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Original Article

Clinical simulation as a continuing education strategy for nursing care*

Simulação clínica como estratégia de educação permanente para a assistência de enfermagem

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ABSTRACT
Objective: to identify the impact of clinical simulation as a continuing education strategy for nursing staff in a hospital setting. **Methods:** qualitative study, with 18 nurses and 23 nursing technicians who worked in Intensive Care Units and medical clinics of a highly complex hospital. The study was conducted in two stages: pre-testing of clinical simulation guidelines, with settings involving cardiopulmonary arrest and nasogastric tube insertion; and pre-test assessment using a semi-structured questionnaire, involving questions regarding the impact of clinical simulation as a continuing education strategy in the nursing team's daily work. Content analysis was used for data analysis. **Results:** two categories emerged that highlight clinical simulation in hospital settings as a continuing education strategy that enables effective learning and impacts nursing know-how. **Conclusion:** clinical simulation impacts the development of professional competencies, technical skills, communication skills, leadership, critical thinking, and teamwork, all of which lead to improvements in care quality and patient safety. **Contributions to practice:** the results reinforce the importance of incorporating new pedagogical strategies, such as clinical simulation, into nursing training and continuing education.
Descriptors: Education, Continuing; Patient Safety; Simulation Training; Nursing.

RESUMO
Objetivo: identificar o impacto da simulação clínica como estratégia de educação permanente no ambiente hospitalar para a equipe de enfermagem. **Métodos:** estudo qualitativo, com 18 enfermeiros e 23 técnicos de enfermagem que atuavam em unidades de terapia intensiva e clínica médica de um hospital de alta complexidade. Desenvolvido em duas etapas: pré-testes de guias simulação clínica, com cenários em parada cardiorrespiratória e de sonda nasoenteral e avaliação dos pré-testes por meio de um roteiro semiestruturado, envolvendo questões referentes ao impacto da simulação clínica como estratégia de educação permanente no cotidiano da equipe de enfermagem. Para análise dos dados foi empregado a Análise de Conteúdo. **Resultados:** emergiram duas categorias que destacam a simulação clínica no ambiente hospitalar como uma estratégia de educação permanente que possibilita um aprendizado efetivo e impacta no saber-fazer enfermagem. **Conclusão:** a simulação clínica impacta no desenvolvimento de competências profissionais, habilidades técnicas, comunicacionais, liderança, pensamento crítico e trabalho em equipe que refletem em melhorias para a qualidade da assistência e segurança do paciente. **Contribuições para a prática:** os resultados apontados reforçam a reflexão sobre a importância da inserção de novas estratégias pedagógicas, como a simulação clínica, na formação e educação continuada em enfermagem.
Descritores: Educação Continuada; Segurança do Paciente; Treinamento por Simulação; Enfermagem.

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Introduction

Clinical simulation is an active approach in the teaching and learning process, standing out as an essential element in healthcare professional training and as an effective tool for continuing education[1]. Through participation in simulated environments, professionals are encouraged to reflect on their knowledge and clinical experiences, considering that the learning process involves not only the simulation itself, but also the feedback stage, in which the quality of the actions performed is assessed[2-3].

Continuing health education seeks to guide healthcare professional training and qualification, aiming to transform the journey of care practices, organize the service and identify health work's needs and challenges, in order to develop strategies to overcome existing demands[4-6].

In this regard, simulation provides important opportunities for professionals to develop skills in the context of continuing education. It is worth noting that there are different types of simulations. This study will contextualize in situ simulation, which consists of applying the tool with the healthcare team itself in their work environment in a simulated setting. This impacts patient safety, technical skills, and communication, thus favoring healthcare professionals' teaching-learning process[7-8]. Evidence regarding the results of implementing in situ simulation in continuing education is associated with greater assertive practices[7-9].

Thus, simulation in the context of professional practice favors prior contact with complex situations that require assertive decision-making, which can be reproduced multiple times in a simulated environment. Through this educational strategy, successes and failures are discussed constructively, encouraging continuous improvement, providing greater safety and qualification to the process, given that it is applied in a controlled environment without real patients[10-11]. Thus, it allows participants to combine theory with practice, acquire technical skills, and improve evidence-based care[12-13].

In healthcare institutions, ongoing and continuing education should be encouraged and promoted in various contexts and processes, given that educational tools provide professional development, refresher courses, and training. These strategies help keep professionals prepared and their skills up-to-date, fostering safe and quality care[14].

Continuing education, therefore, represents an effective tool for the nursing team, considering that it encourages and perpetuates professional competence in highly complex procedures, contributing to Advanced Practice in Nursing, defined by the International Council of Nurses as a specialized knowledge base, which encourages critical thinking and the ability to make complex decisions[15].

