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SIMULATED PRACTICE IN THE APPROACH TO THE CRITICALLY ILL: SCOPING REVIEW

A PRÁTICA SIMULADA NA ABORDAGEM AO DOENTE CRÍTICO: SCOPING REVIEW

PRÁCTICA SIMULADA EN EL ABORDAJE DEL ENFERMO CRÍTICO: SCOPING REVIEW

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Abstract

Introduction: Simulation is defined as a teaching-learning methodology that realistically and safely recreates clinical situations, allowing professionals to develop skills without jeopardizing patient safety. In the field of nursing, simulated practice plays an increasingly central role in education and professional development. **Objective:** Identify the contributions of simulated practice in the performance of nurses in approaching critically ill patients. **Method:** A Scoping Review was conducted based on the Joanna Briggs Institute recommendations in February 2024. The review question was formulated using the PCC (Population, Concept, Context) framework: "What is the contribution of simulated practice to the acquisition of nurses' competencies in the care of critically ill patients?" The search was carried out in EBSCOhost and Google Scholar using the descriptors *Patient Simulation*, *Simulation Training*, *Nurses*, *Critical Care*, and *Clinical Competence*, validated in DeCS/MeSH. A total of 412 articles were retrieved, and after applying the inclusion and exclusion criteria and screening titles/abstracts, 11 articles were included for analysis. **Results:** The simulation develops skills such as communication, leadership, clinical reasoning, critical thinking, teamwork and proficiency on teams that work with critically ill patients. While high fidelity simulation is highly realistic, *in situ* simulation is more accessible and equally effective, allowing you to practice in a real-life environment, with lasting results. **Conclusion:** Simulated practice proves to be a plausible method to ensure patient safety, enabling nurses who work with critically ill patients to develop technical and non-technical skills, increasing their performance.

Keywords: Critical Care Outcomes; Nurses; Simulation Training.

Resumo

Introdução: A simulação é definida como uma metodologia de ensino-aprendizagem que recria, de forma realista e controlada, situações clínicas, permitindo aos profissionais desenvolver competências sem colocar em risco a segurança dos doentes. No âmbito da enfermagem, a prática simulada assume um papel cada vez mais central na formação e no desenvolvimento profissional. **Objetivo:** Identificar os contributos da prática simulada no desempenho dos enfermeiros na abordagem ao doente crítico. **Método:** Foi realizada uma *Scoping Review* baseada nas recomendações Joanna Briggs Institute, em fevereiro de 2024. A questão de revisão foi elaborada em formato PCC (População, Conceito, Contexto) "Qual o contributo da prática simulada na aquisição de competências dos enfermeiros na abordagem ao doente crítico?" A pesquisa foi realizada na EBSCOhost e Google Académico usando os descritores *Patient Simulation*, *Simulation Training*, *Nurses*, *Critical Care*, *Clinical Competence*, validados no DeCS/MeSH. Obteve-se 412 artigos, após aplicação dos critérios de inclusão e exclusão e da leitura de títulos/resumo resultaram 11 para estudo. **Resultados:** A simulação desenvolve competências como comunicação, liderança, raciocínio clínico, pensamento crítico, trabalho em equipa e proficiência nas equipas que atuam com doentes críticos. Enquanto a simulação de alta fidelidade é altamente realista, a simulação *in situ* é mais acessível e igualmente eficaz, permitindo praticar num ambiente semelhante ao real, com resultados duradouros. **Conclusão:** A prática simulada comprova ser um método plausível para garantir a segurança do doente, possibilitando aos enfermeiros que atuam com doentes críticos desenvolver competências técnicas e não técnicas, elevando o seu desempenho.

Palavras-chave: Cuidados Críticos; Enfermeiros; Treinamento por Simulação.

