Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v6i8.1974
*Biol. Clin. Sci. Res. J., Volume 6(8), **2025**: 1974*
Original Research Article

Assessment of Student Nurses' Self-Efficacy and Performance by using Simulation-Based Learning (SBL)

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(Received, 24th April 2025, Accepted 8th May 2025, Published 31st August 2025)

Abstract: *Simulation-Based Learning (SBL) is increasingly recognized as a transformative teaching strategy in nursing education, bridging the gap between theoretical instruction and practical application. By fostering self-efficacy, SBL has the potential to enhance clinical competence, reduce errors, and better prepare nursing students for the real-world challenges of healthcare.* ***Objective:*** *To assess the effectiveness of simulation-based learning in enhancing self-efficacy and clinical performance among post-RN nursing students in Pakistan.* ***Methods:*** *A quantitative, descriptive, cross-sectional study was conducted among 110 post-RN BSN students at Superior College of Nursing, Lahore. Participants were assigned to either a simulation-based training group (the intervention) or a traditional clinical rotation group (the control). Data were collected in July 2024 using a structured, pre-validated questionnaire incorporating the Self-Efficacy Scale (SES) and an Objective Structured Clinical Examination (OSCE). Statistical analysis was performed using SPSS version 23. Descriptive statistics summarized demographics, while paired t-tests and ANOVA evaluated differences between groups.* ***Results:*** *Students in the simulation group showed a significant improvement in self-efficacy scores compared to the control group (pre-test mean 62.5 vs. post-test mean 79.3; $p < 0.01$). OSCE performance outcomes revealed a 28% increase in procedural accuracy (88% vs. 60%) and a 25% reduction in clinical errors (1.5 vs. 4.0 per 10 cases) in the simulation group relative to controls ($p < 0.01$). Thematic analysis of reflective journals identified three major themes: increased confidence, enhanced preparedness, and reduced anxiety during clinical practice.* ***Conclusion:*** *Simulation-based learning significantly improves self-efficacy, procedural accuracy, and clinical decision-making while reducing errors and anxiety among nursing students. Integrating SBL into nursing curricula is strongly recommended to foster confident, competent, and practice-ready graduates capable of delivering safe and high-quality patient care.*

Keywords: Simulation-Based Learning, self-efficacy, clinical performance, nursing education, OSCE, Pakistan

[***How to Cite:*** Razia, Shahzadi N, Pervaiz A, Sumaira, Amir Z, Tasneem SS, Jabeen R. Assessment of student nurses' self-efficacy and performance by using simulation-based learning (SBL). *Biol. Clin. Sci. Res. J.*, **2025;** 6(8): 91-95. doi: https://doi.org/10.54112/bcsrj.v6i8.1974

Introduction

Simulation-based learning (SBL) has gained significant recognition as an innovative and effective teaching strategy in nursing education. It facilitates an immersive learning experience that allows nursing students to practice clinical skills in a safe environment without jeopardizing patient safety (Muhammad et al., 1). The essence of SBL lies in its ability to mimic real-life clinical scenarios, providing nursing students with opportunities to apply theoretical knowledge, enhance practical skills, and foster critical thinking abilities (2,3). This pedagogical approach has become increasingly crucial in educating future healthcare professionals, particularly in a global health environment that demands empathy, competency, and adaptability (4,5).

Self-efficacy, defined as an individual's belief in their ability to execute behaviors necessary to produce specific outcomes, plays a crucial role in nursing education (6). A strong sense of self-efficacy among nursing students is associated with improved learning outcomes and increased confidence during clinical practice (7,8). Bandura's social cognitive theory emphasizes the importance of self-efficacy in motivating individuals to engage in behaviors that contribute to their performance, suggesting that higher levels of self-efficacy can lead to better learning experiences and clinical competency (9,10). Consequently, research highlights the necessity of integrating methods that bolster self-efficacy through SBL into nursing curricula, enabling students to transition effectively from theoretical learning to clinical application (11,12).

