

ORIGINAL RESEARCH

Use of prebriefing in simulation-based experience for nursing education: a scoping review

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ABSTRACT

Introduction:

Embracing innovative pedagogies and structured pre-simulation activities in healthcare simulation enhances learning and clinical performance. The Society for Simulation in Healthcare (SSH) and the International Nursing Association for Clinical Simulation and Learning (INACSL) propose a three-phase approach of prebriefing, simulation-based experiences and debriefing. This scoping review explored the impact of prebriefing pedagogies, aiming to enhance nursing students' chances of success in simulation-based learning experiences.

Methods:

This scoping review encompassed the existing literature on simulation in nursing education, specifically focusing on prebriefing strategies.

Results:

The existing literature revealed variations in the contexts, educational concepts, prebriefing pedagogy and outcome measures employed in simulation-based experiences. None of the studies established a correlation between dependent variables and prebriefing pedagogy strategies. Instead, most studies utilized a combination of dependent variables to measure the correlated aspects of prebriefing, namely personal development and engagement.

Discussion:

The recognized prebriefing strategies serve as valuable resources for nurse educators when designing the prebriefing phase of a simulation-based experience.

What this study adds

- This scoping review identified four significant gaps: Diverse educational frameworks, limited testing of innovative pedagogies, misalignment with clinical dynamics and inadequate engagement evaluation.
- Simulation applications can enhance clinical practice and performance by facilitating the integration of knowledge and skills across diverse clinical contexts.
- There was a lack of consensus regarding interpretation of prebriefing, but its understanding was closely related to the educational/conceptual framework employed.
- The identified prebriefing pedagogies can be classified into conventional and innovative approaches.
- Most reviewed studies used various dependent variables to assess prebriefing: personal development and engagement in simulation-based experience. Immersive experiences were created through prebriefing activities that familiarize participants with tools and simulation logistics.

Introduction

In the dynamic world of healthcare simulation, simulation can drive positive change and empower pre-licensing students and healthcare professionals to excel in their clinical performances [1]. Embracing innovative pedagogies and incorporating structured activities before simulation sessions can enhance the chances of success and maximize learning opportunities [2]. Research and professional development organizations such as the Society for Simulation in Healthcare (SSH) and the International Nursing Association for Clinical Simulation and Learning (INACSL) provide glossaries, standards and ethics for simulations to promote excellence in healthcare simulation practice. To create comprehensive and impactful simulation experiences, SSH and INACSL propose a three-phase approach of prebriefing, simulation-based experiences and debriefing [3,4]. While simulation design and debriefing practices have established standards [3,4], the criteria for prebriefing practices have been well-developed and available since 2021 [6]. It is essential to explore different pedagogies of prebriefing and their impact on simulation-based experiences.

Healthcare simulation has emerged as an integral activity for nursing undergraduates to gain clinical competence in the 21st century, offering an alternative to traditional clinical practicum hours [1]. Previous investigations have focused on the technological aspects and simulation modalities [1]. Simulation technologies refer to the tools (e.g. manikins), equipment (e.g. simulators, virtual reality), software (e.g. computer-based virtual patients) and systems (e.g. simulation control systems with data capture and analysis tools) used to create and facilitate simulation-based learning experiences [3]. These technologies enable replication of real-world scenarios, allowing learners to practice and develop their skills in a safe and controlled environment [3]. Simulation modalities refer to the different simulation methods used in healthcare training [3] such as interprofessional and standardized patient simulation. They provide an opportunity to practice and improve patient safety and team communications by bridging the gap between classroom learning and real-world healthcare settings.

The INACSL Standards Committee introduced the 'Prebriefing: Preparation and Briefing' standard to provide clarity and consistency in simulation design practice. The prebriefing criteria serve to situate learners into a shared mental model and to convey essential ground rules for the simulation-based experience. The established prebriefing standards encompasses general, preparation, and briefing criteria as defined by INACSL [6]. General criteria ensure simulationists possess scenario comprehension and prebriefing expertise, allowing for tailored prebriefing to fulfill specific purposes and objectives. This involves integrating planning and ensuring learner readiness while catering to diverse learner expertise levels, including addressing orientation needs for novices. Preparation criteria encompass creating materials to minimize cognitive load, align with objectives and incorporate a variety of activities. Briefing criteria involve effectively communicating expectations, logistics, roles and fostering a secure learning

atmosphere. Adhering to these criteria fosters a secured and engaged learning environment, ultimately enhancing preparedness and effectiveness of the debriefing process. According to SSH [3], information delivery in prebriefing is crucial in setting the stage, establishing a safe learning environment and ensuring participants are adequately prepared. Emotional preparedness, clear communication, debriefing readiness and time optimization are critical elements in a productive simulation-based experience [2,3].

Although prebriefing is familiar in simulation-based learning experiences, identifying the appropriate pedagogies for this phase remains challenging. Simulationists should possess knowledge of different scenarios and educational concepts related to the prebriefing standard [6]. While evidence focuses on the effectiveness [1] and impact of prebriefing [4], there is a need to review and assess the use and appropriateness of prebriefing pedagogies. Through this scoping review, we aim to summarize, analyse and synthesize relevant studies to shed light on the position and effectiveness of prebriefing pedagogy strategies. The potential of prebriefing can revolutionize healthcare simulation and pave the way for enhanced learning and clinical performance.

