

IMPACT OF SIMULATION-BASED LEARNING ON CRITICAL THINKING AND DECISION-MAKING SKILLS OF NURSING STUDENTS

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Abstract

Introduction: Critical thinking and decision-making are essential competencies for safe and effective nursing practice. Simulation-based learning (SBL) offers a controlled, risk-free environment for students to practice clinical scenarios, develop judgment, and reflect on outcomes. This study examined the impact of SBL on nursing students' critical thinking and decision-making skills.

Methods: A quasi-experimental pretest-posttest design was conducted with 60 third-year nursing students. Participants completed validated assessments: the Critical Thinking Skills Test (CTST) and the Clinical Decision-Making Scale (CDMS) before and after four structured simulation sessions. Classroom observations and a student perception questionnaire were used to evaluate engagement, learning experiences, and perceived benefits. Quantitative data were analyzed using paired t-tests and correlation analysis, while qualitative data were thematically coded.

Results: Post-test scores demonstrated significant improvements in both critical thinking (Pre-test M = 68.5; Post-test M = 82.3; $p < 0.001$) and decision-making skills (Pre-test M = 65.2; Post-test M = 79.8; $p < 0.001$). A strong positive correlation ($r = 0.74$, $p < 0.01$) indicated that enhanced critical thinking directly contributed to improved clinical decision-making. Students reported increased confidence, engagement, and readiness for clinical practice. Challenges included simulation-related stress, time constraints, and initial unfamiliarity with technology.

Conclusion: Simulation-based learning significantly enhances nursing students' critical thinking and decision-making abilities, providing experiential, reflective, and engaging opportunities to bridge theory and practice. Regular integration of SBL, supported by faculty training, adequate resources, and structured debriefing, is recommended to optimize learning outcomes and prepare students for real-world clinical challenges.

Keywords: Simulation-Based Learning, Nursing Education, Critical Thinking, Decision-Making Skills, Clinical Competency, Student Engagement.

Introduction

Critical thinking and decision-making are core competencies in nursing practice, essential for ensuring patient safety, quality care, and effective clinical judgment (Facione, 2011). Nursing education increasingly seeks innovative methods to develop these competencies, with simulation-based learning (SBL) emerging as a powerful pedagogical tool. SBL provides a safe, controlled environment where students can practice clinical scenarios, make decisions, and reflect on outcomes without endangering patients (Jeffries, 2020).

Previous research indicates that simulation improves knowledge retention, clinical skills, and confidence (Cant & Cooper, 2010). However, the extent to which SBL specifically enhances critical thinking and decision-making skills in nursing students requires further empirical investigation. Understanding this impact can guide curriculum development and teaching strategies in nursing education.

This study aimed to:

1. Examine the effect of simulation-based learning on critical thinking skills among nursing students.
2. Assess the impact of SBL on decision-making abilities in clinical scenarios.

Explore students' perceptions of the benefits and challenges of SBL.

Methods

Research Design

A quasi-experimental pretest-posttest design was employed to determine the impact of SBL on critical thinking and decision-making skills.

Participants

The study involved 60 third - year nursing students

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from a tertiary nursing school. Participants were selected using purposive sampling and had completed at least one clinical rotation.

Instruments

1. **Critical Thinking Skills Test (CTST):** A validated instrument measuring analytical, inference, and reasoning skills (Facione, 2011).
2. **Clinical Decision-Making Scale (CDMS):** Assessed students' decision-making in hypothetical and simulated clinical scenarios (Lauder et al., 2013).
3. **Student Perception Questionnaire:** Explored experiences, engagement, and perceived benefits of SBL.

Procedure

Participants completed pre-tests for critical thinking and decision-making. They then engaged in four structured SBL sessions involving scenarios such as patient assessment, emergency response, and care prioritization. Post-tests were administered immediately after the sessions, and feedback sessions were conducted to facilitate reflective learning.

Data Analysis

Quantitative data were analyzed using paired t-tests to determine differences in pre- and post-test scores. Correlation analysis examined the relationship between critical thinking and decision-making improvements. Qualitative data from student perceptions were analyzed thematically.

Results

The study revealed significant improvements in both critical thinking and decision-making skills among nursing students following simulation-based learning (SBL) interventions.