Resumen

Introducción: La simulación se define como una metodología de enseñanza-aprendizaje que recrea, de manera realista y controlada, situaciones clínicas, permitiendo a los profesionales desarrollar competencias sin poner en riesgo la seguridad de los pacientes. En el ámbito de la enfermería, la práctica simulada asume un papel cada vez más central en la formación y el desarrollo profesional. **Objetivo:** Identificar las contribuciones de la práctica simulada en desempeño de las enfermeras al acercarse a los pacientes críticos. **Método:** Se realizó una *Scoping Review* basada en las recomendaciones del Joanna Briggs Institute en febrero de 2024. La pregunta de revisión fue elaborada según el formato PCC (Población, Concepto, Contexto): "Cuál es la contribución de la práctica simulada en la adquisición de competencias de los enfermeros en la atención al paciente crítico?". La búsqueda se llevó a cabo en EBSCOhost y Google Académico utilizando los descriptores *Patient Simulation*, *Simulation Training*, *Nurses*, *Critical Care* y Clinical Competence, validados en DeCS/MeSH. Se obtuvieron 412 artículos y, tras aplicar los criterios de inclusión y exclusión y realizar la lectura de títulos/resúmenes, 11 fueron seleccionados para el estudio. **Resultados:** La simulación desarrolla competencias como la comunicación, el liderazgo, el razonamiento clínico, el pensamiento crítico, el trabajo en equipo y la competencia en equipos que trabajan con pacientes críticos. Aunque la simulación de alta fidelidad es muy realista, la simulación *in situ* es más accesible e igualmente eficaz, ya que permite practicar en un ambiente similar al real, con resultados duraderos. **Conclusión:** La práctica simulada demuestra ser un método plausible para garantizar la seguridad del paciente, permitiendo a las enfermeras que trabajan con pacientes críticos desarrollar habilidades técnicas y no técnicas y mejorar su rendimiento.

Descriptores: Cuidados Críticos; Enfermeros; Entrenamiento Simulado.

Introduction

The report entitled *To Err is Human: Building a Safer Health System* estimated that more than 98,000 deaths occur annually due to medical error, making it imperative to improve the safety of healthcare delivery[1].

The Global Patient Safety Action Plan (2021–2030), entitled *Towards Eliminating Avoidable Harm in Healthcare*, sets out a vision in which no individual should be harmed by errors in healthcare and all should receive safe care. Within its strategic objective number 5, it recommends simulation as a specialised training method for all professionals, with the aim of enhancing patient safety[2]. Simulation is defined as a learning method based on the imitation or representation of a procedure or intervention, allowing experiences to be reproduced outside a real clinical context. It is further considered that simulation has four main objectives: education, assessment, research, and systems integration, thereby strengthening patient safety policy[3].

Simulation may be conducted in simulation centres or *in situ*. Simulation centres developed for this purpose are equipped with more advanced technology, including audiovisual recording systems, which facilitate debriefing; however, such settings create a degree of separation from the real clinical environment[4]. Simulation may be classified as low, medium, or high fidelity, depending on the level of realism of the scenarios and the materials and equipment used[5].

In situ simulation is defined as a team-based training strategy, as it takes place within the actual work environment, using existing materials and equipment and involving professionals from the respective unit. Because it is conducted in a real-world context, it enables learning at both team and organisational levels. It promotes teamwork and improves communication among team members, while also allowing participants to become familiar with available equipment and to more readily identify system failures[4].

Simulated practice is used as a distinctive improvement method in the approach to the critically ill patient, supporting the acquisition and development of both technical and non-technical skills, and promoting continuous improvement in nurses performance in urgent and emergency situations. These contributions have an impact on professional development and, fundamentally, on patient safety[6]. Through simulation, various competencies are developed and refined, such as confidence, communication, clinical reasoning, teamwork, and clinical decision-making. Therefore, the implementation of this method represents significant added value for nurses providing care to the critically ill patient[7]. It enables professionals to acquire and consolidate knowledge within a controlled environment, through guided reflection, while increasing confidence and safety in responding to clinical challenges[8].

Providing care to the critically ill patient is often a source of stress, requiring professionals to respond rapidly and to demonstrate professional autonomy[9]. Nurses caring for critically ill patients must possess thorough scientific knowledge of each procedure performed in order to ensure safe and high-quality care[10]. The acquisition and development of clinical competencies are directly related to exposure to practice, which can be achieved through simulation in a safe and controlled environment without compromising patient safety. This methodology is already considered the gold standard in the training of healthcare professionals[4]. Nevertheless, despite the available evidence, further research is needed on the impact of technology, simulation, informatics, and virtual experiences in the learning process[5].

This study aims to identify the contributions of simulated practice to nurses performance in the management of the critically ill patient.

Method

The methodology employed consisted of a scoping review, based on the recommendations of the Joanna Briggs Institute, with the search conducted during February 2024. The review question guiding the study was developed according to the PCC strategy: "What is the contribution of simulated practice to the acquisition of competencies by nurses in the ma-

nagement of the critically ill patient?" Where Population – Nurses; Concept – Acquisition of competencies through simulated practice; Context – Critically ill patient.

