



QUALITATIVE META SYNTHESIS

Exploring intensive care nurses' perception of simulation-based learning: A systematic review and meta-synthesis

Isabella Weismantel BN¹ | Nancy Zhang RN, BN, GradCertIntCareN, GCHE, MClined, PhD Candidate¹  | Adam Burston RN, BN, GCNurs(Med/Surg), MHLthServMgmt, PhD, Research Fellow, Senior Lecturer^{2,3} 

¹School of Nursing, Midwifery and Paramedicine (Melbourne), Faculty of Health Sciences, Australian Catholic University, Fitzroy, Victoria, Australia

²Nursing Research and Practice Development Centre, The Prince Charles Hospital, Chermside, Queensland, Australia

³School of Nursing, Midwifery and Paramedicine (Brisbane), Faculty of Health Sciences, Australian Catholic University, Brisbane, Queensland, Australia

Correspondence

Adam Burston, Nursing Research and Practice Development Centre, Australian Catholic University, Brisbane, Qld, Australia.

Email: adam.burston@acu.edu.au

Abstract

Aim(s): To explore intensive care nurses' (ICN) perceptions of simulation-based learning (SBL).

Design: A systematic review and meta-synthesis.

Methods: The review followed the PRISMA guidelines for reporting a systematic review. A systematic search strategy was developed using a modified PICO framework. A comprehensive search was conducted in July 2023 in CINAHL, OVID Embase, Medline complete, Web of Science, ERIC and Scopus databases for articles published in English between 2013 and 2023. Data were extracted using the Joanna Briggs Institute QARI Data Extraction, with data synthesis guided by Braun and Clark's thematic analysis approach. Quality appraisal was assessed using the CASP tool.

Results: Eleven studies providing qualitative data were included for analysis. Analysis and meta-synthesis led to the construction of two themes: The learning experience and professional growth through collaboration.

Conclusion: The review highlights the balance needed in finding the appropriate simulation approach, with the right level of fidelity, conducted at appropriately regular intervals, incorporating the correct makeup of professional team members, conducted in the right environment and facilitated by a skilled facilitator, to ensure best outcomes and return on investment for ICN's education.

Implications for Practice: These findings are a valuable resource for educators and organisations considering simulation-based learning initiatives in the intensive care setting.

No Patient or Public Contribution: This review involved analysis of existing literature and as such no unique patient or public involvement occurred.

Reporting Method: The systematic review followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) reporting guidelines.

KEYWORDS

intensive care nurses, simulation-based learning, systematic review

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1 | INTRODUCTION

Intensive care nursing is a complex and challenging domain of healthcare that requires rapid decision-making, skill proficiency and strong teamwork for optimal patient outcomes (Jansson et al., 2013). Simulation-based learning (SBL) has emerged as a pivotal educational approach in intensive care nurse (ICN) education, facilitating the development of essential skills and competencies necessary to care for critically ill patients (Boling & Hardin-Pierce, 2016). The high-pressure environment of intensive care nursing demands an innovative and dynamic pedagogical approach (Jeffries, 2022). As a result, SBL has become standard in ICN education, transforming the way intensive care nursing is taught (Boling & Hardin-Pierce, 2016).

SBL is a well-established, evidence-based teaching method that immerses individuals in scenarios that closely reflect real-life encounters that the clinician may experience in their practice (Mousazadeh et al., 2020). The primary objective of SBL is to bridge the gap between theoretical knowledge and clinical practice, offering nurses a platform to develop their critical thinking abilities and skill proficiency (Cantrell et al., 2017). SBL's widespread adoption in intensive care environments stems from its ability to enhance clinical proficiency and elevate the standard of patient care (Brown, 2019). However, limited understanding exists surrounding the perspectives of ICNs regarding SBL. This review aims to explore ICN perceptions of SBL.

1.1 | Background

The scope of SBL encompasses various immersive scenarios designed to support clinical competencies, catering to the diverse needs of the ICN (Kim et al., 2016). SBL includes high-fidelity simulators that replicate real-life scenarios through sophisticated mannequins, medium-fidelity simulators that strike a balance between realism and affordability, virtual simulators harnessing computer-based platforms and standardised patient simulations where trained actors portray patients (Cantrell et al., 2017). Each modality equips the ICN with essential skills, empowering them to excel in the dynamic and demanding intensive care setting (Kim et al., 2016).