Critical Thinking Skills

Post-test results indicated a substantial increase in critical thinking scores (Pre-test $M = 68.5$, $SD = 8.2$; Post-test $M = 82.3$, $SD = 7.5$; $t(59) = 12.45$, $p < 0.001$). Improvements were most notable in the domains of analysis, inference, evaluation, and reasoning. Students demonstrated enhanced ability to analyze patient data systematically, evaluate treatment priorities, and predict potential outcomes. Observations during SBL sessions indicated that students engaged in structured reflection, comparing alternative interventions and evaluating consequences before taking action, suggesting that SBL promotes higher-order cognitive processes.

Decision-Making Skills

Decision-making scores improved significantly (Pre-test $M = 65.2$, $SD = 7.9$; Post-test $M = 79.8$, $SD = 6.9$; $t(59) = 11.38$, $p < 0.001$). Students exhibited

increased confidence in making timely and appropriate clinical decisions, particularly in prioritizing care, responding to emergencies, and delegating tasks. Observational data indicated that students applied evidence-based reasoning and adjusted interventions according to patient responses during simulations.

Relationship Between Critical Thinking and Decision-Making

A strong positive correlation ($r = 0.74$, $p < 0.01$) was observed between post-test critical thinking and decision-making scores, demonstrating that improvements in analytical and evaluative skills directly contributed to enhanced clinical judgment.

Student Perceptions

Thematic analysis of student perceptions highlighted that SBL promoted confidence, engagement, and preparedness for real-world scenarios. Students appreciated the opportunity to practice without risk to patients and valued immediate feedback from instructors. Challenges included stress during high-fidelity simulations, time constraints, and initial unfamiliarity with simulation technology, which temporarily affected performance.

Discussion

The results underscore the significant role of simulation-based learning in nursing education. The marked improvement in critical thinking aligns with Facione (2011), indicating that structured practice scenarios foster analytical, evaluative, and reflective thinking skills essential for safe and effective nursing practice. Students' ability to systematically analyze patient conditions, anticipate complications, and reflect on outcomes demonstrates that SBL enhances clinical reasoning under realistic conditions.

The improvement in decision-making skills supports previous research by Cant and Cooper (2010), which found that experiential learning allows students to develop problem-solving skills and confidence in handling complex clinical situations. The strong correlation between critical thinking and decision-making reinforces the concept that these competencies are interdependent: enhanced analytical abilities enable more accurate, timely, and contextually appropriate clinical decisions.

Student feedback suggests that experiential engagement, immediate feedback, and reflective practice are key mechanisms through which SBL enhances learning outcomes. However, the challenges identified - stress, resource limitations, and time constraints - highlight systemic barriers that could limit the scalability and effectiveness of

simulation programs. Educators should consider incremental exposure to simulation, structured debriefing, and adequate preparation to reduce anxiety and maximize learning.

The findings suggest that simulation-based learning is an effective pedagogical tool that bridges theoretical knowledge and practical application, fostering competency, confidence, and clinical judgment among nursing students. Integrating SBL consistently into nursing curricula can create more practice-ready graduates capable of delivering safe and high-quality patient care.

Conclusion

This study concludes that simulation-based learning has a significant and positive impact on critical thinking and decision-making skills of nursing students. SBL enhances students' ability to analyze patient data, evaluate treatment options, prioritize interventions, and make timely, evidence-based clinical decisions. These improvements are crucial for patient safety, quality care, and professional readiness.

Student perceptions confirm that SBL fosters confidence, engagement, and preparedness for real-world clinical scenarios, highlighting its effectiveness as a teaching strategy. However, challenges such as simulation-related stress, limited resources, and time constraints must be addressed to optimize the learning experience.

To maximize the benefits of SBL, nursing programs should integrate regular, structured simulation sessions, provide faculty training, ensure access to high-fidelity simulation resources, and incorporate reflective debriefings. Future research should explore long-term retention of skills, the comparative effectiveness of high-fidelity versus low-fidelity simulations, and interdisciplinary simulations to enhance collaborative practice.

In conclusion, a holistic integration of simulation-based learning into nursing curricula not only strengthens critical thinking and decision-making skills but also prepares students for the complexities and uncertainties of real-world clinical practice, ultimately improving patient care outcomes and nursing competency.

Conflicts of Interest

The authors declare that there are no conflict of interest in this manuscript. Results have been deduced objectively; nothing influenced this result by any individual, monetary, or institutional interests. In effect, utmost endeavors were in order to conduct a bias-free operation of gathering and analyzing the data into interpretation and producing

a study based on merit, away from research inconsistencies.

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