For the search and identification of studies, the EBSCOhost platform and Google Scholar were used. The search conducted via EBSCOhost included the MEDLINE Ultimate and CINAHL Ultimate databases and was performed using the following Boolean expression: *simulation training* "AND" *nurses* "AND" *critical care* "AND" *clinical competence* "AND" *patient simulation* "NOT" *children*. The descriptors were validated using the Medical Subject Headings (MeSH) and the Health Sciences Descriptors (DeCS).

The inclusion criteria were defined as follows: full-text articles; peer-reviewed; published between 2018 and 2024; in Portuguese, English, or Spanish. The exclusion criteria were: duplicate articles; participants under 18 years of age; studies involving nursing students; and studies conducted in non-critical care settings.

For the search conducted in Google Scholar, the same keywords were used: *patient simulation*, *simulation training*, *nurses*, *critical care*, *clinical competence*. The inclusion criteria were: full-text articles; published between 2018 and 2024; in Portuguese. The exclusion criteria were: duplicate articles; participants under 18 years of age; studies involving nursing students; studies conducted in non-critical care settings; and theses or dissertations.

From a total of 412 identified articles, eligibility and exclusion criteria were applied in order to refine the search and address the review question. The screening and selection process was conducted in accordance with the PRISMA 2020 flow chart[11]. Initially, 16 duplicate articles were removed. Subsequently, following title and abstract screening, 345 articles were excluded. Of the 28 articles assessed for full-text eligibility, 11 met the inclusion criteria and were included in this scoping review.

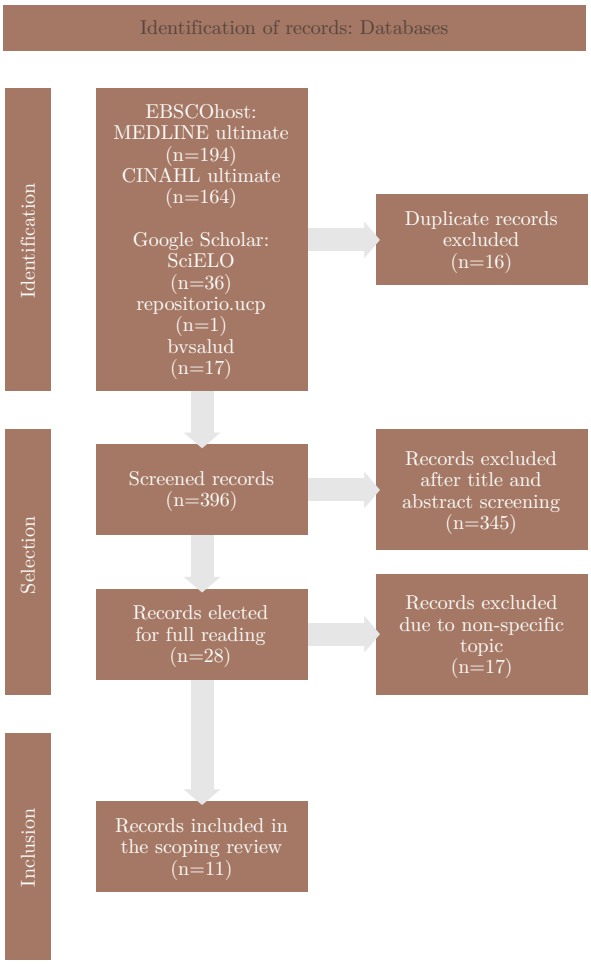

Figure 1: Adapted from "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews"[11].

Results

To facilitate the understanding and analysis of the results, a summary table was developed including the articles selected for discussion. This table compiles essential information from each study, namely the title, authors, year of publication, country, journal, and study design, as well as the respective objective and the main findings identified.

Table 1: Presentation of Extracted Results.

