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Competencies and Best Practices for Simulation Educators in Nursing: A Scoping Review

Presthiena Lofi E L[1], Mercy P J[2], Sujitha Elavally[3]

[1]Research Scholar, Centre for Studies in Medical Simulation, Kerala University of Health Sciences, Thrissur, Kerala (India),
[2]Associate Professor, Academic Staff College, Kerala University of Health Sciences, Thrissur, Kerala (India),
[3]Assistant Professor, Government College of Nursing, Thrissur, Kerala (India).

Corresponding Author: Presthiena Lofi E L

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ABSTRACT

Introduction: Simulation-based education in nursing enhances skill acquisition, critical thinking, and patient safety. Competent simulation educators require proficiency in technical skills, instructional design, debriefing, and learner engagement in simulations. This scoping review explores the competencies, best practices, and evaluation methods for simulation educators in the nursing profession.
Objectives: To identify essential competencies for nursing simulation educators, highlight standards and best practices, and explore tools and methods for competency assessment and enhancement.
Methods: This review followed Arksey and O'Malley's framework (1), incorporating CASP guidelines (2). A systematic search of PubMed, Scopus, and Web of Science from January 2010 to May 2024, along with grey literature, was conducted. Inclusion criteria focused on studies addressing simulation educator competencies, published in English. Data were extracted, charted, and thematically analysed to synthesize findings.
Results: Twenty-four studies were included, identifying key competencies such as debriefing skills, instructional design, and teamwork. Best practices emphasized structured faculty development using Benner's and Rogers' models (3), and adherence to ASPiH (4) and INACSL standards (5). Evaluation methods included Kirkpatrick's framework (6), Objective Structured Assessment of Debriefing (OSAD) (7), and continuous professional development programs. The review highlighted the need for ongoing training, mentorship, and standardized assessment tools for simulation educators.
Conclusion: Simulation educators in nursing require multifaceted competencies and continuous development. Implementing standardized frameworks and validated assessment tools ensures effective simulation-based nursing education. Future research should focus on long-term competency development and innovative training methods.

Keywords: Simulation educators, Educator competency, Nursing education, Faculty development, Debriefing, Simulation Practices

INTRODUCTION

Simulation-based education has become an invaluable component of nursing education, providing a safe and controlled environment where nursing students can develop essential clinical skills, critical thinking

abilities, and confidence in patient care without risking patient safety. The success of simulation-based training is heavily dependent on the competencies of educators who design, facilitate, and evaluate these learning experiences. Competency in simulation education encompasses a diverse range of skills, including technical proficiency, scenario development, effective debriefing, and learner engagement, all of which are critical for preparing nursing students for real-world clinical challenges.

Systematic evaluation of simulation educators is crucial to maintaining and enhancing the quality of nursing education. Nsouli D et al. (8) applied Kirkpatrick's evaluation model, which assesses training effectiveness through four dimensions: participant response, knowledge acquisition, behavioural changes, and overall outcomes, providing a structured method for evaluating faculty development in simulation education. Tools such as the Objective Structured Assessment of Debriefing (OSAD) (7) offer reliable means to assess the quality of debriefing sessions, an essential aspect of nursing simulation. However, Nyoni et al. (9) identified a gap in formal evaluation mechanisms for many educators, highlighting the need for comprehensive training in debriefing techniques to enhance student learning outcomes.

Competency-based training models have demonstrated significant improvements in nursing educators' knowledge and teaching efficacy. Lewis et al. (10) showed that educators trained through structured competency-based programs exhibited enhanced facilitation skills and subject knowledge. Bertiz et al. (11) emphasised the critical need for standardised debriefing practices and continuous professional development to ensure that nursing simulation education remains evidence-based and effective in preparing future nurses. This scoping review seeks to explore and compile the scientific literature on the competencies, best practices of simulation educators. The research questions of this review are: (i) What competencies are essential for simulation educators in health science? (ii) What standards and best practices should simulation educators in health science adhere to? (iii) What tools and methods are available for assessing, enhancing, and evaluating the competencies of simulation educators in health science?

