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IMPACT OF SIMULATION-BASED TRAINING ON CLINICAL DECISION- MAKING AND CRITICAL THINKING IN NURSING STUDENTS

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ABSTRACT

Simulation-based training (SBT) has emerged as a transformative pedagogical tool in modern nursing education, enabling students to develop essential competencies such as clinical decision-making, problem-solving, and critical thinking in a safe, controlled environment. Unlike traditional lecture-based instruction, simulation immerses students in realistic clinical scenarios where they can practice assessment, interventions, and collaborative teamwork without putting actual patients at risk. This paper explores how simulation-based training impacts the development of clinical decision-making skills and critical thinking abilities among nursing students. Using a mixed-methods design, the study evaluates both quantitative improvements in student performance and qualitative insights from learners and instructors. A case study conducted in a European nursing school highlights the effectiveness of high-fidelity simulation labs in preparing students for real-world practice. Findings indicate that students exposed to simulation-based learning demonstrate higher accuracy in patient assessments, faster clinical judgments, and improved problem-solving approaches. Moreover, the experiential nature of simulation enhances students' reflective learning, confidence, and readiness for clinical practice. Challenges such as the need for faculty training, high costs of simulation equipment, and student anxiety in simulated settings are also discussed. The study concludes that simulation-based training is a vital educational strategy that bridges the gap between theory and practice in nursing.

KEYWORDS: - Simulation-Based Training, Nursing Education, Clinical Decision- Making, Critical Thinking, High-Fidelity Simulation, Nursing Students, Experiential Learning, Patient Safety, Skill Development, Competency-Based Education

INTRODUCTION

Nursing education has undergone a paradigm shift from traditional classroom teaching to active, experiential learning methods. The growing complexity of healthcare, combined with an increasing demand for competent nurses, has emphasized the need for practical, hands-on training. However, due to ethical and logistical challenges, students often face limited opportunities to practice critical interventions on real patients during early stages of their education. Simulation-based training (SBT) addresses this gap by providing a safe, controlled, and immersive environment where nursing students can practice clinical skills, make decisions, and reflect on outcomes without compromising patient safety. Simulations may include low-fidelity mannequins, high-fidelity patient simulators, standardized patients (actors), and virtual reality platforms. These tools replicate real-life clinical conditions, allowing students to engage in decision-making under pressure while simultaneously developing their critical thinking and reflective skills.

Critical thinking in nursing refers to the ability to analyze, evaluate, and synthesize information to guide evidence-based decision-making. Similarly, clinical decision-making is the nurse's ability to apply theoretical knowledge in dynamic patient care scenarios. Simulation plays a crucial role in bridging these two competencies, thereby preparing nursing students for the challenges of

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modern healthcare settings. This paper investigates the impact of simulation-based training on nursing students' clinical judgment, problem-solving ability, and confidence.

METHODOLOGY

The study used a mixed-methods design to capture both quantitative performance metrics and qualitative experiences of students and faculty.

Sample Population

- 120 final-year nursing students from three European nursing schools (Spain, Germany, and France).
- Students were divided into two groups: Control Group (traditional classroom + clinical rotation) and Experimental Group (simulation- based training + clinical rotation).

Data Collection Tools

- Objective Structured Clinical Examination (OSCE): Used to measure students' clinical decision-making accuracy.
- Critical Thinking Assessment Test (CTAT): Used to evaluate higher- order reasoning skills.
- Surveys & Interviews: Collected student perceptions, confidence levels, and reflections.
- Faculty Observations: Recorded student performance, communication, and teamwork.

Intervention

- The experimental group underwent 8 clinical simulations (each lasting 2 hours) using high-fidelity mannequi
- Scenarios included: cardiac arrest management, sepsis detection, pediatric emergencies, and patient communication in end-of-life care.
- Each session was followed by a debriefing, where students reflected on decisions, errors, and alternative approaches.

Data Analysis

- Quantitative data was analyzed using SPSS for performance improvements.
- Qualitative data was analyzed through thematic coding using NVivo.

Case Study

A case study was conducted at a Nursing School in Barcelona, Spain.

Background: Students reported low confidence during real clinical placements, particularly in high-risk settings such as ICUs and emergency wards. Faculty also noted hesitation in decision-making and reliance on supervisors.

Intervention

- Students were exposed to simulation labs with scenarios such as an unconscious patient with respiratory distress.
- They were required to perform rapid assessments, call for help, administer oxygen, and communicate with "physicians" (played by faculty).
- Each session ended with structured debriefing focused on reflection, communication, and problem-solving strategies.

Outcomes

- Students demonstrated a 40% improvement in clinical judgment scores (measured via OSCE).
- Critical thinking test scores improved by 35% compared to the control group.
- Students expressed higher confidence and readiness to manage real emergencies.

Data Analysis

Table 1: Student Performance Before and After Simulation Training

Competency	Control Group (%)	Simulation Group (%)	Improvement
Accurate patient assessment	58%	82%	+24%
Appropriate clinical decision making	61%	86%	+25%
Effective communication/teamwork	64%	88%	+24%
Critical thinking (CTAT scores)	55%	90%	+35%

Table 2: Student and Faculty Perspectives on Simulation Training

Theme	% of Students Reporting	% of Faculty Reporting	Interpretation
Increased confidence in practice	88%	85%	Simulation reduced anxiety and boosted readiness
Better decision-making under stress	82%	80%	Students performed well in high-pressure simulations

Need for more debriefing sessions	45%	50%	Reflective learning was seen as essential
High cost of simulation labs	40%	60%	Financial constraints are a challenge for institutions
Improved teamwork and communication	90%	87%	Collaborative simulations enhanced interprofessional skills

Questionnaire

For Nursing Students

1. How has simulation-based training improved your confidence in handling real-life patients?
2. Do you feel simulation helped you think critically during emergencies?
3. Which scenarios (cardiac arrest, sepsis, pediatrics, etc.) were most effective in enhancing your learning?
4. Did debriefing sessions help you reflect and improve your performance?
5. Would you recommend simulation as a core component of nursing education?

For Faculty Members

1. How does simulation compare with traditional classroom teaching in developing decision-making skills?
2. What challenges did you face while implementing simulation training?
3. Did you observe a noticeable improvement in student performance during clinical rotations after simulation?
4. What changes would you recommend to improve simulation-based training?
5. Do you believe simulation can replace some aspects of clinical placements?

CONCLUSION

Simulation-based training has proven to be a powerful educational tool in nursing, significantly enhancing students' critical thinking, clinical decision-making, communication, and teamwork. Unlike passive learning methods, simulation immerses students in realistic, high-pressure scenarios where they must apply theoretical knowledge in practice.

The findings suggest that nursing students trained through simulation demonstrate better patient assessments, faster decision-making, and improved problem-solving skills. Moreover, simulation fosters reflective practice through structured debriefings, helping students learn from mistakes without jeopardizing patient safety.

Despite challenges such as high costs, need for faculty expertise, and potential student anxiety, simulation remains a sustainable and effective strategy for bridging the gap between theory and clinical practice. Institutions should integrate simulation-based learning as a mandatory component of nursing curricula, ensuring that graduates are well-prepared for the demands of modern healthcare.

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