Objectives

This scoping review explores using pedagogies in simulation practices for pre-licensing nursing education and aims to generate an evidence-based synthesis to inform the design, implementation and evaluation of prebriefing. Given the crucial role of nurse educators in facilitating simulations, the authors seek answers to the following research questions from an educational perspective:

- (1) What are the available clinical contexts/contents for conducting simulations in pre-licensing nursing education?
- (2) What is the impact of educational concepts/frameworks on the interpretation of prebriefing by nurse educators in pre-licensing nursing education?
- (3) What prebriefing pedagogies are employed by nurse educators?
- (4) What simulation-based outcome measures are utilized for evaluating prebriefing pedagogy?

Methods

Protocol and registration

Conforming to the updated guidelines for scoping reviews by the Joanna Briggs Institute [7], this review presents its findings based on the checklist provided by the PRISMA Extension for Scoping Reviews [8]. The study protocol was predetermined and can be obtained upon request. Ethical approval was unnecessary because this scoping review does not involve human participants.

Eligibility criteria

The criteria for inclusion in the review were as follows: (1) literature focusing on simulation pedagogies for facilitation and similar purposes, with a definition of the concept

as a multidimensional construct comprising multiple components; (2) literature pertaining to professional training for nursing undergraduates or pre-licensing nursing education, explicitly involving nurse educators in simulation activities, such as instructors, facilitators, course coordinators, programme leaders, lecturers and teaching assistants; (3) primary intervention studies and grey literature providing empirical evidence. Exclusion criteria encompassed secondary studies such as systematic reviews, protocols and editorials.

Information sources and search

In the initial phase the population, concept and context (PCC) framework, as recommended by the Joanna Briggs Institute [7], was used to guide the search. Multiple databases, including CINAHL, ERIC, the Lippincott Williams & Wilkins Nursing and Health Professions Premier Collection, Web of Science and SAGE journals, were searched using the keywords listed in Table 1. The keywords in each category were searched individually, and then publication periods were utilized to refine the search for full-text reports and articles published between January 2010 and March 2022 within each database. A manual search of the references cited in the eligible articles was conducted to identify any relevant studies.

Selection of sources of evidence

All the identified full-text citations were uploaded to Covidence, an online collaboration platform designed for efficient reviews [9]. Duplicate articles were automatically removed using the platform's features. The study selection process presented challenges due to inconsistencies in the terminology used to describe the learning activities preceding the simulation-based experience. In the screening phase, all relevant studies were included based on their titles and abstracts. The first and the second authors (HMC and SLW) assessed the titles, abstracts and full texts to determine the eligibility of the papers. Full-text studies that did not meet the inclusion criteria were excluded. These two authors

held regular meetings to discuss the selected studies and address any uncertainties. In cases where discrepancies arose between these two independent authors, the third author (SYY) reviewed the full texts to provide additional input.

Data charting process and data items

A data extraction table was created on the Covidence web-based platform with the following information: (1) study citations, (2) country, (3) study design, (4) educational contents/contexts (e.g. medical, surgical, obstetrics), (5) educational/conceptual framework, (6) prebriefing principles (from educational perspectives), (7) identified prebriefing strategies, (8) simulation-based experience, (9) outcome measures (dependent and independent variables related to prebriefing). The first and second independent authors carried out the data extraction process. The third author reviewed the data extraction on Covidence to ensure accuracy and resolve any discrepancies. Final decisions were made after reaching a consensus among these three authors.

Quality of studies

Following the guidelines for scoping reviews, the assessment of study quality or risk of bias was not a focus in this review. As a scoping review follows an inductive approach, the emphasis is on exploring and mapping the available evidence rather than evaluating methodological limitations [10,11].

Synthesis of results

Key characteristics of the publications, including critical components of the prebriefing process were, summarized using tables and figures. The third author (SYY) conducted a narrative synthesis employing content analysis to summarize the extracted information and assign appropriate codes. The interpretations, components and measures of the prebriefing phase were tabulated and grouped. Once acquainted with the coded groups, the second author (SLW) analysed and created initial prebriefing themes for discussion with the other three authors (HMC, SYY, SHC). The final synthesis was subsequently reviewed and verified by all four authors.

