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Effectiveness of simulation learning methods on improving the clinical skills of nursing students in midwifery care

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ABSTRACT

Introduction: Clinical competence is a crucial component of nursing education, particularly in midwifery care, where students must integrate knowledge, technical skills, and decision-making to ensure the safety of both mothers and newborns. Traditional classroom learning often fails to provide sufficient opportunities for hands-on experience. Simulation-based learning has emerged as an innovative pedagogical approach to enhance clinical competence in a safe and controlled environment. This study aimed to evaluate the effectiveness of simulation learning methods in improving the clinical skills of nursing students in midwifery care.

Methods: A quasi-experimental pre–post design was conducted among 80 nursing students enrolled in a midwifery course. The intervention group participated in a structured simulation learning program involving high-fidelity obstetric manikins and scenario-based training on antenatal, intrapartum, and postpartum care. The control group received conventional lectures and demonstrations. Data were collected using an Objective Structured Clinical Examination (OSCE) checklist and a self-efficacy questionnaire before and after the intervention. Paired and independent t-tests were used to analyze changes in clinical skill scores and confidence levels.

Results: The findings revealed a significant improvement in the clinical performance of students in the simulation group (mean score increase from 68.4 ± 7.2 to 86.7 ± 6.5; $p < 0.001$) compared to the control group (72.1 ± 8.0 to 75.8 ± 7.6; $p = 0.054$). Students also reported enhanced confidence and readiness for real clinical practice.

Conclusion: Simulation-based learning effectively improves clinical skills and self-efficacy in midwifery education. Integration of simulation into nursing curricula can bridge the gap between theory and practice, ensuring better preparedness for clinical settings.

Keywords: Clinical Skills, Midwifery Care, Nursing Education, Simulation Learning, Students.

INTRODUCTION

Clinical competence is a core outcome of nursing education and a fundamental requirement for ensuring safe and effective patient care. In midwifery education, clinical skills are particularly crucial because students must demonstrate proficiency in managing various aspects of pregnancy, childbirth, and postnatal care that require both technical expertise and sound clinical judgment (Hijrah et al., 2025). The acquisition of these competencies, however, remains a challenge in traditional nursing education models, where learning often relies heavily on theoretical lectures and limited clinical exposure (Wibowo et al., 2025). Many nursing students report feelings of anxiety, unpreparedness, and lack of confidence when transitioning from the classroom to clinical settings, especially in obstetric care, where real-life scenarios can be complex and unpredictable (Ajeng Wijayanti et al., 2025).

Simulation-based learning has emerged as a transformative educational approach that bridges the gap between theory and practice in the training of health professionals. Simulation provides a safe, structured environment where students can practice clinical skills, make decisions, and manage complications without putting patients at risk (Suprapto, Arda, et al., 2025). It enables repetitive practice, immediate feedback, and reflection, key elements of adult learning theory. Experiential learning through simulation fosters a more profound understanding, enhances skill retention, and facilitates the transfer of knowledge to clinical practice. In midwifery education, simulation-based learning (SBL) can replicate realistic maternal and neonatal care situations, enabling students to perform antenatal assessments, assist in delivery, and manage obstetric emergencies in a controlled, learner-centered environment (Suprapto, Nurafriani, et al., 2025).

Recent studies have shown that simulation learning significantly enhances students' clinical competence and self-confidence. High-fidelity simulation improved nursing students' decision-making and psychomotor skills compared to traditional demonstrations. Students exposed to simulated childbirth scenarios displayed better teamwork, communication, and technical performance in labor management. Simulation learning also fosters emotional resilience and reduces clinical anxiety, a crucial factor in midwifery, where effective stress management directly impacts patient outcomes (Temple et al., 2025).