SBL is crucial in enhancing practice within the high-stress, high-complexity intensive care environment, ultimately improving rapid decision-making, effective communication and advanced technical skills (Boling & Hardin-Pierce, 2016). While several studies have explored the perceptions of undergraduate nurses regarding SBL (Brown, 2019; Hung et al., 2021; Kim et al., 2016; Reilly & Spratt, 2007), a significant knowledge gap exists in understanding ICN perspectives within the literature. Comprehensive insight into ICN perceptions is vital as it can illuminate this educational method's facilitators, barriers, benefits and limitations (Karlsen

What does this paper contribute to the wider community?

- Findings of this study are a valuable resource for educators and organisations contemplating the feasibility and potential challenges of incorporating SBL initiatives in their nursing education programmes.
- The review identified two important, unique and complementary themes that can be used to inform educators planning, implementing and reviewing simulation activities for ICN education.

et al., 2017). Such understanding is vital for tailoring educational programmes to meet the unique demands of the intensive care environment (Mousazadeh et al., 2020). For instance, Kim et al. (2016) noted that understaffing posed a significant barrier to nurses' participation in educational programmes. Identifying such barriers and facilitators within SBL can unveil areas for improvement that are equally applicable to other educational programmes and nursing domains (Boling & Hardin-Pierce, 2016). Tailored education not only cultivates improved skills, knowledge and confidence among ICNs but also augments their ability to manage patient care effectively, ultimately elevating job satisfaction and patient outcomes (Boling & Hardin-Pierce, 2016).

Through exploring ICN's nuanced perspectives, this systematic review and meta-synthesis aims to provide a comprehensive synthesis of the existing knowledge, thereby contributing to an enhanced understanding of how SBL shapes intensive care nursing education (Boling & Hardin-Pierce, 2016).

2 | THE REVIEW

A systematic review and meta-synthesis of qualitative and mixed-methods studies was conducted. The review protocol was prospectively registered with the International Register of Systematic Reviews (PROSPERO ID: CRD42023420907).

3 | AIM

The aim of this study was to explore ICN perceptions of SBL. The study sought to answer two research questions:

1. What are the perceived benefits and limitations of SBL among ICN?
2. What are the perceived facilitators and barriers to SBL among ICN?

4 | METHODS

This review and meta-synthesis followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) process (Page et al., 2021) (Appendix S1).

4.1 | Search methods

The search strategy was developed using MESH terms and keywords based on the modified PICo framework, Population (P), phenomenon of Interest (I) and Context (Co) described by Stern et al. (2014). Boolean operators (AND, OR) were used to combine search terms. The strategy was developed, tested and refined by the lead author in conjunction with an experienced librarian, and in consultation with the other two authors. Search terms were customised to suit respective databases. The following databases were searched: CINAHL, OVID Embase, Medline Complete, ERIC, Web of Science and Scopus. The search was conducted during June and July 2023. Additionally, reference lists of included studies were searched for additional articles of relevance. A sample of the search strategy is provided in Table 1.

Following the database searches, identified articles were downloaded and entered into Endnote for removal of duplicates. Following this, articles were uploaded into Covidence (Lachal et al., 2017). Two authors (I.W. and A.B. or N.Z.) conducted initial title and abstract screening. The same two authors (I.W. and N.Z.) then independently read and assessed the full-text studies against the inclusion criteria. Disagreement was resolved in consultation with a third author (A.B.).

4.2 | Inclusion and exclusion criteria

Primary peer-reviewed qualitative and mixed-method studies with qualitative data that investigated the perspectives of ICNs on SBL were included. Eligible studies were published within the past 10 years (after 2013) and written in English. Research on undergraduate nursing students' or non-ICN experiences was excluded from this review.

4.3 | Quality appraisal

All included articles were subjected to quality appraisal. Two authors (I.W. and N.Z.) appraised included studies independently using the Critical Appraisal Skills Programme (CASP) tool for qualitative research (Long et al., 2020). Disagreements were resolved through

arbitration by a third (A.B.) author to reach a consensus. No studies were excluded based on quality appraisal (Table 2).

4.4 | Data abstraction and synthesis

The data underwent analysis and synthesis using a thematic content analysis approach, an inductive process that involves identifying central ideas or themes within the data set (Nowell et al., 2017). The analysis was structured following the six-phase framework developed by Braun and Clarke (2022), which encompasses data familiarisation, initial code generation, theme identification, theme review, theme definition and naming and final report production.