MATERIALS & METHODS

This scoping review adopted the methodological framework established by Arksey and O'Malley, integrating guidance from the Critical Appraisal Skills Programme (CASP) to ensure a thorough and structured review process. The methodology included several key phases; (i) Formulating the Research Question: The initial step involved precisely articulating the research question, aimed at exploring and assessing the competencies necessary for simulation educators within the health sciences domain, (ii) Literature Mapping: A comprehensive search strategy was employed to systematically identify relevant literature from multiple academic databases and grey literature sources, ensuring extensive coverage of the topic, (iii) Study Selection: Inclusion and exclusion criteria were predefined to ensure that only studies directly related to simulation educator competencies and practices in health sciences were included, ,(iv) Data Extraction and Organization: Critical data from the chosen studies, such as research design, methods, key findings, and relevance to the study objective, were carefully extracted and systematically charted and (v) Data Synthesis and Analysis: Extracted data were organized, summarized, and subjected to thematic analysis, providing a detailed understanding of essential competencies for simulation educators and highlighting existing gaps in the literature. This methodical approach ensured that the review not only comprehensively examined the competencies necessary for effective simulation-based education in health sciences but also identified key areas

requiring further research and development (1,2).

Data sources & search strategy

A comprehensive search strategy was employed to identify relevant literature across a variety of data sources. The search encompassed several key academic databases, including PubMed, Scopus, and CINAHL, ensuring broad coverage of the existing research on the competencies of simulation educators in health sciences. Additionally, grey literature, such as conference proceedings, reports, and theses, was also included to capture a wide range of insights. Keywords and search terms were carefully selected and tailored to align with the research question, encompassing terms related to simulation education, educator competencies, and health sciences. Boolean operators were used to refine the search, ensuring that the results were both comprehensive and relevant. To enhance the rigour of the search strategy, manual searches of reference lists from key studies were also conducted, allowing for the identification of additional relevant studies that may have been missed in the initial database search. The search strategy was iterative, with adjustments made as necessary to ensure that all relevant literature was captured. The search strategy was using the keywords 'competency' AND 'simulation' in the following databases; (i) PubMed: (ii) Scopus: and (iii) CINAHL. Inclusion criteria encompassed; (i) Studies focusing on methods or interventions aimed at enhancing competency in simulation training across various fields, (ii) Research articles, systematic reviews, meta-analyses, and other relevant study types, (iii) Articles published between January 2010 to May 2024 and (iv) Articles published in English. Exclusion criteria entailed studies not directly addressing competency enhancement or simulation training and Studies with insufficient data or relevance to the topic.

Citation Management

To ensure precise and efficient management of references, all citations were systematically imported into a Zotero library. Zotero was utilised as the primary citation manager, enabling the seamless organisation and retrieval of references throughout the review process. This tool facilitated accurate citation and referencing, ensuring that all sources were correctly attributed within the scoping review. In addition to Zotero, Sci Space was employed to extract relevant literature directly related to the research questions. This dual approach allowed for a comprehensive and streamlined handling of citations, enhancing the overall integrity and coherence of the review.

Screening Criteria

A rigorous two-stage screening process was implemented to identify and select relevant literature for this scoping review. The first stage involved an initial screening of titles and abstracts to evaluate the relevance of each study concerning the research question and objectives. We eliminated studies that did not address the central research question by developing specific inclusion and exclusion criteria based on the study's objectives, purpose, and relevance to the topic. Two reviewers independently applied these criteria to all studies identified for the review. Full texts of the studies meeting these criteria were then retrieved.

This step was crucial for filtering out studies that did not align with the aims of the review. After this initial filtering, the second stage involved a comprehensive full-text assessment of the studies that had passed the first round of screening. This thorough evaluation was guided by predefined inclusion and exclusion criteria, ensuring that only those studies that met the specified standards were included in the final review. During the data extraction phase, key information from the selected studies was meticulously gathered. This included capturing details such as study design, participant demographics, intervention

specifics, measured outcomes, and significant findings. This detailed extraction ensured a robust analysis of the available evidence. The entire screening and selection process adhered strictly to the PRISMA checklist, which provided a structured and transparent approach to reporting the findings of this scoping review.