Despite growing evidence supporting the use of simulation in nursing education, its integration into midwifery programs remains inconsistent, particularly in developing countries. Barriers, including limited access to simulation laboratories, inadequate faculty training, and the high cost of equipment, often hinder the widespread implementation of simulation-based education (Sengul et al., 2025). Furthermore, while many institutions adopt simulation for emergency obstetric training, few studies have evaluated its broader effectiveness across the continuum of midwifery care, including antenatal, intrapartum, and postpartum management. This highlights a critical gap in understanding how simulation learning influences overall clinical skill development and student confidence in providing comprehensive maternal care. Midwifery education requires a high level of clinical readiness due to the unpredictable and high-stakes nature of childbirth (Bäck et al., 2025). Nursing students must be able to perform essential procedures such as fetal monitoring, assisting in regular deliveries, identifying complications, and providing postpartum care with precision and empathy. Simulation enables learners to engage in realistic, case-based scenarios that mirror these clinical situations, promoting critical thinking, teamwork, and practical communication skills. Unlike passive observation in clinical rotations, simulation actively involves students in patient care decision-making, thus cultivating clinical reasoning and accountability (Hayes et al., 2025).

Moreover, simulation-based education aligns well with the principles of competency-based education (CBE), which focuses on measurable outcomes and skill mastery (Görücü et al., 2024). In midwifery, competency involves not only technical procedures but also interpersonal skills such as empathy, cultural sensitivity, and patient-centered communication. Simulation provides a comprehensive platform for evaluating these competencies through structured assessment tools, such as the Objective Structured Clinical Examination (OSCE) and performance rubrics, ensuring

that students achieve clinical readiness before entering real-world practice environments (Yang et al., 2025).

Given these trends, evaluating the effectiveness of simulation-based learning in developing midwifery clinical skills is essential. The integration of simulation into nursing curricula should not only aim to enhance psychomotor performance but also to improve critical thinking, confidence, and professional behavior attributes necessary for safe maternity care. In resource-limited educational settings, such as many in Asia and Africa, evidence-based implementation of simulation can help overcome clinical training constraints and ensure standardized skill acquisition among nursing students.

Therefore, this study aims to assess the effectiveness of simulation learning methods in improving the clinical skills of nursing students in midwifery care. Specifically, it examines how simulation influences students' performance on clinical skill assessments and their self-efficacy in managing midwifery procedures. The findings are expected to contribute to the growing body of literature supporting simulation as a core component of nursing education and provide practical recommendations for enhancing midwifery training programs. Ultimately, enhancing the clinical competence of future midwives through simulation-based learning can lead to improved maternal and neonatal outcomes, aligning with global health goals for safe motherhood and high-quality reproductive healthcare.

RESEARCH METHODOLOGY

Study Design and Setting

This study employed a quasi-experimental pre–post test design with a control group to evaluate the effectiveness of simulation learning in improving the clinical skills of nursing students in midwifery care. The study was conducted at the Nursing and Midwifery Department of Politeknik Sandi Karsa, which offers a diploma and bachelor's program in nursing education. The simulation sessions were conducted in the institution's clinical skills laboratory, equipped with high- and medium-fidelity manikins and standardized obstetric models that replicate antenatal, intrapartum, and postpartum scenarios.

Population and Sampling

The study population consisted of third-year nursing students enrolled in the midwifery course. The inclusion criteria were: (1) active enrollment in the midwifery module, (2) no prior clinical placement in maternity wards, and (3) consent to participate voluntarily. Exclusion criteria included students with prior midwifery experience or those who were unable to attend all simulation sessions. A total of 80 students were selected through purposive sampling and divided into two groups of 40 each: an intervention group that received simulation-based learning and a control group that received traditional lecture-demonstration methods. Sample size determination was based on power analysis ($\alpha = 0.05$, power = 0.80), ensuring adequate statistical sensitivity to detect differences in mean performance scores.

Intervention Procedure

The simulation learning program spanned six weeks, consisting of weekly sessions of 2–3 hours each. The intervention group participated in structured simulation activities focusing on key areas of midwifery care: antenatal assessment, management of normal labor, immediate newborn care, postpartum management, and handling obstetric emergencies such as postpartum hemorrhage. Each session included: a pre-briefing, where objectives and learning expectations were introduced; a scenario-based simulation using high-fidelity obstetric simulators (e.g., MamaNatalie, Noelle); and a debriefing, facilitated by trained instructors using the GAS (Gather–Analyze–Summarize) method to encourage reflection and feedback. The control group received traditional lectures, demonstrations, and supervised return demonstrations without simulated scenarios. Both groups were taught by instructors with equivalent teaching experience, thereby controlling for faculty-related bias.