Title/Author/Year	Country/Journal/Study Type	Objective	Results
Implications of long-term low-fidelity in situ simulation in acute care and association with a reduction in unexpected cardiac arrests: A retrospective research study. Wang *et al*, 2019[12].	Norway. PLOS ONE. Retrospective study.	To evaluate the effectiveness of regular long-term *in situ* simulation in an intensive care unit.	The results indicate that simulation exercises had a significant impact on healthcare professionals' performance in cardiac arrest situations, also promoting early recognition of clinical deterioration, teamwork, and effective communication. Thus, *in situ* simulation practice proved to be an effective educational tool to enhance nurses first-line response to cardiac arrest.
Effects of Early Warning Score (EWS) Tutorial Simulation on Nurses' Knowledge and Clinical Performance. Damayanti *et al*, 2019[13].	Indonesia. Nurse Media Journal of Nursing. Quasi-experimental study.	To evaluate the effects of Early Warning Score (EWS) tutorial simulation on nurses' knowledge and clinical performance.	The study involved an intervention group that participated in a theoretical session followed by clinical case simulation, and a control group that received only the tutorial. Results showed a significant increase in clinical performance in the intervention group, nearly twice that of the control group. Knowledge improved in both groups. It is concluded that simulated practice contributes substantially to the development of clinical skills in cardiac arrest management, enhancing clinical reasoning and decision-making.
Does Simulation Training for Acute Care Nurses Improve Patient Safety Outcomes: A Systematic Review to Inform Evidence-Based Practice. Lewis *et al*, 2019[14].	United States of America. Worldviews on Evidence-Based Nursing. Systematic literature review.	To synthesise evidence on simulation training for critical care nurses and its impact on patient safety.	The studies demonstrated that simulation-based practice is an effective strategy for developing competencies in critical care nurses. These include clinical reasoning, rapid decision-making, safe procedure execution, and interdisciplinary coordination, directly contributing to improved patient safety and more effective management of clinical deterioration. All studies reported improvements in patient safety following simulation training: increased confidence, better communication, reduction in errors, decreased catheter-related infections, fewer falls, and improved recognition of clinical deterioration.
In Situ Simulation: A Strategy to Restore Patient Safety in Intensive Care Units after the COVID-19 Pandemic? Systematic Review. Gómez-Pérez *et al*, 2023[15].	Switzerland. Healthcare. Systematic Literature Review.	To assess the effectiveness of using *in situ* simulation as a method that enables healthcare professionals to enhance patient safety in Intensive Care Units after the situation experienced during the COVID-19 pandemic.	In situ simulation enabled the acquisition of competencies that allow nurses to identify adverse events at an early stage, thereby reducing the risk of errors. Consequently, medication, communication, and equipment-related errors were prevented, with improvements observed in the early detection and correction of errors. The implementation of *in situ* simulation in Intensive Care Units and Emergency Departments led to improvements in information transfer and effective communication during emergency situations.
Effects of a simulated emergency airway management education program on the self-efficacy and clinical performance of intensive care unit nurses. Han *et al*, 2018[16].	South Korea. Journal of Nursing Science. Quasi-experimental study.	To evaluate the effect of a simulation programme for emergency airway management on ICU nurses self-efficacy and clinical performance.	Simulation significantly increased nurses self-efficacy and clinical performance in emergency airway management, contributing to the acquisition and consolidation of essential skills, including rapid decision-making, management of difficult airways, correct use of devices, and enhanced confidence. It was concluded that simulation improves key competencies in managing clinical deterioration involving the airway.
The Effectiveness of Simulation on Recognizing and Managing Clinical Deterioration: Meta-Analyses. Orique & Phillips, 2018[17].	United States of America. Western Journal of Nursing Research. Quantitative meta-analysis.	To examine the effects of simulation-based teaching on the knowledge and performance of nursing students and nurses in recognising and managing clinical deterioration.	Simulation practice contributes to the acquisition of competencies in managing clinical deterioration, including increased knowledge to recognise and manage deterioration signs; improved performance in critical scenarios executed more quickly and effectively; and development of non-technical skills such as clinical reasoning, decision-making, communication, teamwork, and confidence. It also directly supports structured assessment and prioritisation of care.
Optimizing Nursing Response to Crisis Events through In-Situ Simulation. Bennett *et al*, 2021[18].	United States of America. Medsurg Nursing. Quality Improvement Study.	To improve nurses confidence in the management of critical events.	In situ simulation improved nurses response during critical events. Through simulation, improvements were observed in task execution times during cardiopulmonary resuscitation, resulting in faster and more effective resuscitation. An increase in nurses confidence was also observed, enabling a faster and safer response. The response time to critical events improved, particularly within the first five minutes. In situ simulation promoted patient safety by reducing delays and improving interventions that influence survival. Furthermore, reinforcement of non-technical skills was observed, such as communication and teamwork.
Simulação clínica na educação de enfermagem em terapia intensiva: revisão integrativa. Linn *et al*, 2018[7].	Brazil. Revista Brasileira de Enfermagem. Integrative Literature Review.	To analyse publications on clinical simulation practices for nursing education in intensive care.	Simulated practice develops both technical and non-technical competencies in nurses. Technical skills improvements included cardiopulmonary resuscitation, orotracheal suctioning, prevention of complications in invasive mechanical ventilation, and management of difficult airways. Non-technical skills improvements included communication, critical thinking, teamwork, and decision-making. Simulation also enhanced self-confidence and professional safety, establishing it as an effective methodology to improve care quality and patient safety in clinical deterioration management.
Simulação in situ na educação permanente da equipe de enfermagem de terapia intensiva Malfuss *et al*, 2021[19].	Brazil. Texto & Contexto Enfermagem. Qualitative, descriptive and exploratory study.	To explore nurses perceptions of *in situ* simulation as a strategy for continuing education in intensive care.	The study shows that *in situ* simulation contributed to improving technical competencies, including performing compressions, medication administration, and equipment handling. Non-technical skills improved in communication, decision-making, and teamwork. It also increased self-confidence and reduced anxiety in critical situations.
Simulação in situ com a equipe de enfermagem de terapia intensiva: Relato de experiência. Malfuss *et al*, 2023[20].	Brazil. Enferm Foco. Qualitative, descriptive study.	To report the implementation of *in situ* simulations in the continuing education of intensive care nursing staff.	In situ simulation contributed to ICU nursing team performance, including: enhanced early detection and decision-making in critical events; improved technical proficiency and safety in interventions such as chest compressions and defibrillation; strengthened non-technical skills such as communication, leadership, and teamwork; promoted self-efficacy and reduced anxiety in crisis situations; supported continuous education and integration of new staff members.
Prática simulada: uma estratégia inovadora no presente e protagonista no futuro. Borges *et al*, 2020[6].	Portugal. Cadernos de Saúde. *Scoping review.*	To map nurses competencies in managing critically ill patients through the use of simulated practice.	Simulated practice developed both technical and non-technical competencies, with notable improvements in knowledge, self-confidence, communication, more efficient team dynamics, clinical reasoning, decision-making, leadership, and self-assessment of clinical competence. Debriefing was identified as a facilitator of cognitive, psychomotor, and interpersonal skill development.