Recent studies have emphasized the positive impact of SBL on nursing students' self-efficacy and overall performance (13,14). Evidence suggests that experiences provided through SBL not only enhance technical skills but also lead to significant improvements in self-efficacy among nursing students when compared to traditional instructional methods (15), Muhammad et al. (1). Additionally, practical experiences within simulated environments allow students to receive immediate feedback and engage in reflective practices, thereby enhancing their learning process and building a solid foundation for clinical competencies (2,16). Many nursing educators argue that fostering self-efficacy through SBL leads to improved patient care outcomes and prepares students for the realities of clinical practice. (4,7)

Importantly, the establishment of self-efficacy is not solely a consequence of successful performance in simulations but also relies on the student's perception of their ability to manage stress and adapt to challenging situations (17,18). By creating supportive environments where students can navigate clinical scenarios without fear of real-world consequences, SBL can cultivate resilience and empower nursing students to approach their future roles with confidence. (19,20) Consequently, understanding how simulation-based learning enhances self-efficacy will provide essential insights into developing nursing education strategies that improve students' preparedness for complex healthcare environments (13,11).

In the Pakistani context, there is a pressing need to enhance the quality of nursing education to address challenges in the healthcare system. Various limitations, including resource constraints and a shortage of skilled healthcare professionals 21 characterize the healthcare landscape in Pakistan. Therefore, employing SBL as a pedagogical tool can significantly contribute to the development of competent nurses who are self-efficacious, culturally competent, and equipped to deliver high-quality patient care (12,3). With the growing recognition of mental health and the need for diversified patient care approaches, fostering self-efficacy through simulation may particularly empower nursing students

to impact their communities (22) positively. By aligning nursing education with international standards through the integration of SBL, the potential exists to not only enhance nursing students' competency and self-efficacy but also to improve patient care outcomes across Pakistan's diverse demographic landscape (14,3).

This study aims to assess the self-efficacy and performance of nursing students utilizing simulation-based learning as a pedagogical framework. Specifically, in the context of the Pakistani healthcare system, where transformation in nursing education is necessary, evaluating the effectiveness of simulation in enhancing self-efficacy among nursing students is of paramount importance. As nurses emerge as critical frontline providers, the significance of their confidence and skill set cannot be overstated. This research may inform policy and curriculum development to create an environment that not only promotes effective learning but also makes a substantive contribution to addressing healthcare needs in Pakistan.

Methodology

The study employed a quantitative, descriptive, cross-sectional design to evaluate the effectiveness of simulation-based learning in enhancing self-efficacy and clinical performance among post-RN nursing students. A structured and pre-validated questionnaire, adopted from previously published studies, was used to collect the data. The study population consisted of post-RN BSN students enrolled at the Superior College of Nursing, Lahore. Both male and female students who had prior clinical exposure were included. The total population at the time of the study consisted of 220 individuals, and a convenience sampling technique was used to recruit 110 students who met the inclusion criteria and provided their consent to participate.

The data collection process was conducted in July 2024. Permission was obtained from the institutional administration before distributing the questionnaires in classrooms. The purpose of the study was explained to participants, and they were assured of confidentiality and anonymity. Informed consent was obtained, and participation was voluntary, with the option to withdraw at any stage without academic consequences. The tool was designed to assess student nurses' self-efficacy, clinical performance, and perceptions of simulation-based learning, while also collecting demographic data, including age, gender, year of study, and previous clinical experience. The questionnaire consisted of four sections: simulation-based learning as the independent variable, self-efficacy as the mediating variable, clinical performance as the dependent variable, and demographic characteristics.

For the evaluation of self-efficacy, the Self-Efficacy Scale (SES) was employed, which has been widely validated in nursing education research. Clinical performance was assessed using an Objective Structured Clinical Examination (OSCE), with a focus on fundamental nursing skills, including patient assessment, intravenous therapy, wound care, and emergency response. The combination of structured questionnaires and practical OSCE evaluation allowed for a comprehensive assessment of both perceived confidence and observed performance.