Data Collection Instruments

Data were collected using two validated instruments: the Objective Structured Clinical Examination (OSCE) checklist, adapted from the International Confederation of Midwives (ICM)

competency standards, used to assess clinical performance across technical and communication domains. Self-Efficacy Questionnaire for Clinical Skills (SEQ-CS), a 20-item Likert-scale instrument evaluating students' confidence in performing midwifery procedures (Cronbach's α = 0.89). Both instruments were administered before and after the intervention. Simulation sessions were video-recorded (with participant consent) to ensure objective evaluation and inter-rater reliability.

Data Analysis

Data were analyzed using SPSS version 26.0. Descriptive statistics (mean, SD, and frequency) were used to describe participant characteristics. Paired t-tests assessed within-group changes in pre- and post-test scores, while independent t-tests compared mean differences between the simulation and control groups. ANCOVA was performed to adjust for baseline differences. The level of statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical clearance was obtained from the Institutional Review Board (IRB) of Politeknik Sandi Karsa B-335/PT19/VI/2025. Permission was also obtained from the Head of the Nursing Department. All participants received information about the study objectives, confidentiality assurances, and their right to withdraw without penalty. Written informed consent was obtained from each student before participation.

Summary of Methodology

This quasi-experimental design enabled the assessment of the impact of simulation learning on both clinical competence and self-efficacy among nursing students in midwifery care. By combining objective skill evaluation (OSCE) with self-perceived confidence (SEQ-CS), the methodology offers a comprehensive assessment of simulation effectiveness in preparing students for real-world clinical environments.

RESULTS

A total of 80 nursing students participated in the study, with 40 in the intervention group and 40 in the control group. All participants completed the pre- and post-tests. The mean age was 21.6 ± 1.2 years, and the majority were female (90%). There were no significant differences between the two groups in baseline characteristics such as age, prior exposure to clinical practice, or academic performance ($p > 0.05$), indicating homogeneity of the sample..

Table 1. Baseline Characteristics of Participants (n = 80)

Variable	Intervention (n = 40)	Control (n = 40)	p-value
Age (years), mean ± SD	21.7 ± 1.1	21.5 ± 1.3	0.528
Gender (Female), n (%)	36 (90%)	36 (90%)	1.000
GPA (mean ± SD)	3.42 ± 0.31	3.39 ± 0.33	0.711
Prior clinical experience, n (%)	8 (20%)	7 (17.5%)	0.774

No significant difference at baseline between groups ($p > 0.05$).

Following the intervention, there was a significant increase in the mean Objective Structured Clinical Examination (OSCE) scores among the simulation group compared to the control group. The mean OSCE score in the simulation group improved from 68.4 ± 7.2 to 86.7 ± 6.5 ($p < 0.001$), while the control group showed a more minor, non-significant increase from 72.1 ± 8.0 to 75.8 ± 7.6 ($p = 0.054$). The between-group difference in post-test scores was statistically significant ($t = 6.41$, $p < 0.001$).

Table 2. Comparison of Pre- and Post-Test OSCE Scores

Group	Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Mean Difference	p-value (within group)
Intervention	68.4 ± 7.2	86.7 ± 6.5	18.3 ± 5.2	<0.001***
Control	72.1 ± 8.0	75.8 ± 7.6	3.7 ± 5.8	0.054
Between-group p-value	-	-	-	<0.001***

**p < 0.001 indicates significant improvement in the simulation group.

The self-efficacy levels of students in the simulation group improved significantly after the intervention. The mean self-efficacy score increased from 3.21 ± 0.48 to 4.32 ± 0.44 ($p < 0.001$), while the control group improved modestly from 3.25 ± 0.46 to 3.48 ± 0.49 ($p = 0.063$). Between-group comparison revealed a statistically significant difference in post-test self-efficacy ($p < 0.001$).