In this context, the choice of clinical simulation as a continuing education strategy is justified by the lack of studies that address, in an applied manner, the impacts of in situ simulation on care practice qualification in Brazilian hospital contexts. This research emerges from institutional demands observed by nursing management and the Patient Safety Unit, given the recurrence of reports of adverse events in critical procedures, such as cardiorespiratory arrest and complications related to nasoenteral tube passage, in order to effectively contribute to technical updating, patient safety promotion and the strengthening of the institutional culture of safe care in hospital settings.

Thus, the study raises the following guiding question: what is the impact of clinical simulation as a continuing education strategy in hospital settings for the nursing team? The objective was to identify the impact of clinical simulation as a continuing education strategy for nursing staff in a hospital setting.

Methods

Study design

This is a qualitative study guided by the COnsolidated criteria for REporting Qualitative research (COREQ) protocol. The methodological framework underlying the study was the São Paulo Regional Nur-

sing Council Clinical Simulation Manual for Nursing Professionals[16].

Study location and period

The research was conducted at a large hospital in Santa Catarina from July to August 2023, focusing on patients treated through the Brazilian Unified Health System. The hospital has 240 beds and is a referral center for burn treatment, bariatric surgery, and oncology.

Population and inclusion criteria

The study involved 41 participants, including 18 nurses and 23 nursing technicians, who worked in the Intensive Care Unit (ICU) and medical clinics across various shifts. There was no sample selection, as all participants were invited. Only those who did not meet the exclusion criteria were excluded. Nurses and nursing technicians assigned to and active in the ICU or medical clinic with at least six months of hospital experience were included. Nurses on leave, vacation, or waivers, or filling in for colleagues in other units were excluded. No participants met the exclusion criteria. Therefore, all participants were retained.

Study stages

The study was developed in two stages. In the first stage, two pre-tests of clinical simulation guidelines[16] were conducted, with settings involving cardiopulmonary arrest and nasoenteral tube insertion, developed by the main author. These guidelines were developed in the Simulation Laboratory of the Continuing Education Department of the hospital. They lasted a total of 60 minutes.

In total, 12 meetings were held, six with a cardiorespiratory arrest scenario for nurses and nursing technicians and six with a nasoenteral tube scenario exclusively for nurses in different periods. The settings were selected based on recommendations from the nursing manager and the Patient Safety Unit coordinator, based on the most common reports made by the healthcare team at the institution, namely cardiopulmonary arrest and bronchoaspiration during nasogastric tube insertion. The development of pre-test of simulation clinical guidelines involved briefing, debriefing, and assessment.

First, with the nursing manager's permission, the human resources department arranged for the heads of the hospital's rapid transmission groups to contact the researcher. The researcher then forwarded the invitation to the heads of the internal medicine and ICU departments, encouraging their nursing teams to participate in pre-testing of simulation guidelines for cardiopulmonary arrest and nasoenteric feeding tubes. Once they agreed to participate, they were asked to sign the Informed Consent Form.

The briefings for the cardiopulmonary arrest and nasogastric tube scenarios took place separately over six days, in the morning and afternoon, lasting five minutes each. All participants were initially welcomed for the briefing in the hospital auditorium, which is located next to the simulation laboratory. It is noteworthy that the researchers have significant expertise in the field. One of them has over 10 years of experience in continuing education, is a professor, and has participated in various simulated scenarios. One of the other researchers has been involved in simulation for over 15 years, is a professor, has participated in the construction and creation of several scenarios, and has researched on this topic.

Regarding participant access to the material, all participants were provided with information about the research objectives from the very beginning, as well as the researcher's intentions for conducting the research, a description of the environment and simulation time, the equipment that would be used, and how assessment would be conducted. This information was intended to establish good communication and an environment of trust among those involved. Following this, the researcher/instructor randomly invited one participant to facilitate simulation. She presented

the printed checklist and provided guidance on how to complete it and take notes on the instrument.

Soon after, all participants were invited and directed to the simulation lab. The debriefing began in the simulation lab itself. Initially, the objectives were presented, along with the estimated 15-minute timeframe for this stage, as well as the critical points to be discussed.

Data collection

The second stage consisted of the assessment process. The pre-test assessment stage of clinical simulation guidelines for cardiopulmonary arrest and nasogastric tube settings took place immediately after the debriefing, in the auditorium of the Department of Continuing Education's study center, lasting 10 minutes.