First, the selected studies were reviewed independently by two authors (I.W. and N.Z.) to understand key outcomes and findings. Then the Joanna Briggs Institute QARI Data Extraction Tool for Qualitative Research (Aromataris & Munn, 2020) was used to guide the extraction of data in Covidence, including author, year, country, design, participants' information, methodological details of the studies and study findings. Extracted data were reviewed by a third author (A.B.) to reach a consensus. Following this, the first author (I.W.) downloaded the data as an Excel spreadsheet to assist with identifying and analysing themes (Willis, 2019).

Data analysis and development of initial codes and categories were initiated independently by two authors (I.W. and A.B.). Following a discussion of initial codes and categories, these two authors (I.W. and A.B.) re-engaged with the raw data to further refine categories and develop preliminary themes. This cyclical process was implemented to enhance the credibility and trustworthiness of the analysis (Willis, 2019). This process included the two authors (I.W. and A.B.) re-visiting the source articles and engaging in critical reflection, facilitating a more profound engagement with and understanding of the data, which was then reviewed by the third author (N.Z.). This iterative approach ultimately led to the development of robust analytical themes, aligning with the recommendations of Braun and Clarke (2022).

Lastly, the process of re-contextualising the constructed analytical themes concerning the source data was undertaken by the lead author (I.W.) in consultation with the other two authors (N.Z. and A.B.) (Braun & Clarke, 2022). This ensured that the themes accurately represented the dataset, effectively 'closing the loop' on the analysis process and maintaining the alignment of the themes with the original data.

5 | FINDINGS

The initial database search identified 3177 documents. After removal of duplicates, 1653 articles were subjected to title and abstract

TABLE 1 Search strategy.

Population (P)	AND	Phenomenon of interest (I)	AND	Context (Co)
Key words ("ICU" OR "critical care" OR "intensive care" OR "intensive therapy") N2 (nurs*)		Percept* OR perspective* OR opinion* OR attitude* OR experienc* OR implicat* OR view		((Simulat*) AND (train* OR educat* OR learn* OR develop*))

TABLE 2 CASP.

CASP checklist	Atherton 2020	Ballangrud 2014	Brewster 2023	Dante 2022	Dante 2021	Weatherall 2019	Jones 2017	Karlsen 2017	Karlsen 2021	Leclair 2018	Markiewicz 2023
1 Was there a clear statement of the aims of the research?	1	1	1	1	1	1	1	1	1	1	1
2 Is a qualitative methodology appropriate?	1	1	1	1	1	1	0	1	1	1	0
3 Was the research design appropriate to address the aims of the research?	1	1	1	1	1	1	0	1	1	1	1
4 Was the recruitment strategy appropriate to the aims of the research?	1	1	1	1	1	1	0	1	1	1	1
5 Was the data collected in a way that addressed the research issue?	1	1	1	1	1	1	1	1	1	1	1
6 Has the relationship between researcher and participants been adequately considered?	1	0	1	0	0	1	0	1	0	0	0
7 Have ethical issues been taken into consideration?	1	1	1	1	1	1	1	1	1	1	1
8 Was the data analysis sufficiently rigorous?	0	1	1	1	1	1	0	1	0	0	0
9 Is there a clear statement of findings?	1	1	1	1	1	1	1	1	0	1	1
10 How valuable is the research?	1	1	1	1	1	1	1	1	1	1	1
Total score (maximum 10)	9	9	10	9	9	10	5	10	7	8	7

screening. Following this, full-text screening was performed for the remaining 50 articles. During the full-text screening, 39 articles were excluded, leaving 11 articles for inclusion (Figure 1).

5.1 | Study characteristics

The 11 included articles were published between 2014 and 2023, in seven different countries. Six articles were qualitative (Atherton et al., 2020; Ballangrud et al., 2014; Brewster et al., 2023; Dante et al., 2021; Karlsen et al., 2017; Weatherall et al., 2019), four mixed-methods (Dante et al., 2022; Jones & Potter, 2017; Karlsen et al., 2021; Leclair et al., 2018) and one survey study with two open-ended questions providing useful qualitative data (Markiewicz et al., 2023). Nine studies used semi-structured face-to-face interviews to collect data (Atherton et al., 2020; Ballangrud et al., 2014; Brewster et al., 2023; Dante et al., 2021, 2022; Jones & Potter, 2017; Karlsen et al., 2017; Leclair et al., 2018; Weatherall et al., 2019). Two mixed-methods studies included a survey design for the data collection (Karlsen et al., 2021; Markiewicz et al., 2023). The studies were heterogeneous, with each simulation experience having a different purpose and lasting for differing lengths of time. The simulation experiences ranged from a minimum of 12 min to a maximum of 1 h, each with a debriefing session immediately following the simulation (Table 3).

