conducted in India on the simulators in resuscitation focuses on the actual and potential benefits of simulated base learning in cardiac resuscitation and emergencies, and in conclusion of the review, it is shown that simulation-based training improves the physician's skills and patient outcomes (Sahu & Lata, 2010).

Correspondingly a systematic review was conducted in 2024 to determine the effectiveness of simulation-based learning (virtual reality) for cardiopulmonary resuscitation training, which concluded with evidence that simulation-based learning (virtual reality) training, was more effective than traditional-based learning (Sun et al., 2024).

Hence all the studies that was reviewed indicates that simulation based learning is effective in the acquisition of skills and knowledge in nursing.

7. Method of Data Collection/Assessment

7 (a) Study Settings and Tool

This EBP Projected was conducted in Nursing Department Sarhad University Peshawar (SUIT).A Slandered checklist was used which was adopted from American Heart Association (AHA) which consist of stepwise multiple Questions of a procedure CPR with a two options one is Satisfactory another Unsatisfactory. Data was analyzed using SPSS version 23. (*SHA ACLS PROVIDER MANUAL 2024 ACLS SHA Advanced Cardiac Life Support Provider Manual*, 2024.)

7 (b) Population:

Population of a project was Undergraduate 7th Semester students of Nursing Department SUIT Peshawar.

7 (c) Sample sizes:
Sample size of the project was 12 undergraduate 7th Semester students of Nursing Department SUIT Peshawar.

8. Data Collection

8 (a) Pre-Intervention Assessment:
Baseline CPR skills, knowledge, and confidence levels was assessed using a validated CPR checklist. (*SHA ACLS PROVIDER MANUAL 2024 ACLS SHA Advanced Cardiac Life Support Provider Manual*, 2024.)

8 (b) Interventions:
Nursing students had undergone a structured simulation-based CPR training program, including guided practice, feedback, and debriefing sessions in the skill lab of nursing department for about 3 hours of session.

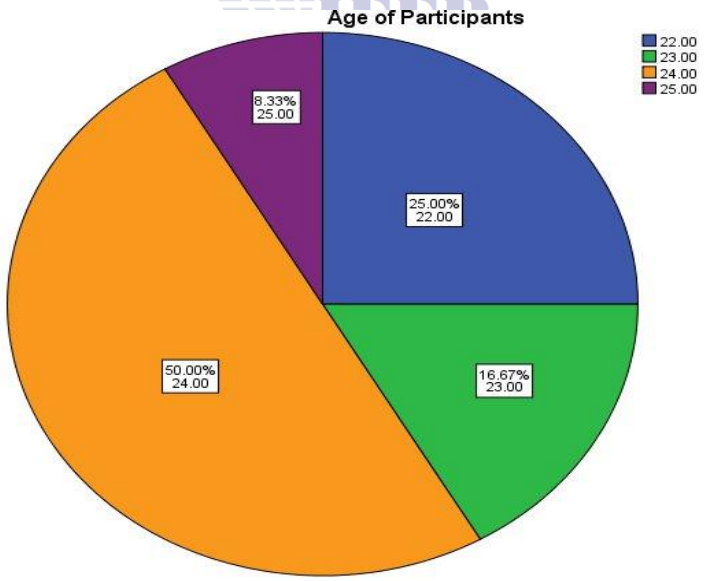
8 (c) Post-Intervention Assessments:
Skills, knowledge, and confidence were reassessed using the same CPR checklist. (*SHA ACLS PROVIDER MANUAL 2024 ACLS SHA Advanced Cardiac Life Support Provider Manual*, 2024.)

9. Data Analysis

The data was analyzed using SPSS Version 23; a paired t-test was used for pre- and post- interventions comparison.
Looking at the demographic data of the participants the study included total 12 nursing students in which 7 were male Students and 5 were female students shown in table no 1.

Gender of Participant			
		Frequency	Percent
Valid	Male	7	60
	Female	5	40
	Total	12	100.0

Table No 1: The study participants were of different age shown in the below Pie chart 1.



Pie Chart 1 The Pre and Post Intervention data was analyzed through Spss version 23 a paired T-test was used in which pre and post intervention were analyzed. Nursing skills was compared from the data that was taken from the students in a form of checklist. Data interpretation showed that the mean of post intervention was 17.33 which is about three times more than that of pre intervention which was 6.50 as shown in Table No 2

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
	Pre_Intervention	6.5000	12	2.77980	.80246
	Post_ Intervention	17.3333	12	2.80692	.81029

Table No 2

Conclusion

Hence from this study it is resulted that simulation based learning was more effective in improving the competency level of nursing students in a clinical practices and make that more effective methods of teaching and learning because SBL provide a controlled environment to the nursing students that are about same as that of real situations which they face on their clinical rotation.

Recommendations

The findings of this Study recommended that SBL methodology should be included in the course curriculum of undergraduate and all other skills should be taught through simulation based in order to prepare competent nursing graduate for providing a best nursing care in a real life situations in Health care setups.

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