Data characterisation and synthesis

A descriptive analytical approach was employed to systematically collect and organize information from the included studies. The data were meticulously entered into a structured data charting form using Microsoft Excel, which served as the primary tool for managing and synthesizing the collected data. The data charting form was designed to capture comprehensive details from each study, including; (i) year of Publication: Documenting the timeline of research developments, (ii) author Details: Recording the names and affiliations of the study authors, (iii) study Objectives: Summarizing the aims and hypotheses addressed in each study., (iv) Study Setting: Noting the context or environment in which the research was conducted, (v) sample Characteristics: Detailing the demographics and relevant traits of the study participants, (vi) Sample Size: Recording the number of participants involved in the study, (vii) Methodology: Describing the research design, tools, and techniques employed, (viii) Key Results: Summarizing the primary findings and outcomes of the study. This structured approach to data characterization enabled a thorough synthesis of the research findings, facilitating a comprehensive understanding of the competencies required for simulation educators in health sciences.

RESULT

Search for studies

The results section will provide an overview of the included studies, detailing their number, study design, and participant characteristics. A summary of the methods or interventions utilized to enhance competency in simulation training will be presented, highlighting variations across domains and contexts. The outcomes and effectiveness of these methods will be synthesized, with an emphasis on identifying factors contributing to successful competency enhancement. The selection procedure for the article is shown in the figure. More than 1298 articles were identified from the data bases. After screening the titles and abstracts 62 articles remained for full text review. Finally, 24 articles included in the scoping review. The title, abstract and full text of the papers were independently read by the researchers and arrived at the consensus of reporting the relevant findings. Any disagreements were resolved by consultation with peer researchers. The dataset for the paper was developed by collecting findings pertinent to the research questions; ((simulation [Title]) AND (competency [Title])) AND (health [Title/Abstract]) - 34 studies, ((simulation [Title]) AND (standards [Title])) - 40 studies, (simulation [Title]) AND (best practice [Title]) - 17 studies, (simulation [Title]) AND (competency [Title]) - 176 studies, and (simulation [Title]) AND (educator [Title]) - 31 studies (Figure 1).