Table 3. Improvement in Clinical Skills (OSCE) and Self-Efficacy Scores After Simulation Learning (Intervention Group, n = 40)

Variable / Domain	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference	p-value
Overall OSCE Score	68.4 ± 7.2	86.7 ± 6.5	18.3 ± 5.2	<0.001
Self-Efficacy Score (SEQ-CS)	3.21 ± 0.48	4.32 ± 0.44	1.11 ± 0.42	<0.001
Antenatal Assessment	69.3 ± 6.9	86.9 ± 6.2	17.6 ± 5.0	<0.001
Intrapartum Care	66.5 ± 7.4	88.6 ± 6.1	22.1 ± 5.6	<0.001
Newborn Care	68.7 ± 6.8	85.1 ± 6.3	16.4 ± 4.9	<0.001
Postpartum Management	69.2 ± 7.1	86.3 ± 5.8	17.1 ± 5.3	<0.001

$p < 0.001$ indicates statistically significant improvement in all domains and self-efficacy.

Table 3 presents the combined results of the Objective Structured Clinical Examination (OSCE) and Self-Efficacy Questionnaire (SEQ-CS) for the intervention group following the implementation of simulation-based learning in midwifery education. The data show a consistent and statistically significant improvement across all domains of midwifery care, including antenatal, intrapartum, newborn, and postpartum management, as well as in overall self-efficacy. The mean OSCE score increased from 68.4 to 86.7 ($p < 0.001$), indicating a significant improvement in students' clinical performance after exposure to simulation scenarios. Among all domains, the greatest improvement occurred in intrapartum care (mean difference = 22.1 points), suggesting that simulated birth scenarios effectively enhance students' ability to manage labor and delivery procedures safely and confidently.

Equally important, the self-efficacy score rose from 3.21 to 4.32 ($p < 0.001$), indicating that simulation learning not only strengthened technical competence but also boosted students' confidence and perceived readiness for clinical practice. This improvement reflects the experiential and reflective nature of simulation-based education, which allows learners to practice repeatedly, receive feedback, and build confidence in performing complex obstetric tasks. The alignment of increased self-efficacy with improved OSCE outcomes underscores the interdependence of skill mastery and psychological preparedness in nursing education. As students gain confidence, they perform more effectively under pressure, demonstrating better communication, problem-solving, and teamwork skills essential for quality midwifery care.

The integrated results confirm that simulation-based learning is an effective pedagogical strategy for improving both clinical competence and self-efficacy in midwifery education. The structured, scenario-driven simulation environment provides students with realistic learning experiences that bridge the gap between classroom knowledge and clinical application, preparing them for safe and independent practice in maternal and neonatal care.

DISCUSSION

The results of this study demonstrated that simulation-based learning significantly improved the clinical skills and self-efficacy of nursing students in midwifery care. The marked increase in both OSCE and self-efficacy scores after the intervention supports the effectiveness of simulation as a pedagogical approach that bridges the gap between theoretical knowledge and practical competence. These findings align with existing evidence suggesting that simulation enhances not only technical proficiency but also confidence, critical thinking, and readiness for clinical practice.

The significant improvement in clinical performance observed in this study (mean OSCE increase of 18.3 points, $p < 0.001$) indicates that simulation learning effectively strengthens students' psychomotor and cognitive abilities. Students who participated in the structured simulation sessions demonstrated greater accuracy in performing antenatal assessments, intrapartum procedures, and postpartum care compared to those taught through traditional lectures (Branch et al., 2025). The highest improvement was recorded in intrapartum care (mean increase = 22.1 points), reflecting the benefits of experiential learning in mastering complex, high-stakes scenarios such as childbirth (Somanadhan et al., 2025). High-fidelity simulation significantly enhanced nursing students' psychomotor skills and decision-making in obstetric emergencies compared to conventional teaching. Scenario-based simulation improved students' ability to manage expected delivery and respond appropriately to complications (Wong et al., 2024). The consistency of these results across studies reinforces the role of simulation in providing hands-on practice and immediate feedback, both of which are essential for competence development in clinical education (Odame-Amoabeng et al., 2025).

The study also revealed a substantial increase in students' self-efficacy scores (from 3.21 to 4.32, $p < 0.001$) following simulation learning. Self-efficacy develops through mastery experiences, vicarious learning, and positive feedback, all of which are embedded in simulation pedagogy. Simulation learning fosters emotional resilience, self-confidence, and autonomy in nursing students. Nursing students who participated in midwifery simulations reported significantly higher confidence levels and readiness for clinical placements. This reinforces the argument that simulation offers a psychologically safe learning environment, where students can make mistakes, reflect, and learn without fear of harming patients (Ostrem-Niemcewicz & Cordova, 2024).