Discussion

Simulated practice stands out as an effective methodology for training nurses in the management of the critically ill patient. The studies analysed confirmed the relevance of this approach as a method for learning, development, and refinement of competencies. Simulated practice enables the enhancement of both technical and non-technical skills, contributing to the quality of team performance in critical care settings. Through simulation, theory can be integrated with practice, and realistic scenarios can be recreated and repeatedly practised—something not feasible in real clinical environments. Consequently, it improves nurses performance in the management of the critically ill patient[13].

The analysed studies demonstrated that simulation training directly contributed to the improvement of nurses technical competencies. Bennett *et al* (2021)[18], in their study, showed a substantial improvement in nurses clinical performance in resuscitation procedures (chest compressions, defibrillation, and ventilation). Following participation *in situ* simulation sessions, greater proficiency, accuracy, and speed in performing these procedures were observed, along with a significant reduction in response time. In the context of airway management, evidence indicates that simulated practice improved clinical performance in managing difficult airways, placement of supraglottic devices, performing cricothyrotomy, orotracheal intubation, and invasive mechanical ventilation, as well as helping to prevent complications associated with these procedures[7,16]. Simulated practice enhanced both technical capability and responsiveness in emergency situations, while also increasing nurses confidence[7,16,18].

A meta-analysis concluded that simulated practice significantly improved nurses knowledge levels and performance in responding to signs of clinical deterioration[17]. Other analysed studies reinforce these findings, demonstrating improvements in nurses ability to identify signs of clinical deterioration and prioritise care, thereby making assessment and intervention more effective and reducing the risk of adverse events[12,13]. The ability to anticipate complications and act in a structured manner contributes to more efficient clinical performance[19].

The relevance of simulated practice in developing non-technical skills was validated in several studies. Positive effects were identified in team communication during emergency situations and in information transfer, including the use of the ISBAR mnemonic[15]. Improvements were also observed in self-confidence, effective communication, teamwork, critical thinking, and decision-making in complex situations, enhancing patient safety and the quality of care provided[6,7,12,15,19]. Clinical reasoning also improved, as simulated practice enables the integration of theory and practice in a setting that closely resembles real clinical environments[13,19].