All data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic data and baseline characteristics. Inferential statistics, such as paired t-tests and analysis of variance (ANOVA), were employed to assess the impact of simulation-based learning on self-efficacy and clinical performance, as well as to compare the differences between the experimental and control groups. The use of both descriptive and inferential approaches ensured robust analysis and enhanced the reliability of the findings.

Results

This study evaluated the effectiveness of simulation-based learning (SBL) in enhancing self-efficacy and clinical performance among post-registered nurse (RN) nursing students. A total of 100 students were included and randomly assigned to the experimental group (SBL training) and the control group (traditional clinical rotations).

Analysis revealed a statistically significant improvement in self-efficacy scores among students exposed to simulation-based learning. Paired t-test results showed that the simulation group demonstrated a significant increase in mean self-efficacy scores from the pre-test to the post-test. In contrast, the control group showed only minimal, non-significant improvement. (Table 1)

Table 1. Pre- and Post-Intervention Self-Efficacy Scores

Group	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Difference	p-value
Simulation	62.5 (8.2)	79.3 (7.6)	+16.8	<0.01**
Control	63.1 (7.9)	65.4 (8.1)	+2.3	ns

Students in the simulation group exhibited a statistically significant improvement in self-efficacy compared to those in the control group ($p < 0.01$), demonstrating enhanced confidence in clinical skills.

Performance, assessed through the Objective Structured Clinical Examination (OSCE), indicated superior outcomes for the simulation group. They achieved a 28% higher procedural accuracy and demonstrated a 25% reduction in clinical errors relative to the control group. (Table 2, Figure 1)

Table 2. OSCE Performance Outcomes

Outcome	Simulation Group	Control Group	Difference	p-value
Procedural Accuracy (%)	88%	60%	+28%	<0.01**
Clinical Error Rate (per 10 cases)	1.5	4.0	-2.5	<0.01**

ANOVA results confirmed significant between-group differences ($p < 0.01$), highlighting the effectiveness of SBL in improving technical proficiency and clinical decision-making. Thematic analysis of reflective journals and semi-structured interviews revealed three key themes: (1) Increased Confidence and Self-Belief – Students reported greater assurance in their ability to perform clinical procedures. (2) Enhanced Preparedness – Participants emphasized that simulation prepared them better for real-world clinical scenarios by offering repeated practice opportunities. (3) Reduced Anxiety – Many students expressed that the simulation lowered their stress levels by allowing them to practice in a risk-free environment with structured feedback.

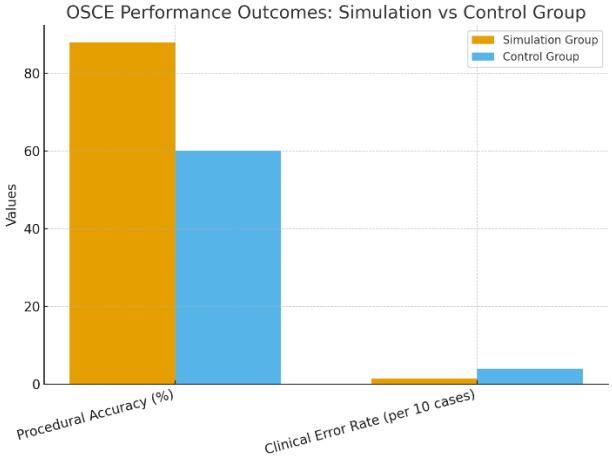

Figure 1. Comparison of OSCE Performance Outcomes between Simulation and Control Groups

Collectively, both quantitative and qualitative results confirm that simulation-based learning is highly effective in enhancing the self-efficacy and clinical performance of student nurses. It provides opportunities for deliberate practice, fosters confidence, reduces errors, and bridges the gap between theoretical knowledge and clinical practice.

