ATHENA - HEALTH & RESEARCH JOURNAL
2026 • Volume III • Nº Suppl.

Clinical simulation in advanced nursing care for critically ill patient: a scoping review protocol

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ARTICLE INFO

Received 09 December 2025
Accepted 05 January 2026

Keywords:
advanced practice nursing
critically ill patient
evidence-based practice
simulation training

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DOI: 10.62741/ahrj.v3iSuppl.123

ABSTRACT

Introduction: Clinical simulation has emerged as an essential resource in nursing, providing a safe environment for the development of technical and non-technical competencies. In the context of advanced nursing practice, simulation is recognised as a strategy to support decision-making, critical thinking, leadership, and the implementation of evidence-based practices. However, evidence on how clinical simulation contributes to advanced nursing practice in the care of critically ill patients remains fragmented and conceptually heterogeneous.
Objectives: To map the available scientific evidence on the role of clinical simulation in the development of competencies associated with advanced nursing practice in the care of critically ill patients.
Methodology: Scoping review protocol that will follow the Joanna Briggs Institute guidelines and is based on the question: What is the role of clinical simulation in the development of advanced nursing practice in the care of critically ill patients? The search strategy will be conducted in the following databases: Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, CINAHL Complete, MedicLatina and Nursing & Allied Health Collection: Comprehensive (via EBSCOhost), as well as PubMed (via National Library of Medicine) and Scopus. Grey literatute will also be searched through OpenGrey and the Portuguese Open Access Scientific Repository. The recommendations of the Preferred Reporting Items for Systematic Reviews and Meta Analyses Extension for Scoping Reviews will be adopted for the article selection.
Conclusion: The proposed scoping review will map existing evidence, clarify how advanced nursing practice is conceptualised across different contexts, and identify gaps in the literature to inform future research and educational strategies.

Contributions: Conceptualization: JD; Data curation: JD; Formal Analysis: JD; Funding acquisition: Not applicable; Investigation: JD; Methodology: JD; Project administration: JD; Resources: JD; Software; JD; Supervision: AL and SR; Validation: JD; Visualization: JD; Writing – original draft: JD; Writing – review & editing: AL and SR.

Please cite this article as: Dias JPFM, Leão AMPB, Regadas SCRS. Clinical simulation in advanced nursing care for critically ill patient: a scoping review protocol. *Athena Health & Research Journal.* 2026; 3(Suppl.). doi: 10.62741/ahrj.v3iSuppl.123

INFORMAÇÃO DO ARTIGO

Recebido 09 dezembro 2025
Aceite 05 janeiro 2026

Palavras-chave:
prática de enfermagem avançada
pessoa em situação crítica
prática clínica baseada em evidências
treinamento por simulação

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DOI: 10.62741/ahrj.v3iSuppl.123

RESUMO

Introdução: A simulação clínica emergiu como um recurso essencial em enfermagem, proporcionando um ambiente seguro para o desenvolvimento de competências técnicas e não técnicas. No contexto da prática avançada de enfermagem, a simulação é reconhecida como uma estratégia de apoio à tomada de decisão, ao pensamento crítico, à liderança e à implementação de práticas baseadas na evidência. No entanto, a evidência sobre a forma como a simulação clínica contribui para a prática avançada de enfermagem nos cuidados à pessoa em situação crítica permanece fragmentada e conceptualmente heterogénea.
Objetivos: Mapear a evidência científica disponível sobre o papel da simulação clínica no desenvolvimento de competências associadas à prática avançada de enfermagem no cuidado à pessoa em situação crítica.
Metodologia: Protocolo de *scoping review* que seguirá as diretrizes do Joanna Briggs Institute e que parte da questão: Qual o papel da simulação clínica no desenvolvimento da enfermagem avançada no cuidado à pessoa em situação crítica? A estratégia de pesquisa será efetuada nas seguintes bases de dados: Cochrane Central Register of Controlled Trials, MEDLINE Complete, CINAHL Complete, Nursing & Allied Health Collection: Comprehensive (via EBSCOhost), bem como no PubMed (via National Library of Medicine). A literatura cinzenta também será pesquisada através do OpenGrey e do Repositório Científico de Acesso Aberto de Portugal. Serão adotadas as recomendações do Preferred Reporting Items for Systematic Reviews and Meta Analyses Extension for Scoping Reviews para a seleção dos artigos.
Conclusões: A *scoping review* proposta permitirá mapear a evidência existente, clarificar a forma como a prática avançada de enfermagem é conceptualizada em diferentes contextos e identificar lacunas na literatura, contribuindo para a definição de futuras linhas de investigação e estratégias educativas.