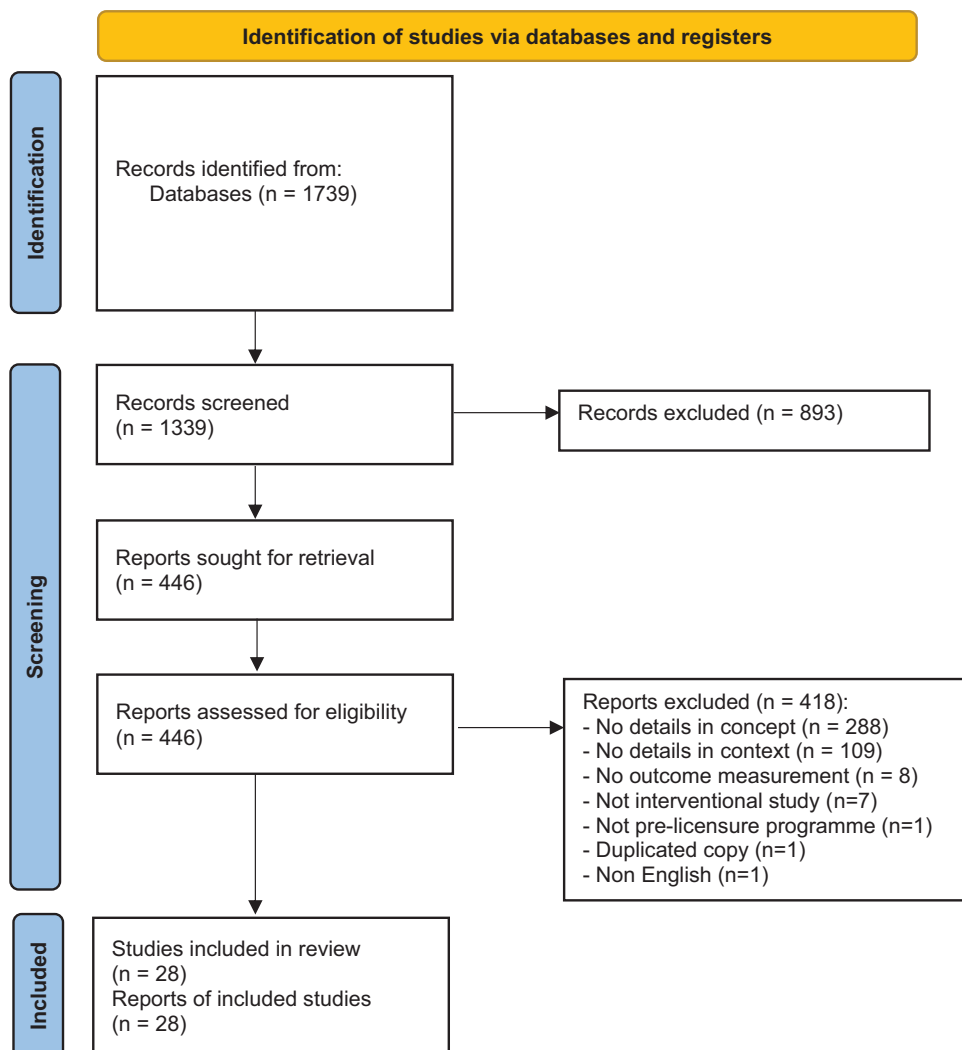
Results

Selection of evidence sources

The PRISMA diagram (Figure 1) provides an overview of the study selection process in this scoping review, including the identification, screening, assessment and inclusion of studies, as well as the reasons for exclusion. Following the removal of duplicate articles and manual searches, it summarizes the total number of studies identified, screened, assessed and included in this scoping review and the reasons for exclusion. After removing the duplicate articles from all the databases and manual searches, the first and second authors independently screened 1,399 titles and abstract records, and assessed 446 full-text articles for eligibility. Ultimately, 28 pieces out of the 446 met the inclusion criteria, and data were extracted from these studies. The extracted data were then reviewed and synthesized qualitatively. Any discrepancies that arose were resolved through team consensus.

Table 1: Key search terms

	PCC framework		
	Population (P)	Concepts (C)	Context (C)
Search terms	Nursing educator	Healthcare simulation	Pre-licensing programme
	Nursing faculty	Simulation-based learning	Healthcare education
	Facilitators	Simulation-based experiences	clinical
	Instructors	Clinical competence	Specialty
	Nursing students	Pedagogy	Nursing
	Undergraduate	Instruction	
		Learning theories	

Figure 1: PRISMA flow diagram of the study selection process

Characteristics of evidence sources

Table 2 details the study citations, country of origin, research design and clinical learning contexts. All included studies focused on simulating interventions for pre-licensing nursing students. Of the 28 articles, 14 were conducted in the United States, three in Australia, two in Korea and Turkey and one each in Israel, Japan, Singapore, South Africa, Spain, Taiwan and the United Kingdom. Regarding research design, 13 studies used non-randomized experimental designs, 11 employed mixed methods, two utilized qualitative research methods and two adopted randomized controlled trial designs. The synthesized results were presented in the following manner to address the pre-defined research questions.

Clinical contents/contexts

The studies included in this review explored the application of simulation in various clinical learning contexts. Examples of simulation applications included medication administration safety [12,13], cardiopulmonary resuscitation [14], urinary catheter insertion [15], telehealth communication [16] and cardiac auscultation [17]. The findings indicated that simulation could enhance clinical practice and performance by integrating knowledge and skills across different clinical settings. These settings

encompassed paediatrics [18,19], obstetrics [20,21], mass casualty incidents [22], end-of-life management [23–25], sex education [26], public health guidance [27], oncology [28] and acute medical and surgical care [29–39].

Educational concepts/frameworks

Based on the 28 publications included in this scoping review, it was found that there needed to be a consensus on the interpretation of prebriefing. Instead, the interpretation was influenced by the educational/conceptual framework adopted. Half of the studies utilized Kolb's experiential learning theory [12,13,17,21–23,25,27,29,32,34–37], while three studies were linked to Bandura's social learning theory [14,18,28]. Other frameworks and concepts associated with prebriefing included the knowledge-to-action model [20,24], deliberate practices [15,30], cognitive load [38], NLN/Jeffries simulation framework [31], problem-based learning [26], INACSL Standards of Best Practice Simulation [16], enquiry-based learning [19] and situational awareness [39]. Examples of prebriefing strategies encompassed interactive learning opportunities [29], self-directed learning bundles [28], obstetrics and end-of-life care discussions [20,24], peer coaching and peer mentoring [15]. For a comprehensive list of the educational/conceptual frameworks, prebriefing interpretations and pedagogies

Table 2: Prebriefing strategies in simulation for pre-licensing nursing education in the literature