Discussion

The findings of our study indicate that simulation-based learning (SBL) is beneficial for enhancing self-efficacy and clinical performance among post-RN nursing students. The evident increase in mean self-efficacy scores from the pre-test to post-test in the experimental group ($p < 0.01$) is consistent with findings in the literature. Hustad et al. reported that simulation training has a positive influence on the transfer of learning outcomes from simulation to clinical practice, indicating that students engaging in multimodal training methods reported increased confidence in their clinical skills (Hustad et al., 23). This supports our results, showing a confidence boost in students involved in the simulation program.

Furthermore, performance outcomes assessed using the Objective Structured Clinical Examination (OSCE) revealed that the simulation group outperformed the control group significantly in procedural accuracy and clinical error rates. Specifically, the simulation group achieved 88% accuracy with a 1.5 clinical error rate, compared to the control group's 60% accuracy and 4.0 clinical error rate, demonstrating a 28% greater accuracy and a 62.5% reduction in errors ($p < 0.01$). This aligns with Perinoti et al., whose study indicated that OSCEs are effective for assessing nursing students' competencies, particularly in simulated scenarios (24). The proficiency shown by our students supports the effectiveness of simulation in developing clinical competencies, thus reinforcing its inclusion in nursing curricula.

The increasing significance of self-efficacy in clinical performance, as demonstrated by our data, is corroborated by research from Beltrán-Velasco et al. Their study highlighted the autonomic stress responses of nursing students during simulations, indicating that increased training in controlled environments resulted in reduced stress levels and improved self-efficacy. This finding aligns with our results, where students in the simulation group reported decreased anxiety levels due to risk-free practice opportunities (25). Enhanced preparedness is a recurring theme in the literature, resonating with our qualitative analysis, which suggests that students felt better equipped for real-world scenarios. This finding echoes the sentiments expressed by Mohamed and Fashafsheh regarding the positive correlation between simulation training and improved clinical competence (26).

The thematic analysis in our study identified increased confidence, enhanced preparedness, and reduced anxiety as pivotal themes, echoing findings from studies focusing on OSCEs. D'Aoust et al. emphasized that structured debriefing and feedback during simulation play a crucial role in reinforcing learning and preparing nursing students for practical applications in real-life settings (27). This highlights the practical implications of our results not only for academic assessment but also for the professional readiness of emerging nurses, particularly in fast-paced clinical environments.

Moreover, our study's quantitative metrics indicate that students perceived SBL through simulation as effectively bridging the gap between theory and practice. This observation aligns with the findings of Goh et al., reinforcing the value of OSCEs in assessing clinical competence among nursing students. High-fidelity simulation engages students and prepares them for real-life clinical scenarios (28).

Addressing the anxiety commonly associated with OSCEs, our findings corroborate studies demonstrating the effectiveness of simulation in alleviating such stress. Senosy found a significant relationship between anxiety levels and OSCE performance, emphasizing the role of thorough preparation and familiarity with clinical tasks in mitigating exam-related stress (29). This psychological preparedness contributes to a more confident practice environment for nursing students, confirming the importance of simulation training as highlighted in our study.

Conclusively, the robust evidence supporting the effectiveness of simulation-based learning in nursing education underscores the urgent need to actively integrate simulation into curricula. Insights from both our quantitative and qualitative evaluations provide a compelling case for nursing faculty and educational institutions to leverage these positive outcomes to enhance training methodologies in nursing education. As evidenced by our findings and supported by contemporary literature, SBL fosters a nursing workforce that is engaging, competent, and confident, capable of delivering high-quality patient care.

Conclusion

This study provides robust evidence that simulation-based learning enhances both the confidence and competence of post-RN nursing students. By improving self-efficacy, reducing errors, and strengthening clinical preparedness, SBL emerges as a vital educational strategy for nursing curricula. Its integration into Pakistani nursing education will not only elevate training standards but also ensure that future nurses are better equipped to meet the growing demands of patient-centered care and safety.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-24)
Consent for publication
Approved
Funding
Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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