JAESH

JOURNAL OF ADVANCES IN EDUCATION,
SCIENCES AND HUMANITIES

ORIGINAL ARTICLE

Experience of clinical simulation as a learning tool in the development of competencies in nursing education

Experiencia de la simulación clínica como herramientas de aprendizaje en el desarrollo de competencias en la formación de enfermeros

Martha S. Quiroz ⬡ ● **Aida M. Macías** ⬡ ● **Delia G. Bravo** ⬡ ● **Mery Y. Mendoza** ⬡

Abstract Clinical simulation emerges as a primary tool in nursing education, enabling students to develop essential competencies through simulated scenarios where they can practice both technical and non-technical skills, receive immediate feedback, and experience real-life situations without the risks associated with direct patient care. The objective of this study was to evaluate the effectiveness of simulation as a methodological strategy in nursing education. A quantitative and descriptive study design was employed, utilizing a validated survey of 111 sixth-semester Nursing students from a university of Manabí. The results showed that 52% of respondents considered simulation to be useful for learning, and 40% reported an increase in their safety and confidence when facing clinical situations. Additionally, 49% stated that simulation helped them integrate theory and practice, reflecting its effectiveness in the educational process. It is concluded that clinical simulation is presented as a valuable strategy in nursing education, favoring the acquisition of critical competencies and improving student confidence.

Keywords clinical simulation, nursing education, professional competencies, active learning, patient safety.

Resumen La simulación clínica emerge como una herramienta primordial en la formación de enfermeros, con la finalidad de que los estudiantes desarrollen competencias esenciales mediante escenarios simulados en los que pueden practicar habilidades técnicas y no técnicas, recibir retroalimentación inmediata y experimentar situaciones reales sin el riesgo asociado a la atención directa al paciente. Este estudio se centró en evaluar la efectividad de la simulación como estrategia metodológica en la enseñanza de enfermería. Se utilizó un diseño de estudio cuantitativo y descriptivo, aplicando una encuesta validada a 111 estudiantes de Enfermería de sexto semestre de una universidad de Manabí. Los resultados mostraron que el 52% de los encuestados consideró que la simulación es útil para el aprendizaje y que un 40% reportó un aumento en su seguridad y confianza al enfrentar situaciones clínicas; además, el 49% afirmó que la simulación les ayudó a integrar teoría y práctica, lo que refleja su efectividad en el proceso educativo. Se concluye que la simulación clínica constituye una estrategia valiosa en la educación en enfermería, favoreciendo la adquisición de competencias críticas y mejorando la confianza de los estudiantes.

Palabras clave simulación clínica, educación en enfermería, competencias profesionales, aprendizaje activo, seguridad del paciente.

✉ Delia G. Bravo
delia.bravo@unesum.edu.ec

Universidad Estatal del Sur de Manabí, Jipijapa, Ecuador.

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Introduction

Simulation has proven to be one of the most powerful forms of enactive learning in the health sciences, enhancing the effectiveness of both direct and indirect learning. These simulated environments allow students to feel confident receiving feedback on their clinical performance and the development of both technical and non-technical skills; therefore, simulation represents a positive experience by creating scenarios that contribute to fostering learning in nursing education.

The International Nursing Association for Clinical Simulation and Learning (INACSL) defines simulation as a set of structured activities that represent real or potential situations in practical education and enable participants to develop or improve knowledge, skills, and attitudes; or to analyze and respond to realistic situations in a simulated environment or through a developing case study (Hanif & Parpio, 2024).

It has been highlighted that it is possible to affirm that the clinical simulation technique represents an essential instrument within the learning process of nursing students (Sánchez & Guamán, 2022), which contributes to the psychomotor development and critical thinking, helps to improve interprofessional communication, the assignment of roles and in turn to the reduction of levels of anxiety and fear in the face of real situations.

The training of healthcare professionals today demands student-centered teaching and requires high scientific and technological standards, including domains such as communication, professionalism, and teamwork. Therefore, introducing simulation into the curriculum has a high cost, but it is necessary to estimate cost-effectiveness, which requires describing in monetary terms the value of patient safety and quality of life (Moore et al., 2016). Simulation-based learning environments allow students to receive systematic and rigorous training that guarantees the development of skills safely and without risk, through clinical intervention processes simulated in real-life situations (Cabrera & Kempfer, 2020).

The development of specific nursing care competencies through clinical simulation leads to greater student satisfaction, confidence, and critical thinking skills. Miller's theoretical model supports simulation-based teaching, as it evaluates the level of professional competency performance using a four-level pyramid.

