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Effectiveness of Simulation Technique on Pediatric Life Support Competencies among Nursing Students: A Pre-Experimental Study

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Abstract- ***Pediatric Life Support (PLS) competencies are essential for nursing students to effectively manage pediatric emergencies. Limited exposure to real-life pediatric emergencies during clinical postings often results in inadequate preparedness among nursing students. Simulation-based education offers experiential learning opportunities in a safe environment, enhancing competence and confidence without compromising patient safety. The present study aimed to evaluate the effectiveness of a simulation technique on Pediatric Life Support competencies among nursing students. A pre-experimental one-group pretest–posttest design was adopted among 67 students from fifth-semester B.Sc. Nursing selected through total enumeration sampling. PLS competency was assessed using a structured questionnaire before and two weeks after a 20-minute hands-on simulation-based PLS training. Data were analyzed using descriptive statistics and the Wilcoxon signed-rank test. The median pretest score was 5 (4,6), which improved to 6 (5,7) in the posttest, which was statistically significant ($p < 0.001$). The findings indicate that simulation-based teaching significantly improved Pediatric Life Support competencies among nursing students. Integration of structured simulation-based PLS training into undergraduate nursing curricula is recommended to enhance preparedness for pediatric emergencies.***

Key words ***- Pediatric Life Support, Nursing Students, Simulation Technique, Competency***

I. INTRODUCTION

Pediatric emergencies demand prompt, accurate, and skilled interventions to reduce morbidity and mortality[1]. Nurses play a crucial role as first responders in pediatric healthcare settings; therefore, competency in Pediatric Life Support (PLS) is an essential professional requirement[2]. However, undergraduate nursing students often have limited exposure to pediatric emergencies during clinical training, leading to gaps in preparedness and confidence[3].

Simulation-based education has emerged as an effective pedagogical strategy in nursing education by providing a safe and controlled environment for practicing critical skills[4]. Simulation enables experiential learning, allowing students to integrate theoretical knowledge with clinical practice while improving psychomotor skills, critical thinking, and decision-making abilities[5]. Evidence indicates that simulation-based life support training leads to better skill acquisition and knowledge retention compared to traditional teaching methods[6].

Despite growing global evidence supporting simulation-based learning, limited studies have explored the effectiveness of simulation-based Pediatric Life Support training among undergraduate nursing students in the Indian context[7]. Therefore, the present study was undertaken to evaluate the effectiveness of a simulation technique on Pediatric Life Support competencies among nursing students.

II. RESEARCH METHODOLOGY

A. Study Design

A Pre-experimental one-group pretest–posttest design was adopted.

B. Setting and Participants

The study was conducted at a selected College of Nursing Ernakulam district, Kerala. A total of 67

students from fifth-semester B.Sc. Nursing were included.

C. Tool for Data Collection

Pediatric Life Support competency was assessed using a structured questionnaire developed by the investigator based on standard Pediatric Life Support guidelines. The same questionnaire was used for both pretest and posttest assessments.

D. Intervention

Following the pretest, participants underwent a 20-minute hands-on simulation-based on Pediatric Life Support. The training covered pediatric assessment, airway management, chest compressions, rescue breathing, and emergency response.

E. Data Collection Procedure

Pretest assessment of Pediatric Life Support (PLS) competency was conducted using a structured questionnaire to assess students' baseline knowledge and understanding of pediatric emergency care. Following the pretest, the students participated in a 20-minute simulation-based hands-on training, which provided opportunities to actively practice essential Pediatric Life Support skills. The simulation training comprehensively covered pediatric assessment, including rapid evaluation of airway, breathing, and circulation, to facilitate early identification of life-threatening conditions.. A posttest assessment using the same structured questionnaire was conducted two weeks after the intervention to evaluate knowledge retention and the effectiveness of the simulation-based training.

F. Data Analysis

Data were analyzed using EZR software. The Wilcoxon signed-rank test was applied to assess the effectiveness of the simulation technique, with $p < 0.05$ considered statistically significant.

III. RESULTS AND FINDINGS

Sixty seven students completed both pretest and posttest.

Test	Range	Median (IQR)	p Value
Pre test	2 - 8	5 (4,6)	p< 0.001**
Post test	3 -9	6 (5,7)	

**Level of significance p<0.05

The Wilcoxon signed-rank test revealed a statistically significant improvement in PLS competency scores after the intervention ($p < 0.001$), indicating the effectiveness of simulation-based training.

IV. DISCUSSION

The present study demonstrated a statistically significant improvement in Pediatric Life Support competencies among nursing students following simulation-based training. This finding supports the effectiveness of simulation as an instructional strategy for enhancing knowledge and preparedness related to pediatric emergency care.[4] Simulation provides an active learning environment that allows students to practice critical skills safely, thereby improving learning outcomes.[5]

The observed improvement can be attributed to the experiential nature of simulation-based education, which promotes active engagement and integration of theory with practice. Simulation aligns with experiential learning principles, enabling learners to develop cognitive, psychomotor, and decision-making skills through deliberate practice and reflection.[4] Previous studies have consistently reported that simulation enhances clinical competence and confidence among nursing students.[9]

Consistent with the present findings, Cant and Cooper reported that simulation is particularly effective for teaching high-risk, low-frequency skills such as life support, where real-time clinical exposure is limited.[1] Similarly, Shin et al. found through meta-analysis that simulation-based learning significantly improves nursing students' clinical competence compared to traditional teaching methods.[6]

The short-duration simulation session used in the present study resulted in measurable competency gains, suggesting that even brief, focused simulation experiences can be effective. However, evidence also suggests that life support skills may decline over time without reinforcement, highlighting the importance of periodic refresher training.[8]

Although the findings are encouraging, the modest increase in posttest scores indicates that a single

simulation session may not be sufficient to achieve optimal mastery. Longitudinal integration of simulation with repeated practice and objective skill assessment methods is recommended to enhance skill retention and clinical transfer.[7]

V. CONCLUSION

Simulation-based Pediatric Life Support training was effective in enhancing nursing students' competencies. Incorporation of structured simulation sessions into undergraduate nursing curricula can strengthen preparedness for pediatric emergencies and improve patient safety outcomes.

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