Citation (year)	Country	Study design	Clinical learning context	Educational/ conceptual framework	Prebriefing interpretation	Identified prebriefing pedagogies	Simulation-based experience	Measures of outcomes
Alfes (2011)	United States	Non-randomized experimental study	Pain management after total knee replacement surgery	Kolb's experiential learning theory	Provide a multitude of interactive learning methods that challenge students at their current competency level	Demonstrative video	Role-play with SimMon	Self-confidence
Amod & Brysiewicz (2019)	South Africa	Qualitative research	Postpartum haemorrhage (PPH) management	Kolb's experiential learning theory	Offer the learning opportunity to manage real-life emergencies	Volunteer to participate in a PPH scenario role-play	Role-play with HFHPS SimMon	Promoting reflection, thinking about learning, managing real-life emergencies, trying out what was learnt to improve clinical competence, decision-making, problem-solving skills
Bogossian et al. (2014)	Australia	Mixed methods	Recognizing and responding to sudden patient deterioration	Deliberate practice	Provide opportunities for students to integrate and improve pre-requisite knowledge	Written information, standard verbal explanation, the role assignment of the team	High psychological fidelity simulation-based experiences	Knowledge (11 MCQ); clinical performance: leadership, team working, task management, situation awareness (OSCE score sheet)
Burrell et al. (2023)	United States	Mixed methods	Oncology evidence-based symptom management (EBSM)	Bandura's social learning theory	Teach a specialty content area, oncology EBSM, within a seminar-style course and pre-simulation activities	Five weeks of oncology EBSM, PowerPoint presentations, interactive case studies	Standardized patient simulation with two 20-minute scenarios	Knowledge, confidence and competence (objective and self-perceived) on oncology EBSM
Cabañero-Martínez et al. (2021)	Spain	Mixed methods	Healthcare communication skills in difficult situations such as patients in end-of-life care	Kolb's experiential learning theory	Emphasize the previous training contents in communication skills before the simulation	The lecture introduces educational interventions and scenarios	Participation in four different standardized patient simulation scenarios and observe the simulation of their groupmates	Attitude towards communication, communication skills, satisfaction with simulated experiences
Cardoza & Hood (2012)	United States	Non-randomized experimental study	Paediatric clinical experience in the acute care setting	Bandura's social learning theory	Facilitate students to recall previously acquired nursing knowledge regarding nursing actions to changes in patient conditions	Acknowledge simulation scenario, include the paediatric patient case information, the parent/child profiles and assigned student nursing roles	Neurological assessment on child manikin, IVs, treatments (deterrent stocking, nasal oxygen, surgical dressings)	Self-efficacy

Continued

Table 2: Continued

Citation (year)	Country	Study design	Clinical learning context	Educational/ conceptual framework	Prebriefing interpretation	Identified prebriefing pedagogies	Simulation-based experience	Measures of outcomes
Carman et al. (2016)	United States	Non-randomized experimental study	The dying process and end-of-life (EOL) care	Kolb's experiential learning theory	Design and implement the multidimensional learning bundle in linking the simulation and didactic content.	Learning bundle of EOL care, and in-class discussion (a case study reviewed for linkage to the simulation-based experience)	The simulation-based experience was the continuation of the unfolding case scenario from prebrief reflected in the symptoms of dying in the high-fidelity simulator with family members and medical officers	Formmelt Attitudes on Care of the Dying (FATCOD)
Chang et al. (2021)	Taiwan	Mixed methods	Nursing process topics: constipation and death	Cognitive load theory design principles	Providing a learning experience clarified course contents more interestingly by the novelty of the interactive animation	Exercise the five components of the nursing process with assignments via online learning bundle	A standardized patient simulation	Self-confident in communication/ groups' assignment and examination results. Thematic analysis for qualitative data emerged: effective communication skills, problem-solving, confidence, feeling prepared and novel learning experiences
Craig et al. (2021)	United States	Non-randomized experimental study	Medication-safety enhanced simulation	Kolb's experiential learning theory	Consolidate safe medication practices before attending the simulation	Knowledge revision, deliberate practice on low-fidelity simulator	The use of high-fidelity simulators for practising oral and subcutaneous medication administrations	Medication Safety Critical Element Checklist (MSCEC) Scores by Group
Davies et al. (2020)	Australia	Mixed methods	A mixed medical and surgical ward with a simulated 52-bed healthcare facility provides various diagnostic and interventional services. A doctor's office, blood bank and pharmacy helped maintain the realism.	Kolb's experiential learning theory	Instil self-confidence in dealing with a variety of simulated situations	Role assignment and expectations as a registered nurse	Participants were organized in 3-hour shifts (morning, afternoon and evening), attending six shifts over 2 days, of which two consecutive shifts were spent in the role of a registered nurse with manikins	Satisfaction with the Simulation Experiences scale and content analysis of open-ended questions. Three themes emerged: simulation, the role of registered nurses and learning