Critical analysis and synthesis led to the construction of two themes: *The learning experience and professional growth through collaboration* (Table 4).

5.2 | Theme 1: The learning experience

The learning experience of SBL emerged as a key theme in many studies (Atherton et al., 2020; Ballangrud et al., 2014; Dante et al., 2021, 2022; Karlsen et al., 2017; Leclair et al., 2018; Markiewicz et al., 2023; Weatherall et al., 2019). Multiple aspects of the experience were identified, including expectations, emotional responses, benefits to the mode of learning, fidelity and realism and regularity.

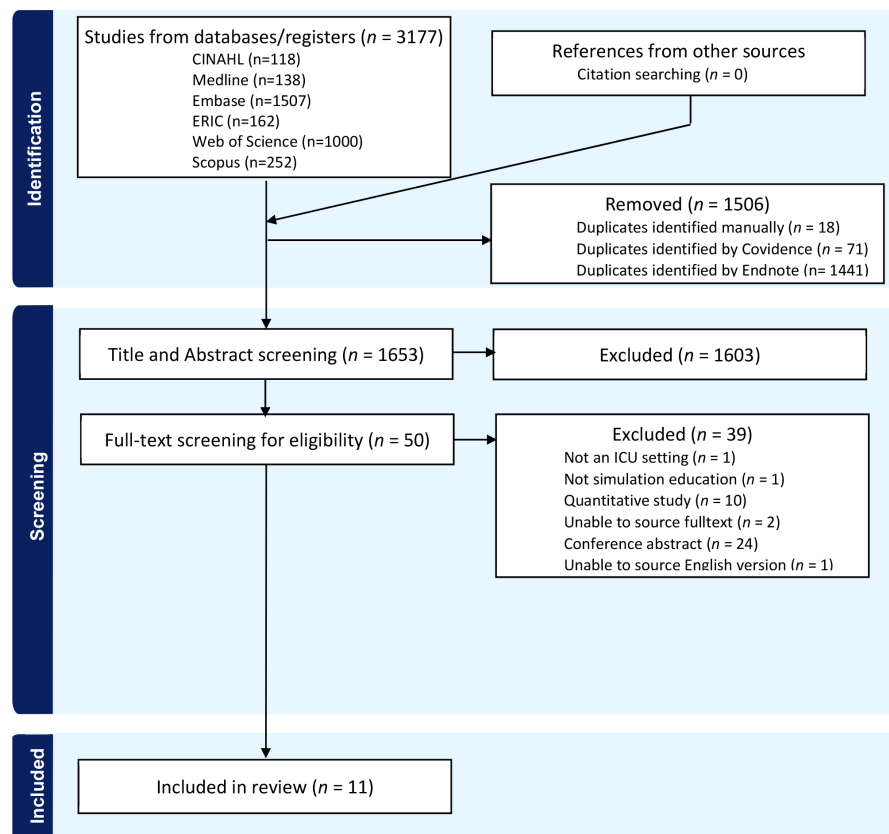
5.2.1 | Expectations

Nurses' expectation of SBL prior to participation tended to be one of wariness. This was grounded in uncertainty related to unfamiliarity with simulation equipment and resources, or simply the unknown element of a new experience. Despite initial scepticism, many participants, such as those in Dante et al. (2021) study, found SBL to be much more valuable than anticipated,

[...] my expectations about simulations were not very high, I was also critic because I thought the laboratory was not provided with adequate equipment[...] I was very impressed with the laboratory and its realism.

(p. 6)

FIGURE 1 PRISMA flow diagram.
[Colour figure can be viewed at
wileyonlinelibrary.com]



Not knowing what to expect from the simulation was a predictor of emotional responses such as anxiety.