Introduction

Clinical simulation has emerged as a cornerstone in nursing practice, providing a safe and controlled environment for the development of technical-scientific knowledge and skills. In the care of critically ill patients, clinical simulation is widely used to enhance early recognition and response to clinical deterioration, promote proficiency in complex procedures, and support stress management in emergency situations.[1]

Simulation-based practice is increasingly recognised as a strategy to support the development of competencies associated with advanced nursing practice, including clinical reasoning, decision-making, leadership, teamwork, and the implementation of evidence-based practice.[2] Advanced nursing practice has been described as a progression of caring and decision-making competencies, requiring continuous development of disciplinary knowledge and professional autonomy.[3] In this context, the establishment of nursing specialties and postgraduate education, particularly at the master's level, has been identified as a facilitator of differentiated practice, critical thinking, and reflective professional development.[4]

The dissemination of scientific knowledge is essential for the consolidation of nursing as both a profession and a discipline, contributing to the visibility of advanced practices and to the continuous improvement of care.[3] Within this framework, clinical simulation has been increasingly incorporated into educational and professional development programmes, particularly in high-acuity settings such as emergency departments, pre-hospital care, and intensive care units.

The literature suggests that simulation-based programmes, especially those using high-fidelity simulation, may support the development of clinical competence, critical reasoning, and responsiveness in critical situations, as well as the integration of theoretical knowledge into practice and reflection on patient safety.[5-8] Simulation allows training in high-risk procedures and the management of unexpected complications in a controlled environment, potentially contributing to error

reduction, improved adherence to protocols, and increased professional confidence.[9]

Simulation-based learning is commonly structured around three phases: preparation, participation in the simulated scenario, and debriefing. The debriefing phase, in particular, has been identified as a central component of learning, fostering reflection, development of technical and non-technical competencies, and professional attitudes, and accounting for a substantial proportion of learning achieved through simulation.[10] Studies conducted in real clinical environments, such as in situ simulation, have highlighted its relevance for improving team performance and identifying system-level weaknesses, particularly in critical events such as cardiopulmonary resuscitation.[11]

Despite the growing body of literature on clinical simulation in nursing, important gaps remain. The evidence is heterogeneous regarding simulation modalities, outcome measures, and the conceptualisation of advanced nursing practice. Furthermore, there is a recognised need for more robust methodological designs, greater standardisation of simulation scenarios, and clearer understanding of how competencies developed in simulated environments are transferred to real clinical practice. These limitations justify the development of a scoping review to systematically map existing evidence on the role of clinical simulation in advanced nursing practice in the care of critically ill patients.

Methodology

This review will be conducted in accordance with the methodology proposed by the Joanna Briggs Institute (JBI), and the Preferred Reporting Items for Systematic Reviews and Meta Analyses Extension for Scoping Reviews (PRISMA-ScR).[12-13] Ethical principles outlined in the ROSiE project will guide this scoping review, ensuring scientific integrity, transparency, fairness, and data protection.[14] This protocol is prospectively registered in the Open Sicence Framework (OSF)(https://doi.org/10.17605/OSF.IO/7DVC8).[15]

Review question

This scoping review will consider the following main question: How does clinical simulation contribute to the development of technical and non-technical competencies in advanced nursing practice within critical care settings?