Continued

Table 2: Continued

Citation (year)	Country	Study design	Clinical learning context	Educational/ conceptual framework	Prebriefing interpretation	Identified prebriefing pedagogies	Simulation-based experience	Measures of outcomes
Demirtas et al. (2021)	Turkey	Mixed methods	Cardiopulmonary resuscitation (CPR) training	Bandura's social learning theory	Ease students' worries before the simulation	Didactic lecture and real-time demonstration	A 53-year-old male patient as the medium-fidelity CPR model whose breathing and circulation stopped in a traffic accident for participants' hands-on practice and CPR management	CPR skills scores, Student satisfaction and self-confidence in learning, Qualitative data emerged themes: Not knowing exactly what to do in CPR, emotions regarding lack of self-confidence in CPR after simulation-based training
Hayden et al. (2014)	United States	Randomized controlled trial	Simulated clinical experiences	The NLN/Jeffries Simulation Framework	Engage students as active participants throughout the simulation period	Role assignment, expectations and simulated patient background	Problem-solving built into the scenarios and fidelity was appropriate for the learning objectives for participants handling and practices	ATI RN Comprehensive Predictor measured knowledge. Clinical competency was measured by the Creighton Competency Evaluation Instrument, the New Graduate Nurse Performance Survey and the Global Assessment of Clinical Competency and Readiness for Practice, the National Council Licensure Examination, Critical Thinking Diagnostic, the Clinical Learning Environment Comparison Survey (CLECS)
Hayes et al. (2018)	Australia	Qualitative research	Administration of medication for the medical and surgical clinical contexts	Kolb's experiential learning theory	Engage students with feelings, needs and emotions towards patients at a more visceral level	Relevant learning bundle with case studies	Working in groups of five, participants self-selected one of the five available roles of an administering nurse, medication recipient, confused patient, interrupting nurse and observer to role-play the scenario	Qualitative data were collected from non-assessable participants' written reflections, and thematic content analysis was adopted to identify emerging themes on pondering practice and enhancing the art of reflection

Continued

Table 2: Continued

Citation (year)	Country	Study design	Clinical learning context	Educational/ conceptual framework	Prebriefing interpretation	Identified prebriefing pedagogies	Simulation-based experience	Measures of outcomes
Hollenbach (2016)	United States	Non-randomized experimental study	Obstetric management	The knowledge to action model	Reduce anxiety in nursing students before initial clinical experiences	After 7 weeks of obstetrics course lectures, immediately before each simulated scenario began, a standard case study relevant to the simulation was read to the participants	A group of six to eight participated in a workshop, including four interactive simulation sessions facilitated by the course coordinator	The Spielberger State-Trait Anxiety Inventory (STAI)
Ignacio et al. (2016)	Singapore	Mixed methods	Managing deteriorating patients	Mental rehearsal (MR)	Enhance nursing students' performance of physical tasks and cognitive components	Didactic component, video presentation, relaxation techniques, practising MR alone	Standardized patient simulated deteriorating clinical process	RAPIDS tool scores for clinical performance, stress indicators included heart rates, systolic blood pressure, State and Trait anxiety. Qualitative data led to emerging themes including managing stress, using a mental framework, using realistic simulations with the MR strategy
Jeffers (2018)	United States	Mixed methods	Medical and surgical nursing with hospice care	Knowledge action model	Exposure to end-of-life discussions	Readings and assignments	A simulated patient was actively dying and in pain. An actor portrayed his wife at the bedside, asking questions and beginning the grief process. The patient died, and the students had to pronounce him dead and inform the wife	The FATCOD instruments, qualitative data with two emerging main themes in reflecting on emotions surrounding end-of-life care and transforming perspectives on end-of-life care
Johnson et al. (2020)	United States	Mixed methods	Urinary catheter insertion skills (UCISs)	Deliberate peer-to-peer practice	Practice skills among peer groups before participation in the simulation	Peer coaching and peer mentoring	Skill practice on a case scenario using a high-fidelity simulator (HFS)	UCIS measurement checklist for quantitative and qualitative data from group interviews stressed the importance of learning skills with peers before participating in the participation of HFS scenario

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Table 2: Continued

Citation (year)	Country	Study design	Clinical learning context	Educational/ conceptual framework	Prebriefing interpretation	Identified prebriefing pedagogies	Simulation-based experience	Measures of outcomes
Khalaila (2014)	Israel	Non-randomized experimental study	Medical and surgical nursing management, including chest pain, asthma, pneumonia or post-surgical assessment	Kolb's experiential learning theory	Explain the logistics	Environmental orientation and simulated patient background	Acted as a staff nurse to perform the appropriate nursing assessments for the interventions for the simulated patient	Spielberger State-Trait Anxiety Inventory, self-confidence in caring for an actual patient, satisfaction with the simulation scale
Kim & Shin (2016)	Korea	Non-randomized experimental study	Sex education	Problem-based learning combined with simulation-based learning	Design and implement a sex education program and simulation problem-based learning program	Lectures for sexuality and related knowledge	Hands-on practice managing a simulated patient with sexual health problems and counselling for the simulated patient who desires sexual knowledge	The gender-role perception was measured by the Sex-Role Orientation and Sex-Role Ideology Scale, and a 40-item scale measured Sex knowledge
Kim & Lee (2020)	Korea	Non-randomized experimental study	Responding to mass casualty incidents (MCI)	Kolb's experiential learning theory	Design and implement the simulation-based MCI program	Lecture for MCI care for 70 minutes, introduction of Emergo Train system & simulation scenarios	The Emergo Train System (ETS) developed by the Disaster Medicine and Traumatology Education Center in Sweden, patient cases can be selected based on different scenarios by systematizing the clinical signs of casualties and treatment instructions. It also has the advantage of including communication and teamwork between the site and the hospital	Triage accuracy, response attitudes, teamwork scale, satisfaction with simulation experience
Kirkman et al. (2018)	United States	Mixed methods	Multiple patients simulated clinical experiences in a medical unit	Kolb's experiential learning theory	Promote students' ability to achieve learning objectives and targeted outcomes	Pre-simulation assignment for the student to complete, including learning objectives, a synopsis of the scenario, and critical thinking questions related to medical conditions encountered during simulation, orientation to the learning environment and role assignment	Playing the roles of various members of the patient care team in the simulated clinical experience	The Program for Nursing Curriculum Integration (PNCI) Simulation Effectiveness Tool measured the self-confidence related to decision-making skills, interprofessional communication and level of preparedness