Simulated practice provides opportunities to train competencies and skills that lead to improved nurse performance in managing critical events and making rapid decisions under stress[7,19]. It therefore reinforces the importance of nursing teams using simulation to practise emergency scenarios, allowing greater familiarity with such situations[18].

Another contribution of simulated practice is the increase in nurses self-confidence following simulation training[18], as well as a reduction in anxiety when faced with real emergency scenarios. Two studies support these findings, indicating that after participating in simulation training, nurses demonstrate greater preparedness and confidence in critical contexts[16,19]. Simulated practice recreates a safe environment that allows repeated practice without fear of error, promoting learning, reflection, and feedback[7].

Patient safety outcomes associated with simulated practice were demonstrated in several studies, including reductions in the incidence of cardiac arrest[12], decreases in adverse events such as falls, reductions in infection rates associated with invasive devices[14], and fewer errors related to medication and equipment handling[15]. However, despite improvements in clinical outcomes related to safety, one study emphasises the need to verify whether these improvements translate into sustained safe behaviours outside the simulated environment and whether they are maintained over time[14]. According to another author, when simulated practice is not conducted sequentially, its effects may diminish after six months[7].

It is not possible to conclude that simulated practice alone is responsible for these improvements based on a single or even multiple sessions, as there are factors present in real clinical environments that cannot be fully replicated in simulated scenarios. Assessing real-world patient safety outcomes following simulation training remains a challenge[14]. It is therefore important to determine whether competencies acquired through simulation are effectively transferred into practice over time[7,14,15,16], through both proximal and distal observation following training, as well as in real clinical settings[14]. As simulation becomes increasingly used as a learning method in both academic and clinical contexts, it is essential that simulation programmes demonstrate high levels of reliability[17].

According to evidence from one analysed study, *in situ* simulation yields better outcomes in knowledge acquisition compared to scenarios conducted in simulation centres. In *in situ* sessions, participants interact with peers and instructors and actively engage in activities. Therefore, the effectiveness of training conducted in laboratory settings versus *in situ* should be further examined[17].

Although high-fidelity simulation provides a high degree of realism, *in situ* simulation enables training in environments closely aligned with real workplace contexts, contributing to longer-lasting competency acquisition. It promotes patient safety by minimising the likelihood of errors and reducing potential consequences[17].

With the implementation of this method in intensive care units and emergency departments, improvements in team performance in caring for critically ill patients have been observed[6,15,19].

Although nurses working in intensive care units possess substantial knowledge, simulated practice remains highly valuable, particularly for those with many years of professional experience. It enables not only the acquisition but also the updating of knowledge. Professionals recognise *in situ* simulation as an important resource for updating protocols and guidelines, acknowledging that relying solely on experience may lead to outdated practices, thereby compromising quality of care and patient safety. In situ simulation should be implemented across all settings, particularly in units caring for critically ill patients[19].

As a facilitating factor, the ability to train in safe and controlled environments was highlighted, allowing participants to receive feedback to improve acquired competencies[7,20]. The incorporation of debriefing is considered essential, as it enables reflection on the training, identification of performance gaps, and critical analysis of actions taken[6,20]. In this way, it promotes effective learning, competency development, teamwork, and leadership[7].

The implementation of clinical simulation within induction protocols for new professionals in services caring for critically ill patients would lead to gains in health outcomes and patient safety[7].

The relevance of simulated practice is also recognised as an essential contribution to nurses continuing professional development[19,20], promoting safety, lifelong learning, and the identification and correction of vulnerabilities[15].

Conclusion

The implementation of simulation is increasingly demonstrated to be an effective learning tool within healthcare teams, particularly those working with critically ill patients. It promotes learning and the development of both technical and non-technical skills that are essential for the delivery of care and for ensuring patient safety.

It contributes to the development of self-confidence, effective communication, teamwork, critical thinking, clinical reasoning, decision-making, and overall clinical performance. It improves nurses performance and minimises the likelihood of errors. Furthermore, it enables training in environments that closely resemble real workplace settings, facilitating professionals' familiarity with emergency situations. For the outcomes of clinical simulation to be sustained over time, it is important that it is used as a continuous rather than occasional methodology. The use of debriefing enables reflection and the identification of areas for

improvement, fostering the development of acquired competencies. The incorporation of clinical simulation into induction protocols for new team members working with critically ill patients would represent a significant added value in ensuring patient safety.

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JA: Study coordination, study design, data collection, storage and analysis, review and discussion of results.
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