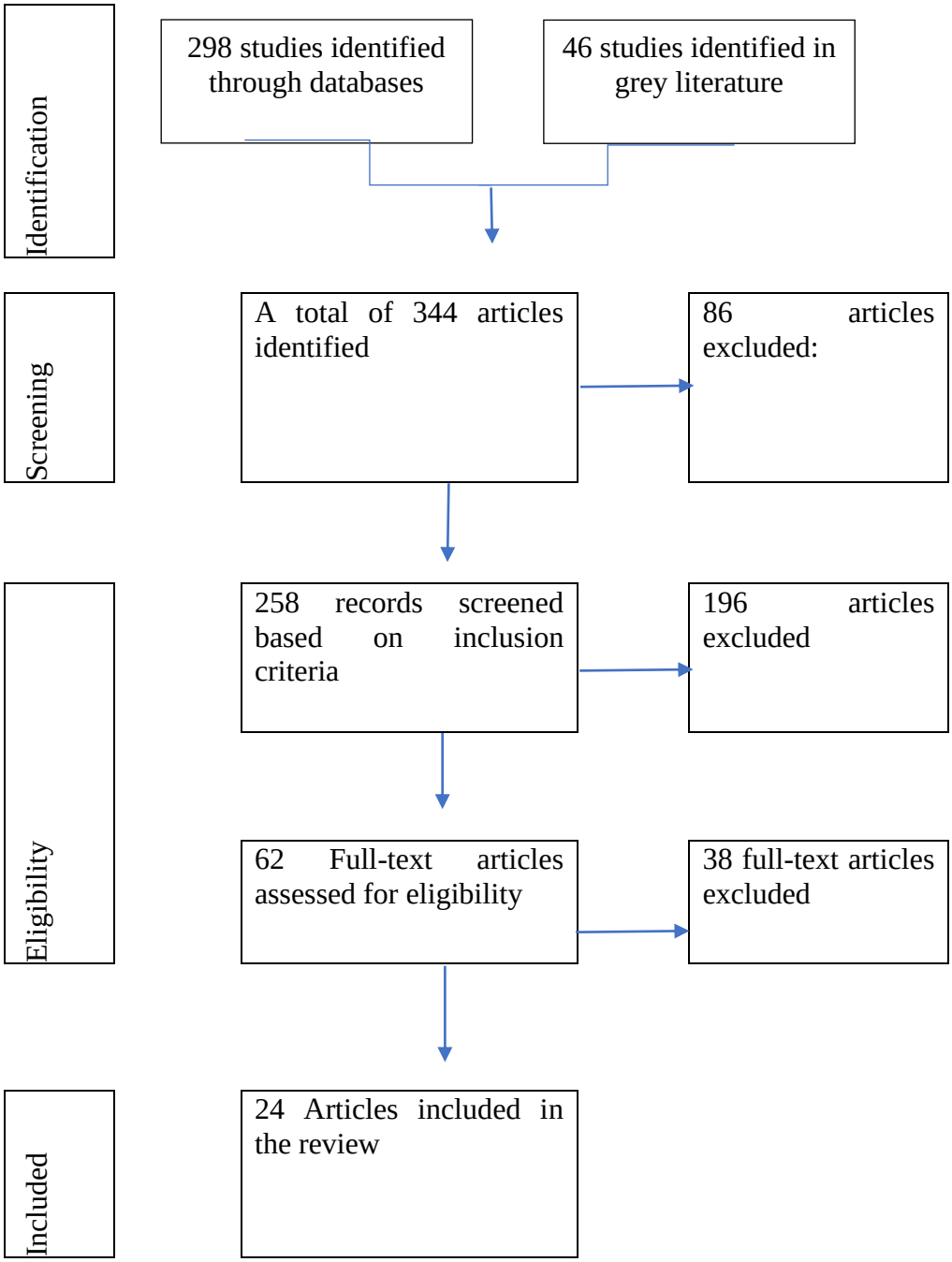

Figure 1: PRISMA Flow chart of the study selection

General characteristics of the studies

This study seeks to present an overview of all the available literature under the categories of; Among the 24 studies selected in this scoping review 8% (2) were published in 2024, 8% (2) in 2023, 12.5% (3) in each year in 2022 and 202, 8% (2) in each 2020 & 2018, 4% (1) in each year 2018, 2017, 2012, 2011, 2005, and 25% (6) in the year 2015.

Domains of Simulation Educator Competencies Derived from the Selected Study Findings

Simulation educators must possess a blend of instructional, technical, and professional competencies, including proficiency in

debriefing, scenario development, and learner engagement. Faculty development programs that incorporate tiered training, mentorship, and ongoing education play a crucial role in enhancing their effectiveness. Training strategies based on models such as Benner's novice-to-expert framework and Rogers' Diffusion of Innovations further strengthen professional growth. Adopting standardized competency frameworks, such as ASPiH and INACSL guidelines, ensures consistency in simulation education. Additionally, structured evaluation methods such as OSAD, competency-based models, and Kirkpatrick's framework support continuous professional development and self-assessment, contributing to improved educator performance. (Table 1 & 2)

Table 1: Domains of Simulation Educator Competencies Derived from the Selected Study Findings

Domain	Key Findings	Supporting Studies
Competencies Essential for Simulation Educators	Simulation educators require skills in debriefing, instructional design, scenario development, and learner engagement. Technical knowledge, teamwork, and professional attitudes are also essential.	Topping et al. (12), Wang & Vozenilek (13), Young Sook Roh & Issenberg (14), Zafosnik et al (15), Gilbert & Brown (16), Rogers et al. (17)
Faculty Development for Simulation Educators	Structured faculty development programs, including tiered training models, mentoring, and continuous education, enhance simulation educator competencies. Framework-based approaches such as Benner's novice-to-expert model and Rogers' Diffusion of Innovations improve training effectiveness.	Gardner et al (18), Soni et al (19), Saikia et al (20), Holtschneider (21), Seethamraju et al. (22), Young Sook Roh & Issenberg (14)
Standards and Best Practices in Simulation Training	Simulation training should adhere to structured competency frameworks (e.g., ASPiH standards (4)) and include ongoing faculty development. Institutions should focus on standardized curricula, evaluation metrics, and institutional support.	INACSL Standards Committee (5), Baxendale et al (23), Eppich et al (24), Health Education England (25)
Tools and Methods for Evaluating Simulation Educator Competencies	Assessment tools such as Objective Structured Assessment of Debriefing (OSAD), competency-based training models, and Kirkpatrick's evaluation framework are effective. Continuous professional development programs and self-assessment frameworks are also recommended.	Seethamraju et al. (22), Nyoni et al. (9), Lewis et al. (10), Montgomery et al. (11)