Continued

Table 2: Continued

Citation (year)	Country	Study design	Clinical learning context	Educational/ conceptual framework	Prebriefing interpretation	Identified prebriefing pedagogies	Simulation-based experience	Measures of outcomes
Powers et al. (2021)	United States	Non-randomized experimental study	Visual assessment and diagnosis of a simulated patient via telehealth to enable nursing students to communicate with other health professionals	The INACSL (2016) Standards of Best Practice: Simulation	Engage students in immersive simulation and act as a qualified healthcare professional	The creation of a concept map for each SP using given background information and an outline of an ISBAR/the facilitator providing a bedside report on both SPs before the simulation	Participants in the nurse role formulated an ISBAR report and used the FaceTime application to contact the appropriate team member to address the SP issue/ Participants played board game activities to practice interprofessional collaboration	Self-report amount of clinical collaboration, satisfaction and self-confidence
Valler-Jones (2014)	United Kingdom	Mixed methods	The care of the critically ill child	Enquiry-based learning combined with simulation-based experiences	Facilitate students to design a peer-led simulation scenario to achieve the pre-set module learning	Participants were facilitated in focusing on the care of the critically ill child, where they were required to develop a peer-simulation clinical scenario with ground rules	Each scenario would take between 15 and 20 minutes to include a structured peer debrief from the rest of the group and the facilitator	Evaluation of the knowledge via the OSCE; Clinical acquisition skills survey, self-report confidence and competence level, and thematic analysis of the comments identified satisfaction and a sense of achievement in taking part in the simulated activities
Doğru & Aydın (2020)	Turkey	Randomized controlled trial	Cardiac auscultation	Kolb's experiential learning theory	Integrate the simulation training into the undergraduate nursing curriculum	Lecture and demonstration of how to perform auscultation on the simulator	Practising cardiac auscultation on a high-fidelity simulator	Knowledge evaluation form for cardiac auscultation, skill evaluation form for cardiac auscultation and state anxiety inventory. Skill evaluation form for cardiac auscultation on actual adult patient 2 weeks after simulation
White et al. (2021)	United States	Non-randomized experimental study	A patient in septic shock	Situational awareness combined with simulation-based experiences	Integrate the simulation training into the undergraduate nursing curriculum	Infection and sepsis via PowerPoint presentation and laboratory experience, students rotated through two stations on various aspects of septic shock with a screening tool	Use of high-fidelity manikin with a fixed scenario to improve assessment and perception of sepsis deterioration	Knowledge score and time to task (response time to patient deterioration)

Continued

Table 2: Continued

Citation (year)	Country	Study design	Clinical learning context	Educational/ conceptual framework	Prebriefing interpretation	Identified prebriefing pedagogies	Simulation-based experience	Measures of outcomes
Woda, Hansen, et al. (2019)	United States	Non-randomized experimental study	Diabetic patient care	Kolb's experiential learning theory	Integrate the simulation training into the undergraduate nursing curriculum	Hyperglycaemia and hypoglycaemia care via didactic lecture, roles and expectations	Handle safe nursing intervention and medication administration for high-fidelity simulator scenario	Knowledge and performance related to the care of the diabetic patient
Woda, Schnable, et al. (2019)	United States	Non-randomized experimental study	Perceived clinical decision-making (CDM) and competence to take care of an acute illness	Kolb's experiential learning theory	Integrate the simulation training into the undergraduate nursing curriculum	Clinical course for clinical decision-making with group projects, online activities, case studies, NCLEX preparation, brief report of patient conditions before simulation	In a high-fidelity simulator scenario, to become and experience an RN during the simulation, to complete the nursing process with clinical decision-making	Perceived CDM was measured by the Clinical Decision-Making in Nursing Scale (CDMNS)/the Creighton Competency Evaluation Instrument (CCEI) was used
Yoshioka-Maeda & Naruse (2021)	Japan	Non-randomized experimental study	Health guidance for community settings and target population in public health nursing	Kolb's experiential learning theory combined with Schon's (1983) reflective practice	Bridge the gap between theoretical knowledge and clinical practice	Lecture, group work, explanation of the simulation logistics, discussion of how to assess the standardized patient through group work in 25 minutes of simulation	Standardized patient scenario for mother and child, tuberculosis, adult occupational health	Level of self-confidence and practical skills required for public health nursing

HFHPS: high fidelity human patient simulator; NLN: National League of Nursing; RAPID: Rescuing A Patient In Deteriorating Situations; INACLS: International Nursing Association for Clinical Simulation; SP: simulated patient; ISBAR: introduction, situation, background, assessment, recommendation; OSCE: Objective Structured Clinical Examination; ATI: Assessment Technologies Institute; NCLEX: National Council Licensing Examination.