Assessment was carried out using two instruments: (1) a semi-structured script with guiding questions directed at each simulation topic: what was it like to participate in two pre-tests of clinical guidelines in a simulation laboratory in a hospital environment, using simulators and equipment? How do you perceive clinical simulation as a continuing education strategy in hospital settings? And (2) the Student Satisfaction and Learning Self-Confidence Scale[17].

Open-ended qualitative analysis questions were administered in the form of an individual written interview guide immediately after the debriefing, led by the lead researcher. Participants responded descriptively to the questions in a private setting, encouraging free expression. Although there were no oral interviews, data collection was guided by the logic of qualitative analysis, accompanied by skimming and systematic categorization. The responses were analyzed until no new significant elements emerged in the statements, characterizing the data saturation point, which was identified after reading and categorizing all 41 records, based on the São Paulo Regional Nursing Council Clinical Simulation Manual for Nursing Professionals stages[16]. No repeated interviews were conducted, since the collected responses revealed consistency and sufficient thematic repetition for in-depth qualitative analysis.

Assessment was presented to participants in advance during the briefing for both settings, ensuring clarity regarding the objectives, confidentiality, and information use. The scripts were returned to the researcher at the end of the activity.

Data analysis

The data analysis process followed content analysis[18] recommendations, comprising the following phases: pre-analysis, material exploration, and processing of results: interpretation and inference. The data were organized in a table to facilitate skimming and construction of the *corpus* of the studied topic. Coding began with recording units (excerpts of speech) for symbolic categorization, seeking semantic grouping (meaning of codes).

Ethical aspects

To ensure participant anonymity, participants were identified in the study by the letters N (Nurse) and T (Nursing Technician), followed by an Arabic numeral in the order in which the questionnaire was submitted. All participants signed an Informed Consent Form. The research was approved by the *Universidade Federal de Santa Catarina* Research Ethics Committee, under Opinion 6,021,031/2023 and Certificate of Presentation of Ethical Consideration 67912223.6.0000.0121, and also followed Resolution 466/2012 recommendations of the Brazilian National Health Council.

Results

The study involved the participation of 41 nursing professionals, including 18 nurses and 23 nursing technicians, who work in the ICU and medical clinic sectors of a hospital in Santa Catarina mountains.

The majority of participants were women 35 (85.4%) and men 6 (14.6%) aged 25 to 58. The predominant professional category was nursing technicians 23 (53.7%), followed by nurses 18 (46.3%). Length of service at the institution ranged from one to 33 years, with 14 (34.2%) working for up to one year, 23 (56.1%) for two to 20 years and four (9.7%) for 21 to 33 years. Of the 18 nurses who participated, one (5.5%) had two or more specializations, such as adult, neonatal, and pediatric ICU, emergency care, family health, auditing, and management.

After analyzing the data, the following categories emerged: Clinical simulation as a promoter of practical learning, safety, and skills development; Clinical simulation as a strategy for overcoming training gaps and strengthening continuing education.

Clinical simulation as a promoter of practical learning, safety, and skills development

This category demonstrates that clinical simulation in hospital settings is a systematic in-service training. As a continuing education strategy, it inspires learning through its realistic potential, enables the clarification of common questions, and allows for repetition of nursing practice, consolidating theoretical and practical knowledge in a relaxed, interactive, and comfortable manner. It also facilitates familiarization with materials and equipment, and procedural dexterity, consequently creating a safe environment for patients: *I truly found it very important and valuable, as it cleared up pertinent doubts I had regarding probe positioning, optimal patient positioning for the technique, and nostril fixation. Being in a hospital setting made it more realistic and intimate, leaving me relaxed and comfortable handling the equipment and clarifying doubts, giving me the opportunity to repeat and redo the technique for better learning* (N7). *It was very enriching; the interaction was enlightening, with a wealth of information on common questions, generating significant benefits for the staff and especially for the patients* (T4). *It was important for learning and improving the technique of systematized procedures* (T2). *The simulation is crucial for helping professionals with concerns and questions* (T12). *It provided a reminder of the techniques and precautions, as well as visualization and understanding of probe positioning in imaging exams* (N10).

Clinical simulation in hospital settings allows nursing staff to acquire new knowledge and provide refresher training and technical skills for situations not typically encountered in daily practice. It familiarizes and trains staff for emergency situations: *Very important, as it is not a daily routine for all sectors like emergencies* (T3). *A wonderful, unique opportunity to experience and prepare for everyday emergency situations* (N8). *Yes, very important; there must always be moments of ongoing education, to recover and improve knowledge, and to pass on new updates as well* (T5).

