Effectiveness of Virtual Learning on Knowledge and Attitude Regarding Pediatric Advanced Life Support (PALS) Among Nursing Students: A Quasi-Experimental Study

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***Abstract*—Background**
Pediatric Advanced Life Support (PALS) is an essential competency for nursing students involved in pediatric emergency care. Traditional teaching methods may not provide adequate exposure to emergency scenarios, leading to gaps in knowledge and clinical decision-making skills. Virtual learning has emerged as an innovative educational strategy that enhances student engagement and learning outcomes.

Objectives
To assess the effectiveness of virtual learning on knowledge and attitude regarding Pediatric Advanced Life Support among nursing students.

Methods
A quasi-experimental pre-test and post-test design was adopted among 60 nursing students selected through purposive sampling. Participants were divided into an experimental group (n=30) and a control group (n=30). The experimental group received virtual learning through a structured instructional video on PALS, while the control group underwent traditional simulation-based training. Knowledge was assessed using a structured multiple-choice questionnaire, and attitude was measured using a Likert scale. Data were analyzed using descriptive and inferential statistics.
Results
The mean pre-test knowledge scores were comparable between the experimental group (7.4) and control group (7.8). Following the intervention, the experimental group demonstrated a significantly higher mean post-test knowledge score (12.6) compared to the control group (9.9) ($p < 0.05$). The attitude score was also significantly higher in the experimental group (54 ± 4.8) than in the control group (46 ± 3.6), indicating a positive perception of virtual learning ($t = 7.3$, $p < 0.001$).

Conclusion
Virtual learning significantly improved nursing students' knowledge and attitude regarding Pediatric Advanced Life Support. The findings support the integration of virtual learning strategies into nursing curricula to enhance emergency preparedness and clinical reasoning skills.

***Index Terms*—Virtual Learning, Pediatric Advanced Life Support, PALS, Nursing Students, Knowledge, Attitude, Simulation-Based Education.**

I. INTRODUCTION

The integration of artificial intelligence and digital technologies has transformed nursing education by providing innovative approaches to teaching and learning. Virtual learning environments, simulation platforms, and multimedia educational tools offer opportunities for students to engage in active and experiential learning. These approaches facilitate the acquisition of clinical competencies while ensuring learner safety.

Pediatric emergencies require rapid assessment, critical thinking, and timely interventions. Pediatric

Advanced Life Support (PALS) provides evidence-based guidelines for managing life-threatening conditions in children. However, nursing students often have limited opportunities to encounter pediatric emergencies during clinical training. Consequently, innovative educational strategies are necessary to bridge the gap between theoretical knowledge and clinical practice.

Virtual learning has gained recognition as an effective teaching modality capable of enhancing knowledge retention, clinical reasoning, and learner satisfaction. Therefore, this study aimed to evaluate the effectiveness of virtual learning on knowledge and attitude regarding PALS among nursing students.

II. BACKGROUND OF THE STUDY

Pediatric cardiac arrest remains a major global health concern, requiring healthcare professionals to possess adequate resuscitation knowledge and skills. Effective PALS training enables healthcare providers to recognize and manage pediatric emergencies promptly, thereby improving patient outcomes.

Recent advancements in educational technology have introduced virtual learning methods that allow learners to practice clinical decision-making in a safe and controlled environment. Studies have demonstrated that virtual simulation improves critical thinking, confidence, and knowledge acquisition among nursing students. Despite these advantages, limited evidence exists regarding the effectiveness of virtual learning in PALS education among nursing students in the Indian context.

III. NEED FOR THE STUDY

Limited exposure to pediatric emergency situations during clinical training.

Traditional teaching methods may not adequately prepare students for real-life emergencies.

Virtual learning offers flexible, interactive, and learner-centered educational experiences.

Evidence regarding the effectiveness of virtual learning in PALS education remains limited.

IV. OBJECTIVES

To assess the knowledge regarding Pediatric Advanced Life Support among nursing students.

To evaluate the effectiveness of virtual learning on PALS knowledge.

To compare post-test knowledge scores between experimental and control groups.