The first levels encompass knowledge (knowing) and how it is applied in specific cases (knowing how). The third level (demonstrating how), which refers to competence, is measured in four in vitro (simulated) environments, in which the professional demonstrates what they are capable of doing. The final level encompasses the professional's performance (doing) in real-world practice, demonstrating what they are truly capable of doing (competence) (García-Gutiérrez et al., 2012).

Each level consists of observable actions that are assessed and used for evaluation, allowing instructors to create situations that reflect the realities of clinical practice. The instructor's role in simulation is fundamental; it requires a shift from a leading and demonstrative role to that of facilitator and coach, acting as a secondary support who guides students in the collective construction of their learning. Therefore, instructors need training and skills to integrate simulation into their educational activities.

Based on this need, the research project entitled "Clinical simulation as a methodological strategy in the training of Bachelor of Science in Nursing" was born. During its execution, Phase I was directed, allowing for teacher preparation regarding simulation, creating a guide of simulated cases, and providing feedback for teaching and technical staff, as well as assessing the applicability of simulation in a higher education institution. Therefore, the evaluation of simulated environments and their approaches is fundamental to improving the teaching and learning process, as well as understanding the students' experience of simulation-based learning.

Methodology

The study employed a descriptive quantitative design and used empirical techniques to collect information from students involved in the teaching-learning process. One hundred and eleven adult students of both sexes, enrolled in the sixth semester of the nursing program during the 2024 PII academic period, participated voluntarily and signed informed consent forms. The research was conducted within the framework of the project "Clinical Simulation as a Methodological Strategy in Nursing Education", implemented at a public university in Manabí. An instrument validated by six experts, called the "Clinical Simulation Quality and Satisfaction Survey", was used, consisting of 11 items on a 5-point Likert scale. Data were collected using Google Forms and subsequently exported, coded, and cleaned in Excel for analysis in SPSS v.25 using descriptive statistics, including frequencies, percentages, standard deviation, and variance. The study complied with the ethical principles approved by the CEISH ITSUP committee and with the guidelines of the Belmont Report, guaranteeing anonymity and confidentiality, and was considered to have minimal risk as it did not intervene in the behavior of the participants.

Results and discussion

Table 1 shows that the majority of participants belonged to the 20-24 age group, representing 81% of the sample, indicating a predominantly young population. The older age ranges show significantly lower participation: 10% belong to the 25-29 age group, while the 30-34 and 35-45 age groups

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reach only 5 and 4%, respectively.

Table 1. Sociodemographic characteristics.

Variable	Category	Frequency	Percentage
	20-24	90	81
	25-29	11	10
Age	30-34	6	5
	35-39	2	2
	40-45	2	2
Gender	Male	37	33
	Female	74	67

Regarding gender, a 67% female predominance is observed among sixth-semester nursing students, which aligns with the historical trend of greater female representation in this profession. However, the 33% male participation reflects a progressive increase in male representation in the field, with an increasingly visible presence in the professional sphere.

Table 2 presents the results of the student perception assessment of clinical simulation as a pedagogical strategy. It includes five statements related to the method's usefulness, the relevance of the simulated cases, its impact on safety and confidence, the integration of theory and practice, and the improvement of clinical competence. For each item, the response categories are detailed, along with the corresponding frequencies, percentages, standard deviation, and variance. This organization allows for the identification not only of the overall trend in responses but also of the consistency and dispersion of perceptions, offering a comprehensive view of the value students attributed to simulation in their training process.

The results showed that 52% of students strongly agreed and 43% agreed that simulation was a useful learning method, demonstrating a predominantly positive perception of

Table 2. Student perception of the effectiveness of clinical simulation in learning

Statement	Category	Frequency	Percentage	Standard deviation	Variance
Simulation is a useful teaching method for learning	Strongly disagree	3	3	1.72	2.95
	Disagreement	1	1	1.29	1.66
	Indifferent	1	1	1.29	1.66
	OK	48	43	0.67	0.45
	I completely agree	58	52	0.74	0.55
The simulated cases are tailored to my theoretical knowledge.	Strongly disagree	3	3	1.21	1.46
	Disagreement	2	2	0.99	0.98
	Indifferent	10	9	0.86	0.74
	OK	56	50	0.39	0.15
	I completely agree	40	36	0.62	0.39
The experience with the simulation has increased my safety and confidence.	Strongly disagree	4	4	1.24	1.54
	Disagreement	1	1	1.52	2.31
	Indifferent	39	35	0.63	0.39
	OK	45	40	0.47	0.22
	I completely agree	22	20	0.65	0.42
Simulation has helped me integrate theory and practice	Strongly disagree	3	3	1.19	1.42
	Disagreement	4	4	1.21	1.46
	Indifferent	28	25	0.69	0.48
	OK	55	49	0.39	0.15
	I completely agree	21	19	0.65	0.42
Interacting with the simulation has improved my clinical competence.	Strongly disagree	2	2	1.21	1.46
	Disagreement	1	1	1.38	1.90
	Indifferent	12	11	0.76	0.58
	OK	63	56	0.31	0.10
	I completely agree	33	30	0.53	0.28