Table 3: Components and examples of prebriefing pedagogies in the literature

Key components	Subthemes	Principles	Descriptions	Examples of conventional pedagogies	Examples of innovative pedagogies
Personal development	Self-efficacy	Social learning	Believe in one's ability to act effectively to achieve anticipated goals and outcomes via social interactions	<i>Expert model demonstration</i> (Alfes, 2011; Craig et al., 2021; Demirtas et al., 2021; Doğru & Aydın, 2020)	<i>Peer coaching and peer mentoring</i> (Johnson et al., 2020) <i>Peer-simulation scenario production</i> (Valler-Jones, 2014) <i>An online interactive animation</i> (Chang et al., 2021)
	Satisfaction and confidence	Orientation for objectives and expectations	Feel satisfied and assured of the application of learnt knowledge in solving clinical problems during simulation-based experiences	<i>Seminar-style course</i> (Burrell et al., 2023) <i>Learning bundle/module</i> (Cabañero-Martínez et al., 2021; Carman et al., 2016; Hayes et al., 2018; Kim & Shin, 2016; Kim & Lee, 2020; White et al., 2021; Woda, Hansen, et al., 2019; Woda, Schnable, et al., 2019; Yoshioka-Maeda & Naruse, 2021) <i>Relevant readings and assignments</i> (Jeffers, 2018; Kirkman et al., 2018)	<i>An online interactive animation</i> (Chang et al., 2021)
	Flexibility	Familiarization	Mitigate degree of stress by enhancing preparedness	<i>Environmental orientation and logistics</i> (Cardoza & Hood, 2012; Davies et al., 2020; Khalaila, 2014)	<i>Mental rehearsal techniques and practices</i> (Ignacio et al., 2016)
Simulation-based experience engagement	Retainment of the acquired competences	Emotional and ethical considerations	Establish expectations, confidentiality, and evaluation-feedback processes aligned with learning outcomes via activities	<i>Volunteer to participate in a PPH scenario role-play</i> (Amod & Brysiewicz, 2019), <i>Acknowledgement to simulated patient background, role expectations and props for realism</i> (Bogossian et al., 2014; Hayden et al., 2014; Hollenbach, 2016; Khalaila, 2014)	<i>Mental rehearsal techniques and practices</i> (Ignacio et al., 2016) <i>Concept map</i> (Powers et al., 2021) <i>An online interactive animation</i> (Chang et al., 2021)
	Challenging current competent levels	Suspension of disbelief	Encourage participants' risk-taking to develop the next level of competencies within the prebrief without apprehension	Not available	<i>Mental rehearsal techniques and practices</i> (Ignacio et al., 2016)
	Awareness of professional responsibilities	Role clarification	Assume and demand a pre-licensing student is prepared for independent practice during simulation-based experiences	<i>Volunteer to participate in a PPH scenario role-play</i> (Amod & Brysiewicz, 2019)	<i>The application of a current clinical management system for mass casualty incidents</i> (Kim & Lee, 2020)

identified in each study, refer to the corresponding columns in [Table 2](#).

Prebriefing pedagogies

A content analysis was performed to identify the educational principles and components of prebriefing along with the outcome measures [40]. The impact of pedagogies on prebriefing interpretations was analysed. Examples

of prebriefing strategies, categorized as conventional or innovative approaches, are presented in [Table 3](#). Two main components, personal development and simulation-based experience engagement, were identified, each comprising three subthemes. For example, personal development in self-efficacy and social learning could be achieved through conventional strategies such as expert model demonstrations or innovative approaches such

as peer coaching and peer mentoring. Table 3 provides a comprehensive list of analysed items, some of which may serve multiple purposes.

Simulation-learning outcome measures

Table 2 outlines the simulation-learning outcome measures as indicated in the column 'measures of learning outcomes'. However, none of the studies explicitly identified dependent variables that were fully correlated with prebriefing pedagogies, as these pedagogies were implemented within the first phase of the simulation process. Instead, most studies employed a combination of different dependent variables to assess the two correlated components of prebriefing, personal development and simulation-based experience engagement. A few studies focused solely on evaluating either personal development or simulation-based experience engagement [13,18,20,23,26,29,32].

Discussion

The identified gaps in this scoping review contribute valuable insights to the literature. The review aimed to uncover prebriefing pedagogies and provide evidence-based guidance, and is the first to focus on clinical context learning and the interpretation of prebriefing in pre-licensing nursing education. It identifies the components, pedagogies and measures of prebriefing in the simulation process. A limited literature review has evaluated the effectiveness of pre-simulation for training nursing students [1,4]. Out of the 28 studies, essential prebriefing components were identified, enhancing the immersive simulation experience. The following are the identified gaps for discussion.

Adopting diverse educational/conceptual frameworks

Many of the included studies interpreted prebriefing by aligning it with specific theoretical frameworks, such as Kolb's experiential learning theory, Bandura's social learning theory, the knowledge-to-action model and the NLN/Jeffries simulation framework. For instance, Alfes [29] employed Kolb's theory of experiential learning to design a simulation that offered participants various learning scenarios to integrate and apply their knowledge based on their learning styles. Alfes incorporated diverse interactive learning methods during the prebriefing phase, challenging participants at their current level of clinical competency before engaging in the simulation-based experience. As a relatively new approach in the simulation process, prebriefing lacks a universal definition or standardized procedure, particularly in publications before 2021 [6]. This scoping review demonstrates that the synthesized evidence is primarily based on nurse educators' perspectives, highlighting the activities conducted during the simulation process. Additionally, with advancements in healthcare simulation technology and the need to apply clinical content in different contexts, selecting appropriate pedagogies becomes crucial in achieving the desired learning outcomes right from the initial phase of the simulation process. Consequently, the question 'What prebriefing approach is universally applicable?' emerged as a critical area for further research.