Table 2: Table of Summary from the 24 studies reviewed in this article

Author	Objectives	Methods
Soni et al. (19)	Examined published literature on training programs designed for simulation-based teaching.	Scoping review examines faculty development practices in simulation-based teaching, focusing on approaches, challenges, and effectiveness
McNeill et al. (26)	Developed novice faculty in simulation education.	Course-based faculty development using NLN competencies.
Barlow et al. (27)	Identified system issues using simulation.	Mixed methods: live simulation, PDSA, HFMEA framework.
Nyoni et al. (28)	Identified the simulation debriefing needs of health sciences educators within a faculty of health sciences.	Mixed methods design was used, combining quantitative observations with qualitative semi-structured interviews.
Roh & Issenberg (14)	Developed a tiered simulation educator training program.	Pre-test/post-test study on nursing educators.
Dieckmann et al. (29)	Explored long-term reflections of simulation educators.	Semi-structured interviews.
Holtschneider (30)	Examined the role of simulation in nursing professional development.	Column review with case examples.
Topping et al. (12)	Identified competencies for nurse simulation educators.	Systematic literature review.

Akhter et al. (31)	Assessed nurse educators' knowledge & attitude on high-fidelity simulation.	Online survey.
Jackson et al. (32)	Analysed educator-student communication in interprofessional simulation.	Observational study.
Burns (33)	Studied feedback & debriefing in simulation for UK doctors.	Simulation events with Foundation Year 1 doctors.
Hrzic et al. (34)	Developed a simulation-supported decision-making framework for public health education.	Delphi survey & expert consensus.
Wang & Vozenilek (13)	Created a simulation-based emergency medicine curriculum.	Development & implementation of cases.
Crawford (35)	Established ASPiH standards for simulation-based education.	Review of existing standards & stakeholder consultation.
Angel et al. (36)	Audited hospital compliance with ASPiH standards.	Audit of simulation sessions in a UK hospital.
Keiser et al. (37)	Identified competencies for healthcare simulation technicians (HSTs).	Job description analysis & interviews.
Gardner et al. (18)	Explored existing interventions to enhance the knowledge, skills, and effectiveness of simulation instructors	A scoping review to analyse trends in faculty development for simulation-based education.
Thomas et al (38)	Explored the application of Benner's Novice to Expert Model to the knowledge, skills, and attitudes of simulation educators	The Novice to Expert Model was used to define stages of simulation facilitator development
Holtschneider (30)	Examined nursing professional development via simulation.	Discussion-based review.
Truchot et al. (39)	Explored theories in In-Situ Simulation (ISS).	Scoping review with stakeholder feedback.

DISCUSSION

Competencies Essential for Simulation Educators

Simulation educators must possess a diverse skill set encompassing pedagogical, technical, and interpersonal competencies to deliver effective simulation-based learning experiences. According to Topping et al. (12), essential competencies include scenario development, applying evidence-based teaching methods, and fostering learner-centred educational environments, aligning with established best practices in health professions education. Wang and Vozenilek highlighted the significance of teamwork and crisis resource management skills, particularly in emergency medicine simulations, as critical components for delivering high-quality simulation training.(13) Young Sook Roh and Issenberg introduced a tiered competency development framework that categorizes simulation educator training into three progressive levels: basic, intermediate, and advanced, providing a structured pathway for skill enhancement.(14) Roche et al. identified nine core competency areas essential for simulation educators, including technical proficiency, instructional design, teamwork, and professional conduct, underscoring the multifaceted nature of simulation-based education.(37) Hrzic et al. proposed a competency model tailored to public health education, which integrates stakeholder collaboration, evidence-based decision-making, and participatory system mapping. (34) This framework highlights the importance of systemic thinking and interdisciplinary cooperation in simulation training. Collectively, these findings emphasize the need for well-rounded training programs that address the diverse competencies required by simulation educators in various healthcare settings.

Standards and Best Practices in Simulation Training

Implementing standardized guidelines and best practices is essential to maintain the quality and consistency of simulation-based

education. Crawford (35) and Angel et al. (36) examined the application of the Association for Simulated Practice in Healthcare (ASPiH) standards, which offer a comprehensive framework designed to enhance the effectiveness and quality of simulation programs. An audit conducted by Angel et al. within a hospital-based simulation program identified gaps in adherence to ASPiH standards, underscoring the need for clearly defined procedural frameworks to ensure uniformity and excellence in simulation-based learning. (36) Faculty development is integral to the delivery of high-quality simulation education. McNeill et al. advocated for faculty training programs grounded in Rogers' Diffusion of Innovations model, which supports the adoption of simulation-based teaching techniques by both novice and experienced educators (26). Similarly, Thomas et al. introduced a Simulation Educator Toolkit based on Benner's novice-to-expert framework, providing a structured approach to enhance faculty competencies and improve instructional effectiveness. (38) These studies highlight the critical importance of continuous professional development, demonstrating that structured training, mentorship programs, and competency-based frameworks are essential for fostering long-term excellence in simulation education.