[...] at first, I felt a little lost, anxious, and scared because I did not know what to expect from simulation.
(Dante et al., 2021, p. 5)

Participants in one study also identified their expectation that simulation was provided as a necessary component of a '...comprehensive learning programme...' (Weatherall et al., 2019, p. 278).

5.2.2 | Emotions

A range of emotions were experienced by ICN's. These emotions included discomfort, anxiety, feelings of insecurity and awkwardness (Dante et al., 2022; Karlsen et al., 2017; Leclair et al., 2018). Several learners expressed discomfort when being recorded during a simulation, leading to feelings of anxiety, embarrassment and scepticism at the beginning of the experience.

[...] I felt embarrassed to be observed! [...] during both the first and the second experience, the simulation made me understand many aspects of clinical practice, and this was very gratifying.
(Dante et al., 2022, p. 5)

A participant in Karlsen et al. (2017) echoed this sentiment, emphasising the challenges posed by video observation:

Yes, they were challenging... they were very accentuated for somehow the worst patient cases you can encounter... well it's horrible to see myself on video, so I dreaded that a bit.
(p. 101)

The simulation facilitator responsible for running the simulation was identified as crucial to the successful navigation of these emotions. Participants in these studies highlighted the crucial role of guidance and feedback from faculty members in enhancing skill development and promoting reflection on clinical practice (Dante et al., 2021, 2022; Markiewicz et al., 2023).

[...] but the relationship with facilitators and the progression of simulation sessions, turned my embarrassment into comfort.
(Dante et al., 2021, p. 5)

Simulation facilitators were instrumental in creating realistic and practical learning environments, and participants valued the immersive scenarios and feedback they provided.

Participants consistently emphasised the importance of a safe learning environment provided by simulation scenarios (Ballangrud

TABLE 3 Study characteristics.

Authors	Aim	Location	Setting	Sample size (n)
Atherton et al. (2020)	To explore the impact of simulation on nurses' experiences of raising the option of tissue donation with families of deceased patients in an ICU	Aotearoa, New Zealand	One level three adult ICU	5
Ballangrud et al. (2014)	To describe intensive care nurses' perceptions of simulation-based team training for building patient safety in the ICU	Norway	Seven ICUs in one hospital trust	18
Brewster et al. (2023)	To explore how intensive care staff conceptualise leadership within a simulated workplace	Melbourne, Australia	One ICU in a large tertiary and private hospital	20
Dante et al. (2022)	To examine the influence of a modified teaching model based on multiple exposures to high-fidelity simulations on both the learning outcomes and the perceptions of graduate students enrolled in a critical care nursing course	Italy	University of L'Aquila	20
Dante et al. (2021)	To investigate the influence of multiple high-fidelity simulation exposures on the experiences of postgraduate students	Italy	University of L'Aquila	15
Jones and Potter (2017)	The project sought to discover if an academic setting, designed and used for nursing students, would be suitable to execute the simulated crisis scenarios for experienced registered nurses and respiratory therapists	Ontario, Canada	A community college simulation lab	20
Karlsen et al. (2017)	To explore intensive care nursing students experiences with confirming communication skills training in a simulation-based environment	Norway	A university hospital	14
Karlsen et al. (2021)	To explore critical care nursing students' experiences with simulation-based communication skills training focusing on relatives	Norway	A university college	119
Leclair et al. (2018)	The purpose of this study was for the assessment and evaluation of an ongoing, longitudinal simulation-based curriculum for interprofessional workplace critical care teams	Vermont, USA	One medical intensive care unit (MICU)	9
Markiewicz et al. (2023)	To assess the effect of adding a SBL experience to the existing End-of-Life Nursing Education Consortium adult critical care course on critical care nurse comfort with palliative communication as a component of end-of-life care	USA	A 689-bed tertiary academic medical centre containing five specialised ICUs	11
Weatherall et al. (2019)	To examine what educational approaches health professionals of varying backgrounds find useful when learning or teaching paediatric airway management	Sydney and Melbourne, Australia	A hospital setting	23

et al., 2014; Dante et al., 2022; Karlsen et al., 2021; Leclair et al., 2018). The sense of safety lessened anxiety and facilitated active learning. A participant from Karlsen et al. (2021) highlighted the emotional journey within this safe environment:

I was very anxious prior to the simulation because I was afraid that the role play would be

embarrassing, but it was not at all, and I felt very good afterwards because I was stepping out of my comfort zone.