Empirical testing of limited innovative pedagogies

The literature highlights two primary prebriefing pedagogies: conventional and innovative approaches. In the nursing curriculum, prebriefing is incorporated through seminar-style courses or learning bundles consisting of didactic lectures and laboratory tutorials [13,14,17,20,25–27,35,36,39]. Minimizing the time gap between acquiring foundation knowledge and exposure to simulation-based experience is crucial in increasing simulation satisfaction and confidence [1]. Within the nursing curriculum integration, prebriefing activities such as online interactive animation can be tailored to match learners' clinical and simulation experience levels, promoting effective knowledge acquisition and recall [38]. In addition to conventional strategies, this scoping review identifies limited innovative approaches for prebriefing, including peer coaching and peer mentoring [15], peer-simulation scenario generation [19] and mental rehearsal techniques and practices [33]. The studies emphasize the significant impact of evidence-based prebriefing on personal development and active engagement in simulations [15,19,33] in contrast to conventional approaches such as reading assigned textbooks or focusing on environmental orientation and logistics. Furthermore, innovative approaches such as the mental rehearsal technique, which involves mentally visualizing or imagining a clinical scenario or procedure before engaging in the actual simulation activity, can encourage participants to psychologically prepare for risk-taking in simulation-based experiences, challenging their current competencies [33]. However, the evolution of prebriefing pedagogy, particularly in facilitating participants' recall of acquired nursing knowledge and prompt action to address simulated patients' deteriorating conditions, requires further investigation particularly regarding initially deployed conventional prebriefing approaches [18,27,31,32,34–37,39].

Challenges in aligning prebriefing activities with evolving clinical dynamics

As clinical technology continues to advance, prebriefing pedagogies can serve as rehearsal tools. To provide participants with a realistic simulation-based experience, it is essential to ensure the fidelity or realism of the intervention, where the unfolding scenario mirrors current clinical practice [4]. Kim and Lee [22] identified various challenges related to administration, planned actions, attitudes and communication in mass casualty incidents during simulation-based experiences. To address these challenges, they introduced the Emergo Train System, a pre-made system replicating a real-time disaster clinical information system. This system enables nursing students to engage in triage assessment, communication and teamwork in multiple casualty scenarios, fostering collaboration between the simulation site and hospitals. In the prebriefing phase, participants can familiarize themselves with relevant tools and simulation logistics, enhancing their immersion in the simulation-based experience.

Neglecting assessment of participant engagement

Most studies in this scoping review utilized various assessment tools to evaluate different aspects of simulation learning outcomes related to prebriefing rather than assessing simulation learning outcomes as a distinct concept. For instance, Ignacio et al. [33] employed mixed methods to assess the dependent variable of the standardized patient-simulated deterioration process using mental rehearsal techniques and three independent variables measured through a series of assessments. These assessments included components such as personal development and simulation-based experience engagement. As an aspect of personal development, flexibility was measured through physical stress indicators and a state and trait anxiety questionnaire. In contrast, current competence levels, representing simulation-based experience engagement, were measured using the rescuing a patient in deteriorating situations' tool, which is a validated and reliable instrument.

In this scoping review, the measurements most used for personal development were the state and trait anxiety scale, combined with self-report instruments assessing self-efficacy, confidence and satisfaction. A few studies employed specific instruments to measure simulation-based experience engagement. Research teams often developed tools for multiple-choice question (MCQ) knowledge items and checklists for assessing clinical performance. Simulation engagement, serving as the primary independent variable and reflecting the outcome of prebriefing, raises the question of whether simulation engagement measurement as a representation of prebriefing achievement warrants further investigation.

Limitations

The findings of this review need to be interpreted while considering its limitations. Although the authors conducted a thorough screening of nearly 1,400 articles from various databases using relevant keywords to capture the population, concepts and contexts, it is possible that some relevant studies were unintentionally excluded from this review. The field of simulation modalities and pedagogies has experienced rapid evolution, with variations across different countries. Consequently, ensuring the identification of all relevant studies was challenging. Nevertheless, this scoping review employed a systematic and comprehensive approach, with the support of Covidence data management, to identify, screen, review and extract relevant information, aiming to minimize errors and risks in data synthesis. Lastly, it is important to note that this review focused only on studies published in English, potentially excluding relevant non-English studies.

Conclusion

This scoping review uncovers four critical interpretations of prebriefing for nurse educators utilizing simulations in daily practice. Firstly, the adoption of an educational/conceptual framework influencing the prebriefing process and its pedagogies. Given the diverse clinical contexts and

contents, a one-size-fits-all framework does not exist, emphasizing the need to align the appropriate educational framework with the interpretation of prebriefing. Secondly, as new pedagogies emerge in prebriefing, nurse educators should conduct thorough research to evaluate their impact on simulation-learning outcomes. Thirdly, with the advancement of clinical technology and information systems, the simulation process can serve as a valuable pilot rehearsal tool, allowing nurse educators to introduce and reinforce new technology within participants' simulation-based experiences. Lastly, future studies should explore and develop comprehensive outcome measures to assess engagement in simulation-based experiences, recognizing the vital role of prebriefing in creating an immersive learning environment.

Declarations

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Authors' contributions

The authors collectively contributed to the planning, reviewing, synthesizing and reporting of the review, demonstrating equal involvement and commitment.

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