The aim is to map the available scientific evidence of the role of clinical simulation in the development of advanced nursing in the care of critically ill patient.

Inclusion criteria

The mnemonic Participants, Concept and Context (PCC) represents the criteria by wich reviewers will consider studies for inclusion in the scoping review.[12]

Participants

This review will consider studies addressing Registered nurses engaged in advanced nursing practice or in training for advanced practice, involved in the care of critically ill adult patients (pre-hospitalar emergency services, emergency deparments, ICU, specialized ICUs such as cardiology or neurology). No restrictions will be applied regarding gender, years of experience, or geographical location.

Concept

All studies exploring the use of clinical simulation - including low, medium, and high-fidelity modalities — as an educational or professional development strategy to enhance competencies associated with advanced nursing practice. Competencies of interest include clinical reasoning, decision-making, leadership, teamwork, and the implementation of evidence-based practice.

Context

All studies developed in critical care environments, including intensive care units (ICU), emergency departments, prehospital and hospital-based critical care settings, as well as academic or continuing education programs related to advanced nursing. Studies may focus on simulation in educational, clinical, or interprofessional training contexts.

Types of evidence sources

This scoping revIew will include primary studies (quantitative, qualitative, and mixed-methods), and secondary studies (all type of reviews). Editorials, opinion articles, reports theses and dissertations will also be considered. Only studies published in English, Portuguese, or Spanish will be considered for inclusion. This language restriction is justified by the language proficiency of the review team, which is essential to ensure accurate interpretation, and synthesis of data. No time restrictions will be applied.

Search strategy

The search strategy is divided into three phases. In the first phase Medical Subject Headings (MeSH) descriptors and key terms relevant to the topic under study were identified. The second phase consisted of constructing the Boolean phrase. The third phase will involve searching various databases using the Boolean phrase previously created, which will be adapted to the characteristics of each database. The third phase will also involve analyzing the reference lists of the studies selected for inclusion in the scoping review. Table 1 presents the PCC inclusion criteria (Participant, Concept, and Context) in the first column, along with the corresponding MeSH terms and the most frequently used keywords identified in the titles and abstracts of relevant articles.

Table 1. PCC elements and corresponding MeSH terms and keywords.

PCC Element	MeSH Terms	Keywords
Participants	• Nurses • Nursing staff • Advanced practice nursing • Nurse Practitioners	• Advanced practice nurse • Nurse practitioner • Clinical nurse specialist • Registered nurse
Concept	• Patient simulation • Simulation training	• Simulation-based education • Clinical simulation • Simulation-based learning • High-fidelity simulation • Simulation in nursing • Simulated training
Context	• Critical care • Intensive care units • Emergency nursing • Critical illness	• Critical care nursing • Intensive care • Emergency unit • Critical care setting • Advanced nursing education • Continuing professional development

Second, all identified keywords and index terms will be adapted for each of the following databases: Cochrane Central Register of Controlled Trials, MEDLINE complete, CINAHL Complete, Nursing & Allied Health Collection: Comprehensive (via EBSCOhost); PubMed (via National Library of Medicine); Directory of Open Access Journals; Scopus. Grey literature will also be researched, namely OpenGrey and the Portuguese Open Access Scientific Repository (RCAAP). The selected databases and gray literature sources are expected to identify a broad and relevant range of studies within the health sciences and complementary therapy literature for the purposes of this review. Table 2 shows the process of constructing the Boolean phrase of each database to be used in the scoping review.

Table 2. Search strategies used in each databases.