(p. 2854)

Facilitators were identified as a crucial support mechanism for simulation participants.

Sample	Design/methods	Data collection	Data analysis
Registered Nurses employed in one ICU	Qualitative descriptive design	Individual, audio-recorded, face-to-face, semi-structured interviews within 1 year of the simulation intervention. Interview guides used, with one pilot interview conducted. Transcripts verified by participants	Thematic analysis four-step approach described by Polit and Beck (2017)
Registered Nurses employed from seven ICUs in one hospital	Qualitative descriptive design	Individual, video-recorded, face-to-face interviews within 4 weeks of the simulation intervention	A manifest inductive content analysis based on Elo and Kyngäs (2008) was used
Registered nurses, consultant ICU medical staff and trainee ICU medical staff	Qualitative interpretivism, ethnography	Group, video-recorded, face-to-face interviews immediately after the simulation intervention. Open conversation relevant to research questions encouraged. Transcripts verified by lead author	Thematic analysis using the five stages of framework analysis
Registered nurses enrolled in a postgraduate intensive-care course	Mixed-method sequential study (quantitative → qualitative)	Group, audio-recorded, face-to-face interviews. Interview guide used	Giorgi phenomenological descriptive approach
Registered nurses attending the postgraduate intensive care course	Qualitative phenomenological study	Group, audio-recorded, face-to-face semi-structured interviews. Transcripts verified by lead author	Phenomenological descriptive approach
Registered Nurses and respiratory therapists	Mixed-methods qualitative and quantitative	Group, face-to-face interviews. Interview guide used Open-ended narrative survey questions. Opportunity for open comments at the end of the form	Using triangulation, simulation specialists searched for converging data by means of questionnaire tabulations, observational notes or anecdotal reflections
Registered Nurses enrolled in a postgraduate intensive-care course	Qualitative, exploratory and descriptive design	Group, audio-recorded, face-to-face interviews. Interview guide used. Transcripts verified by lead author	Inductive thematic data analysis approach using open coding
Registered Nurses in their final year of a postgraduate intensive-care course	Mixed-methods qualitative and quantitative	Survey design with four open-ended questions for qualitative data collection	Braun and Clarke (2022) thematic analysis
Critical care team members	Mixed-methods qualitative and quantitative	Individual, audio-recorded, face-to-face interviews. Interview guides used. Transcripts verified by participants	Inductive thematic data analysis
Registered nurses taking the ELNEC critical care course offered by the partner institution	Quantitative pretest/post-test design with two open-ended questions for qualitative data	Comfort with Communication in Palliative and End-of Life-Care (C-COPE), a 28-item tool measuring nurse comfort with palliative and end-of-life care communication. Two open-ended questions in the post-text survey	Descriptive statistics for the quantitative data. The analysis of the two open-ended questions was not discussed
Paediatric intensive care staff	Qualitative	Group, audio-recorded, face-to-face interviews. Interview guide used. Transcripts verified by lead author	Content analysis approach described by Malterud was used. A process of decontextualisation and recontextualisation was undertaken

...because he's standing right there, he can take over any minute it's a good thing because they're not walking out of the room and saying, 'Off you go'.

(Weatherall et al., 2019, p. 276)

Finally, it was noted by Leclair et al. (2018) that all participants recognised that discomfort with simulation tends to diminish with repeated simulation experiences.

TABLE 4 Analytical themes.

Preliminary categories	Refined categories	Research question/s	Theme 1
Regular training	Expectations	2	The learning experience
Expectations of SBL	Emotions	1	
Active learning process	Fidelity and realism	2	
The learning experience	Regularity	1, 2	
Realistic practice			
Fidelity limitations			
Usefulness of repeated simulations			
Safe learning environment			
Realism and fidelity			
Unfamiliarity with simulation learning equipment/resources			
Discomfort with being recorded/observed			
	Refined categories	Research question/s	Theme 2
Responsibility and awareness	Empowerment	1	Professional growth through collaboration
Awareness and communication	Communication	1	
Gender dynamics in leadership	Common understanding	1	
Debriefing and reflection	Inter-professional learning	1, 2	
Finding a common understanding of team performance	Building confidence	1	
Interprofessional learning and team building			
Interprofessional learning			
Lack of team presence			
Confidence building			
Preceptor role and feedback			
Guided learning and skills development			

5.2.3 | Fidelity and realism

The role of SBL as a unique method of learning was well acknowledged, with ICNs generally holding a positive attitude towards this innovative method (Atherton et al., 2020; Dante et al., 2021, 2022; Leclair et al., 2018; Markiewicz et al., 2023). SBL helped enrich knowledge and skills, allowing participants to bridge the gap between theory and practice (Dante et al., 2021).