For the nursing team, clinical simulation in the hospital context as a continuing education strategy enables improvements in work processes, engagement, organization and decision-making skills, allowing for greater team integration: *Opportunity to practice maneuvers before applying them to patients. Better team integration and organization of the work process* (N8). *A united team improves leadership and leadership* (T6). *Team engagement improves the organization and determination of each role* (T1). *Well, I think that CE* (continuing education) *is a crucial strategy for improving processes and strengthening teams* (T21).

Furthermore, in this category, it is possible to understand that the use of simulators, materials, and equipment for clinical simulation in a space designed for the reality experienced by nursing teams provides effective learning. It promotes systematic training and critical thinking about the techniques performed, stimulating nursing professionals' awareness of patient safety culture, greater ethical commitment, and risk management: *Yes, given that continuing education makes professionals rethink their daily practices and experiences. Given the availability of a laboratory for practical materials, I believe the dynamics become more beneficial in both content and learning quality. I found clinical simulation within hospital settings important and interesting, given the more realistic equipment and the teaching methods offered by the master's student* (N11). *Yes, it allows procedures to be performed multiple times, reducing potential errors in daily practice* (N14). *The team felt comfortable using equipment and medication, and we felt more confident performing the procedure; we were able to perform an excellent simulation* (T19). *Didactic materials such as X-ray*

images and a projector were used (N13). *All training has its value, but with the available equipment, we learn more easily* (N9). *Mainly because you learn, and when the situation actually happens, you'll be better prepared to help the patient and the team* (T6). *I consider clinical simulation important because it doesn't put the patient's life at risk, and we can develop skills as closely as possible to the real context, promoting effective learning* (N4).

Clinical simulation as a strategy for overcoming training gaps and strengthening continuing education

Through this category, it is clear that clinical simulation in hospital settings is an active methodology that effectively teaches nursing know-how. By bringing realism to the nursing team's daily routine, it fosters interest in learning, becomes dynamic, encourages clinical reasoning, and facilitates the understanding and memorization of procedures. It develops self-confidence and confidence in nursing: *An enriching experience for professional life and one that can be applied to the realities of hospital settings* (N1). *Simulation is very important and allows for easy assimilation of the techniques and practical information* (N3). *I find this methodology very dynamic. It encourages reasoning and develops self-confidence and security regarding the procedure to be performed* (N4). *It is extremely educational and easy to understand with the topics covered* (N6). *A dynamic process, easy to memorize procedures* (N14). *I really like the clinical simulation format; it makes training dynamic, encourages thought and action; the proximity to reality facilitates learning* (N14).

Clinical simulation in hospital settings, as a continuing education strategy, promotes professional safety and fills a gap in academic training. During academic training, students do not always have opportunities to develop a sufficient number of procedures and techniques that provide effective learning. Therefore, clinical simulation as a continuing education strategy enables professionals to deepen and update their theoretical and practical knowledge: *Undoubtedly of great importance, it provides professionals with current information and exchange experiences, reviewing assignments completed during undergraduate studies and updating them over time* (N7). *During undergraduate studies, I had doubts, but in our daily lives, I notice difficulties with procedures, among other things. Continuing education in the workplace is of great value* (N10). *Yes, because in practice, we experience insecurity, fear, and a lack of rapid mastery of the situation* (T17). *The training process* (undergraduate studies) *is flawed; there is no opportunity to complete all practical training during this period* (N19). *Yes, speaking for myself, I never felt prepared for a cardiorespiratory arrest. With the simulation, I felt more confident* (T19).

Discussion

Analysis of the nursing team's discourse revealed that clinical simulation, as a continuing education strategy, significantly impacted professional know-how, strengthening technical, communication, and decision-making skills in critical situations. Participants attributed a central role to the methodology in active learning and in approaching the realities of care, highlighting the safe environment as a facilitator of reflection, improvement, and integration within the multidisciplinary team[19-20].

Regarding the category findings, it was possible to observe that in the first category, participants identified this teaching strategy as a relevant contribution to professional training, enabling the identification of challenges and potential in emergency care, such as risk reduction, self-confidence, improved skills and competencies, and effective decision-making. These findings are consistent with other studies already conducted using simulation, where participants highlighted this educational strategy as fundamental to improving clinical reasoning and decision-making[21-22].

Repeating actions in a simulated environment until confidence and preparation are gained provides safety to professionals and, especially, to patients in healthcare. These factors foster the importance of simulation as a strategy for developing technical and non-technical skills[22-23]. This strategy has proven effective as a training and development method for nurses and nursing professionals with little experience or little mastery in their practice/specialty[8,24-27].