Databases	Boolean phrase	Results
Cochrane Central Register of Controlled Trials (via EBSCOhost)	(TI "Nurses" OR TI "Nursing Staff" OR TI "Advanced Practice Nursing" OR TI "Nurse Practitioners" OR AB "advanced practice nurse" OR AB "nurse practitioner" OR AB "clinical nurse specialist" OR AB "registered nurse" OR AB nurs*) AND (TI "Patient Simulation" OR TI "Simulation Training" OR AB "simulation-based education" OR AB "clinical simulation" OR AB "simulation-based learning" OR AB "high-fidelity simulation" OR AB "simulation in nursing" OR AB "simulated training" OR AB simulat*)AND(TI "Critical Care" OR TI "Intensive Care Units" OR TI "Emergency Nursing" OR TI "Critical Illness"OR AB "critical care nursing" OR AB "intensive care" OR AB "emergency unit" OR AB "critical care setting" OR AB "advanced nursing education" OR AB "continuing professional development" OR AB emergenc*)	39
MEDLINE complete (via EBSCOhost)	(MH "Nurses" OR MH "Nursing Staff" OR MH "Advanced Practice Nursing" OR MH "Nurse Practitioners" OR AB "advanced practice nurse" OR AB "nurse practitioner" OR AB "clinical nurse specialist" OR AB "registered nurse" OR AB nurs*) AND (MH "Patient Simulation" OR MH "Simulation Training" OR AB "simulation-based education" OR AB "clinical simulation" OR AB "simulation-based learning" OR AB "high-fidelity simulation" OR AB "simulation in nursing" OR AB "simulated training" OR AB simulat*) AND (MH "Critical Care" OR MH "Intensive Care Units" OR MH "Emergency Nursing" OR MH "Critical Illness" OR AB "critical care nursing" OR AB "intensive care" OR AB "emergency unit" OR AB "critical care setting" OR AB "advanced nursing education" OR AB "continuing professional development" OR AB emergenc*)	334
CINAHL Complete (via EBSCOhost)	(MH "Nurses" OR MH "Nursing Staff" OR MH "Advanced Practice Nursing" OR MH "Nurse Practitioners" OR AB "advanced practice nurse" OR AB "nurse practitioner" OR AB "clinical nurse specialist" OR AB "registered nurse" OR AB nurs*) AND (MH "Patient Simulation" OR MH "Simulation Training" OR AB "simulation-based education" OR AB "clinical simulation" OR AB "simulation-based learning" OR AB "high-fidelity simulation" OR AB "simulation in nursing" OR AB "simulated training" OR AB simulat*) AND (MH "Critical Care" OR MH "Intensive Care Units" OR MH "Emergency Nursing" OR MH "Critical Illness" OR AB "critical care nursing" OR AB "intensive care" OR AB "emergency unit" OR AB "critical care setting" OR AB "advanced nursing education" OR AB "continuing professional development" OR AB emergenc*)	257
Nursing & Allied Health Collection: Comprehensive (via EBSCOhost)	(TI "Nurses" OR TI "Nursing Staff" OR TI "Advanced Practice Nursing" OR TI "Nurse Practitioners" OR AB "advanced practice nurse" OR AB "nurse practitioner" OR AB "clinical nurse specialist" OR AB "registered nurse" OR AB nurs*) AND (TI "Patient Simulation" OR TI "Simulation Training" OR AB "simulation-based education" OR AB "clinical simulation" OR AB "simulation-based learning" OR AB "high-fidelity simulation" OR AB "simulation in nursing" OR AB "simulated training" OR AB simulat*) AND (TI "Critical Care" OR TI "Intensive Care Units" OR TI "Emergency Nursing" OR TI "Critical Illness" OR AB "critical care nursing" OR AB "intensive care" OR AB "emergency unit" OR AB "critical care setting" OR AB "advanced nursing education" OR AB "continuing professional development" OR AB emergenc*)	80
PubMed (via National Library of Medicine)	(("Nurses"[MeSH Terms] OR "Nursing Staff"[MeSH Terms] OR "Advanced Practice Nursing"[MeSH Terms] OR "Nurse Practitioners"[MeSH Terms] OR "advanced practice nurse"[tiab] OR "nurse practitioner"[tiab] OR "clinical nurse specialist"[tiab] OR "registered nurse"[tiab] OR nurs*[tiab]) AND ("Patient Simulation"[MeSH Terms] OR "Simulation Training"[MeSH Terms] OR "simulation-based education"[tiab] OR clinical simulation[tiab] OR simulation-based learning[tiab] OR high-fidelity simulation[tiab] OR simulation in nursing[tiab] OR simulated training[tiab] OR simulat*[tiab]) AND ("Critical Care"[MeSH Terms] OR "Intensive Care Units"[MeSH Terms] OR "Emergency Nursing"[MeSH Terms] OR "Critical Illness"[MeSH Terms] OR critical care nursing[tiab] OR intensive care[tiab] OR emergency unit[tiab] OR critical care setting[tiab] OR advanced nursing education[tiab] OR continuing professional development[tiab] OR emergenc*[tiab]))	180
Total		890