Tools and Methods for Evaluating Simulation Educator Competencies

Evaluating the competencies of simulation educators systematically is essential for ensuring the effectiveness of simulation-based education. Seethamraju et al. utilized Kirkpatrick's evaluation framework, which assesses training outcomes at four levels: participant reaction, knowledge gained, behavioural changes, and overall results, offering a comprehensive method to evaluate the impact of faculty development programs in simulation education.(25) Additionally, the Objective Structured Assessment of Debriefing (OSAD) has been used as an effective tool for assessing the quality of debriefing sessions led by simulation educators. Research by Nyoni et al. highlighted that many educators lacked formal evaluation systems, pointing to the need for structured training in debriefing techniques to enhance learner experiences and outcomes. (9) Competency-based training models have proven to significantly improve the knowledge base and instructional effectiveness of simulation educators. Montgomery et al. emphasized the importance of standardized debriefing practices, reinforcing the necessity of ongoing professional development programs that incorporate evidence-based instructional strategies to ensure high-quality simulation education. (11)

CONCLUSION

This review underscores the importance of well-defined competencies, adherence to best practices, and robust evaluation methodologies for simulation educators in health sciences. Simulation educators require pedagogical expertise, technical proficiency, and teamwork skills, which can be systematically developed through tiered competency-based frameworks. The integration of structured faculty development programs, such as those based on Benner's novice-to-expert model or Rogers' Diffusion of Innovations model, is essential for enhancing educator effectiveness. To maintain the quality of simulation education, institutions should adopt standardized guidelines, such as the ASPiH standards, and implement validated assessment tools like Kirkpatrick's model and OSAD to evaluate faculty performance and learning outcomes. Future research should focus on the development of innovative methodologies for competency assessment, particularly in areas such as interdisciplinary simulation training and technology-enhanced education frameworks. By systematically integrating evidence-based training models, faculty development initiatives, and robust evaluation mechanisms, healthcare

institutions can ensure the sustainability and effectiveness of simulation-based education. The findings of this scoping review are highly relevant to clinical nursing practice, as competency-based simulation education is integral to preparing nurses for real-world clinical challenges. Simulation training provides nurses with a safe, controlled environment to develop critical clinical skills, including patient assessment, clinical decision-making, and emergency response, without jeopardizing patient safety. The review highlights essential competencies for simulation educators, such as debriefing, instructional design, and scenario development, which directly influence the quality of training provided to nursing students and practitioners. These competencies ensure that nursing simulations accurately reflect clinical scenarios, thereby enhancing the preparedness of nurses for complex patient care situations. Structured faculty development programs, as discussed in the review, ensure that nursing educators remain updated with the latest clinical practices and educational methodologies. The adoption of frameworks like Benner's novice-to-expert model and Rogers' Diffusion of Innovations model facilitates the continuous professional growth of nursing educators, which translates to improved teaching and better clinical outcomes in nursing practice.(40) Adherence to established standards, such as the ASPiH guidelines, ensures that nursing simulations are conducted with high fidelity, offering realistic and immersive learning experiences that improve clinical competencies, including patient communication, teamwork, and critical thinking. Furthermore, the use of validated assessment tools like Kirkpatrick's model and OSAD ensures that nursing educators' competencies are continuously evaluated and enhanced, leading to better simulation-based education outcomes. This focus on continuous improvement and evidence-based teaching methods ensures that nurses are well-prepared to provide high-quality patient care, adapt to rapidly changing clinical environments, and deliver safe and effective nursing interventions. The integration of simulation-based education into nursing practice not only enhances clinical skills but also fosters a culture of continuous learning and excellence in patient care.

Declaration by Authors

Ethical Approval: This scoping review was done as a part of the major project with ethical clearance no. (UEC/1/KUHS/6/2021(Version-2) of university ethics committee of Kerala University of Health Sciences, Thrissur, Kerala, India.

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