Simulation not only enhances individual technical skills but also promotes teamwork, communication, and critical thinking competencies crucial in midwifery practice (Chan et al., 2025). During simulation sessions, students engage in role-playing as midwives, assistants, and family members, enabling them to experience collaborative care dynamics similar to those found in real clinical settings. Effective simulation design combines active learning, feedback, and debriefing to facilitate clinical reasoning and teamwork (Uwera et al., 2025). The structured debriefing sessions conducted in this study likely contributed to the significant improvements observed. Guided debriefing enhances reflection, helps students analyze their actions, and promotes critical thinking, a crucial skill in managing obstetric complications. This aligns with the observed increase in both technical and non-technical skills among participants (Bakhshi et al., 2025).

Globally, numerous studies have confirmed the benefits of simulation in nursing and midwifery education. Simulation-based training has been shown to improve communication and problem-solving in maternal health scenarios (Aydın Kartal & Aker, 2025). Integrating simulation into obstetric nursing courses resulted in higher student satisfaction and improved performance in OSCEs. Likewise, High-fidelity simulation resulted in greater knowledge retention and skill transfer compared to demonstration methods (Vogel et al., 2024). The present study's results align with these findings and extend them by showing consistent improvement across all domains of midwifery care. Notably, the integration of scenario-based learning, structured debriefing, and standardized evaluation through OSCE provided a comprehensive framework for assessing both competence and confidence. The combination of these methods is

what makes simulation-based learning superior to traditional didactic approaches (Birdsall et al., 2025).

The findings of this study have important implications for curriculum design in nursing education. Incorporating simulation as a core component of clinical training can ensure standardized skill acquisition, particularly in settings with limited clinical placement opportunities (Chen et al., 2025). Simulation learning aligns with the competency-based education (CBE) framework advocated by the World Health Organization, emphasizing measurable outcomes and patient safety. Furthermore, simulation can be tailored to different levels of fidelity, ranging from low-cost role-play models to high-fidelity manikins, making it adaptable to resource-constrained environments. In institutions where clinical exposure to obstetric cases is limited, simulation offers a sustainable alternative to achieve learning outcomes without compromising patient safety (Shikuku et al., 2024).

While the results are encouraging, this study had certain limitations. First, the quasi-experimental design limits the ability to establish long-term retention effects; future longitudinal research should assess whether skills and confidence are sustained in real clinical practice. Second, the study was conducted in a single institution, which may limit generalizability. Expanding the research to multiple institutions with diverse student populations could provide broader insights. Additionally, future studies should explore hybrid models that combine virtual and in-person simulations to increase accessibility and cost efficiency (Malya et al., 2025).

This study provides strong evidence that simulation-based learning is an effective educational strategy for improving both clinical competence and self-efficacy among nursing students in midwifery care. By allowing students to engage in realistic, reflective, and interactive learning experiences, simulation enhances not only skill proficiency but also confidence, teamwork, and critical thinking, core elements of professional readiness. Integrating simulation into midwifery curricula thus represents a pivotal step toward producing competent, confident, and compassionate practitioners capable of delivering high-quality maternal and neonatal care.

CONCLUSIONS

This study demonstrated that simulation-based learning significantly improved the clinical skills and self-efficacy of nursing students in midwifery care. Students who participated in structured simulation sessions showed superior performance in technical competence, critical thinking, and confidence compared to those who received traditional instruction. The findings confirm that simulation learning effectively bridges the gap between theoretical knowledge and practical application, providing a safe environment for students to practice and refine essential midwifery skills. Simulation not only enhanced psychomotor ability but also fostered teamwork, communication, and decision-making, which are crucial for safe and high-quality maternal and newborn care.

It is recommended that simulation-based education be integrated into the core curriculum of nursing and midwifery programs. Educational institutions should invest in simulation facilities, train instructors in debriefing techniques, and develop standardized simulation scenarios aligned with competency-based education frameworks. Collaborative partnerships between nursing schools and healthcare institutions can further enhance realism and learning outcomes. Future studies should investigate the long-term effects of simulation on clinical performance in real-world settings and assess cost-effective implementation strategies for implementation in resource-limited environments. Integrating simulation in midwifery education represents a vital step toward preparing competent, confident, and compassionate future nurses.

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