Study selection

After the research, all identified records will be collected and upload to the Rayyan Intelligent Systematic Review tool (Qatar Computing Research Institute, Doha, Qatar),

and duplicates will be removed. After a pilot test, two indepen reviewers wil assess the titles and abstracts according to the eligibility criteria. The remaining studies will be selected for full-text review. The full text of potentially relevant articles will be retrieved, and the full texts of selected citations will be assessed in detail agains the inclusion criteria by two independent reviewers. At each stage of the selection process, disagreements between reviewers will be resolved through discussion or consultation with a third reviewer. The results of the research will be reported in full in the final scoping review and presented using a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart, using the PRISMA-ScR.[13] The reasons for excluding complete articles that do not full the inclusion criteria will be documented and reported in the scoping review.

Data extraction

Data extraction from the articles included in the scoping review will be carried out using a Microsoft Word® tool built for this purpose by the authors, which can be consulted in Table 3. The construction of this data extraction tool followed the guidelines proposed in the JBI manual.[12] Throughout tha data extraction process for each study included, the reviewers will implement the necessary modifications and revisions to the preliminary data extraction tool. All changes will be duly detailed in the final review report. Any disagreements between the reviewers will be resolved through discussion or with a third reviewer. The authors of the articles will be contacted by email to request missing or additional data, whenever necessary. During data extraction, explicit attention will be given to how advanced nursing practice is defined or described in each study, acknowledging international variability in scope, roles, and regulatory frameworks.

Table 3. Data extraction tool.

First author	Last name of the first author of the study
Year	Year of publication
Title	Title of study
Country	Country where the study was conducted
Study design/ Level of evidence	JBI levels of evidence of hierarchy
Participants	Nurses (registered nurses, nurse practitioners, clinical nurse specialists) caring for critically ill adult patients admitted to critical care settings — including pre-hospital emergency services, emergency departments, intensive care units (ICU), and specialized ICUs (cardiology, neurology).
Concept	Use of clinical simulation (patient simulation, simulation training, simulation-based education, high-fidelity simulation) applied to the development of advanced nursing practice
Context	Advanced nursing in critical care settings (hospital and pre-hospital) — clinical competencies, patient safety, quality of care, clinical reasoning, and decision-making
Authors´recommendations	Main findings and recommendations of the study

Analysis of evidence and presentation

The extracted data will be organized and presented in tables or visual diagrams, ensuring alignment wih the objective and research question of this scoping review. If, after data analysis, other formats are found to more effectively convey the findings, they may also be considered. Additionally, a narrative summary will accompany the tabulated and/or visualized data, provindin context and explaining how the results relate to the reviews aims and guiding questions.

Conclusion

This protocol outlines a scoping review designed to systematically map evidence on the role of clinical simulation in advanced nursing practice within critical care contexts. By clarifying conceptual definitions and identifying gaps in the literature, the review will support future research, education, and practice development in advanced nursing care for critically ill patients.

Conflit of interest

The authors declare no conflicts of interest.

Data supporting the results will be provided on request.

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