its effectiveness. This methodology allowed for the recreation of real-world situations in a controlled environment, enabling the practice of skills such as problem-solving, decision-making, and collaboration—aspects difficult to develop through traditional methods. Responses expressing disagreement or indifference (1% each) were minimal, and the low standard deviation indicated little variability in opinions, reinforcing the assessment of simulation as a valuable teaching strategy.

Regarding the relevance of the simulated cases to the theoretical knowledge, 50% agreed, and 36% strongly agreed that the scenarios were appropriate for their training. This alignment suggested that the simulation not only complemented the theory but also enriched the understanding of the content. The percentages of disagreement (3% strongly disagreed and 2% disagreed), although low, indicated that some students may have perceived a disconnect between the cases and their level of knowledge, possibly due to a lack of

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conceptual understanding, variable quality of the scenarios, or individual differences in learning styles. Again, the low statistical dispersion demonstrated a high degree of consensus on the usefulness of the simulated cases.

Regarding the impact of simulation on safety and confidence, 40% of students agreed, and 20% strongly agreed that this methodology increased their self-confidence. Simulation fostered active participation, promoted resilience, strengthened decision-making, and prepared students to face real-life situations with greater confidence. However, 35% remained indifferent, and a small percentage expressed disagreement (4% strongly disagreed and 1% disagreed), which could be explained by anxiety related to the simulation, lack of experience, or a need for more feedback. These findings are consistent with recent reviews that have shown that repeated simulation followed by structured debriefing significantly increases self-confidence and clinical safety (Al Gharibi et al., 2020; Alrashidi et al., 2023).

Regarding the integration of theory and practice, 49% reported agreeing and 19% strongly agreeing that simulation facilitated this integration. The possibility of applying theoretical concepts in simulated contexts allowed students to understand the real-world utility and impact of the knowledge they acquired. Although 7% expressed disagreement, this minority group highlighted the importance of adapting the scenarios to the academic level and providing constant faculty support. International evidence supports these results, as simulation has been shown to significantly improve clinical decision-making and the transfer of knowledge to practice (Görücü et al., 2024; Hung et al., 2021).

Finally, 56% agreed, and 30% strongly agreed that the simulation strengthened their clinical skills. This confirmed that simulation contributed to the development of essential skills for the training of future nursing professionals. Although 11% were indifferent, this perception may be related to individual differences in learning styles or limited exposure to the scenarios. Previous research indicated that high-fidelity simulation improves technical skills, interprofessional communication, and preparedness for highly complex situations, especially in resource-limited settings (Mesquita et al., 2019). Furthermore, advances such as virtual reality and AI-based simulation have presented additional opportunities to enhance clinical learning, allowing for unlimited repetition of cases and increasing student motivation (Kim et al., 2020; Aydin et al., 2025).

Conclusions

Nursing education, especially in sensitive areas like neonatal care, requires more than theoretical knowledge: it demands strong skills, confidence, and the ability to act with precision. In this context, clinical simulation has become a key pedagogical tool, perceived by most students as a highly useful method capable of recreating real-life situations in safe environments. The findings showed that this methodology strengthened confidence, decision-making, and the integration of theory and practice, generating clear improvements in clinical competence. Furthermore, the instructor's role proved fundamental, acting as a facilitator and designer of scenarios that enhance the effectiveness of simulated learning.

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Conflicts of interest
The authors declare that they have no conflicts of interest.

Author contributions
Conceptualization: Martha S. Quiroz. **Methodology:** Martha S. Quiroz, Aida M. Macías. **Formal analysis:** Martha S. Quiroz, Delia G. Bravo, Mery Y. Mendoza. **Investigation:** Martha S. Quiroz, Mery Y. Mendoza. **Writing – original draft:** Martha S. Quiroz, Aida M. Macías, Delia G. Bravo, Mery Y. Mendoza. **Writing – review & editing:** Aida M. Macías, Delia G. Bravo.

Data availability statement
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Statement on the use of AI
The authors acknowledge the use of generative AI and AI-assisted technologies to improve the readability and clarity of the article.

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