To assess students' attitudes toward virtual learning.

V. HYPOTHESES

H1: There is a significant difference in post-test knowledge scores between experimental and control groups.

H2: Virtual learning improves knowledge regarding PALS more effectively than traditional simulation methods.

H3: Nursing students develop a positive attitude toward virtual learning following the intervention.

VI. CONCEPTUAL FRAMEWORK

The study was guided by Betty Neuman's Systems Model, which emphasizes the interaction between environmental stressors and individual responses. Virtual learning served as an educational intervention designed to strengthen students' cognitive defenses and enhance their adaptation to clinical challenges associated with pediatric emergencies.

VII. METHODOLOGY

Research Design

A quasi-experimental pre-test and post-test control group design was adopted.

Setting

The study was conducted at Ganga College of Nursing, Coimbatore, Tamil Nadu, India.

Population and Sample

The study included 60 nursing students selected through purposive sampling.

Experimental Group: 30 students

Control Group: 30 students

Pilot Study

A pilot study was conducted among six nursing students, including three participants in each group. The study confirmed the feasibility of the research process and the reliability of the data collection

instruments.

Reliability

The reliability of the knowledge questionnaire was established using the Split-Half Method, demonstrating satisfactory internal consistency.

VIII. INTERVENTION

The experimental group received virtual learning through a structured instructional video demonstrating:

Patient assessment

Airway management

Chest compressions

Response management procedures in Pediatric Advanced Life Support

The control group received traditional simulation-based instruction covering identical learning objectives and duration.

IX. DATA COLLECTION INSTRUMENTS

Demographic Questionnaire

Structured Knowledge Questionnaire on PALS

Attitude and Satisfaction Likert Scale

X. DATA COLLECTION PROCEDURE

Ethical approval was obtained from the institutional ethics committee. Informed consent was secured from all participants. Pre-test assessments were conducted before the intervention. Following completion of the educational sessions, post-test assessments were administered.

XI. RESULTS

Demographic Characteristics

Among the participants, 83% were female and 17% were male. Most students (60%) were aged between 19 and 20 years. Equal representation was observed from B.Sc. Nursing and DGNM programs.

Knowledge Scores

Group	Pre-test Mean	Post-test Mean	t-value
Experimental	7.4	12.6	8.39
Control	7.8	9.9	4.79

The pre-test scores were comparable between groups. However, the experimental group demonstrated significantly greater improvement in post-test knowledge scores compared to the control group ($p < 0.05$).

Attitude Scores

Group	Mean Score	SD
Experimental	54	4.8
Control	46	3.6

The experimental group reported significantly higher attitude scores compared to the control group ($t = 7.3$, $p < 0.001$), indicating greater satisfaction and acceptance of virtual learning.

XII. DISCUSSION

The findings demonstrated that virtual learning significantly enhanced nursing students' knowledge regarding Pediatric Advanced Life Support. Students exposed to virtual learning achieved higher post-test scores than those receiving traditional simulation training. Furthermore, the positive attitude scores suggest that students perceived virtual learning as engaging, effective, and beneficial for clinical learning.

These findings are consistent with previous studies that reported improved learning outcomes, clinical reasoning, and learner satisfaction through virtual simulation and technology-enhanced learning strategies in nursing education.

XIII. CONCLUSION

Virtual learning is an effective educational strategy for improving knowledge and attitudes regarding Pediatric Advanced Life Support among nursing students. The incorporation of virtual learning approaches into nursing curricula may strengthen emergency preparedness, clinical reasoning, and learner engagement.

XIV. NURSING IMPLICATIONS

Virtual simulation technologies can enhance clinical competency development and promote safe learning experiences. Nursing educators should consider

integrating virtual learning resources into pediatric nursing education to prepare students for real-world emergency situations.

XV. RECOMMENDATIONS

Similar studies may be conducted using larger sample sizes.
Randomized controlled trials may be undertaken to strengthen evidence.
Qualitative studies can explore students' experiences with virtual learning.
Longitudinal studies may assess knowledge retention over time.

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