In this study, participants expressed how mea-

ningful it was to participate in this activity, especially because it provided an opportunity to rethink their practice and their daily experiences. Given that in the daily grind of nursing care, it is often impossible to stop, reflect, and examine with great tact and care what needs to be reviewed and improved in care.

The second category reflects that simulation is an educational tool that promotes greater reflection, critical thinking about the experience, exchange of experiences, in addition to enabling professionals to improve their skills. From this perspective, the study presents important paths for healthcare institutions to follow in the context of continuing education, as it has proven to be a promising tool for strengthening learning and, consequently, safety and quality in healthcare. The authors reinforce these findings by mentioning that this is a strategy that clarifies doubts, consolidates knowledge, encourages updating, and provides a safe environment for skills training[28].

Recently, clinical simulation for learning nursing skills has steadily gained ground in educational institutions. The adoption of innovative teaching methods to train better-prepared professionals highlights the importance of more critical analyses of the current reality as well as the identification of educational gaps that guide the implementation of new pedagogical approaches[10].

Given this reality, the application of the strategy should be encouraged due to the benefits and potential for students, professors, patients and the support network, considering that clinical simulation consists of a fundamental tool with innovative potential to boost academics' teaching-learning process, encompassing relational, technical, and non-technical skills, such as communication, active listening, decision-making, clinical reasoning, among others[28].

This tool allows for skill development, combined with the opportunity to clarify doubts, minimize insecurity, and strengthen daily work by bringing it closer to the realities of practice. Participants emphasize that the direct connection between the clinical guideline objectives, combined with the learning objectives and skills to be developed, becomes a key resource for deepening and preparing these professionals for safe care.

Clinical simulation was an effective strategy for reviewing enteral tube care practices, aiding in the development of knowledge and appropriate skills[24]. These reflections support the findings of this study, which found that nursing professionals developed knowledge and skills in patient care through clinical simulation. Simulation allows for outcomes that approximate professional roles in a controlled environment and a dialogic approach. This ensures interactive learning and constructive feedback, including error analysis, discussion of concerns, and communication that encourages optimization and quality of healthcare[1].

However, it should be noted that the development of clinical simulation as a continuing education strategy still faces institutional challenges, especially the training of professionals who will implement this educational strategy. Investments in infrastructure, such as equipped laboratories and appropriate materials, and the availability of staff time to participate in activities without compromising direct care, are also essential. It is important to note that participants initially worry about exposing their knowledge to other colleagues as well as a lack of familiarity with the methodology and fear of exposure. Another important point is the lack of a consolidated institutional policy that systematically integrates clinical simulation into training processes. These limitations highlight the importance of management support, strategic planning, and ethical awareness regarding the use of simulation[7-8,10].

In summary, evidence shows that simulation in a healthcare environment, especially hospital units, requires planning and resources for the successful development of activities and for good adherence by professionals, with regard to their use and acquisition of knowledge, skills and attitude.

Study limitations

As limitations, we identified the method adopted as potentially subject to biases related to participant perception, given that data were collected through individual reports and lacked longitudinal follow-up, which precludes a more in-depth assessment of the long-term impacts of the clinical simulation strategy on professional practice. Furthermore, we highlighted as a limitation the fact that the study was conducted in a single large public hospital, which may possibly restrict the generalization of the findings to other institutional contexts. Another point worth highlighting is the limited structural and human resources for expanding the strategy and diversifying simulated settings, which may have limited the scope of the analysis.

Contributions to practice

The findings reinforce the importance of clinical simulation as an effective tool for improving professionals' technical and behavioral skills, promoting patient safety and improving care quality. Furthermore, the results highlight the need for continued investment in active teaching methodologies, encouraging managers and educators to implement innovative strategies that promote professional development and improve healthcare services. Thus, this study contributes to the reflection on the inclusion of new pedagogical approaches in nursing training and continuing education.

Conclusion

Clinical simulation as a continuing education strategy was found to impact the quality of nursing care. Simulation's contributions enabled the development of various professional competencies, including technical and non-technical skills, communication, leadership, critical thinking, and teamwork, which resulted in improvements in care quality and patient safety, influencing ethical commitment to risk management. Therefore, when continuing health education is based on problematizing reality, valuing workers' expertise, and knowledge exchange, it becomes a more assertive process, raising safety standards.

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Authors' contributions

Research conception and design or data analysis and interpretation: Weissenberg VCC, Tholl AD. Writing of the manuscript or critical review of relevant intellectual content, approval of the final version to be published, agreement to be accountable for all aspects related to the accuracy or integrity of any part of the manuscript being investigated and resolved appropriately: Weissenberg VCC, Bellaguarda MLR, Knihs NS, Tholl AD.

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