[...] we enriched our knowledge by integrating theoretical concepts into practice.

(p. 4)

and

[...] the experience proved to be very effective for learning from both technical and non-technical points of view.

(Dante et al., 2021, p. 5)

Nurses held varying expectations regarding SBL, but often participants were pleasantly surprised by the method's realism and effectiveness (Dante et al., 2022). Simulation scenarios closely mirrored real-life intensive care events, providing participants with a secure and controlled learning environment.

[...] Having never worked with high-fidelity mannequins, I didn't expect that they would be so realistic. I could monitor any parameter, talk to the patient, see him breathe, verify the correctness of the manoeuvres; let's say that this was the most interesting part, which I least expected.

(Dante et al., 2022, p. 8)

The transferability of simulation to clinical practice was also noted, allowing nurses to practice challenging conversations and essential competencies prior to engagement with patients.

It did help, just the whole practice ... so it's not the first time you're ever talking about it.

(Atherton et al., 2020, p. 26)

A participant in Markiewicz et al. (2023), when praising their experience of simulation, highlighted an important approach to good quality simulation experiences, stating,

Very hands-on, real-life experience.

(p. 4)

Additionally, the use of actors facilitated a real sense of authenticity for participants:

The use of an actor was a very positive experience. Because of him, the scenarios felt very real and the cases were relatable to the real world.

(Karlsen et al., 2021, p. 2854)

Nonetheless, participants also recognised fidelity limitations, including changes in their sense of urgency and difficulties in replicating real-world conditions.

Nurse: If you are looking to start an IV, it's not on a real arm. The adrenaline is there, but it's a little different than the real thing.

(Leclair et al., 2018, p. 389)

In addition, Jones and Potter (2017) highlighted that participants found unfamiliarity with the simulator distracting, underscoring the importance of providing proper equipment orientation.

5.2.4 | Regularity

Participants in over half of the studies emphasised the necessity for regular SBL sessions to enhance their preparedness and competence in intensive care situations (Ballangrud et al., 2014; Dante et al., 2021, 2022; Karlsen et al., 2017; Markiewicz et al., 2023; Weatherall et al., 2019). Participants viewed repeated exposure as extremely beneficial in bridging the gap between theoretical knowledge and practical application, ultimately improving patient safety.

We are practising on living people, and some of them die because we are not prepared well enough. So, it is absolutely crucial for patient safety that you are capable of doing your job before you actually have to do it.

(Ballangrud et al., 2014, p. 182)

This desire was also highlighted in Dante et al. (2021) study by a participant who stated:

[...] increase the number of cases and the time dedicated to each activity....

(p. 6)

5.3 | Theme 2: Professional growth through collaboration

The second theme revolves around the ability of SBL to enable participants to come together in their learning, learning from and about each other. This builds commonality in understanding, improves team capacity and ultimately empowers clinicians with confidence.

5.3.1 | Common understanding

Participants in some studies recognised that SBL creates awareness of the importance of clarifying roles and responsibilities within a healthcare team (Ballangrud et al., 2014; Brewster et al., 2023; Leclair et al., 2018). This heightened awareness underscores the necessity of structured teamwork and clear communication in clinical practice.

Simulations create consciousness about the role one-self and other people play. [...] I see that some [people] are very fit to be leaders while others are not; some create chaos.

(Ballangrud et al., 2014, p. 184)

Each person really could become aware of their role and how they could work better with other roles.

(Leclair et al., 2018, p. 389)

The importance of identifying leaders and practising leadership was also identified.

Somebody needs to be leading. It is a collaborative thing, but it's not a leadership community. It's one person.

(Brewster et al., 2023, p. 7)

5.3.2 | Communication

Participants frequently reported an enhanced awareness of their communication skills following the SBL experience (Karlsen et al., 2017; Markiewicz et al., 2023). They emphasised the significance of effective communication skills, particularly the use of keywords, in fostering therapeutic relationships and interactions with patients and their families. Participants from various studies expressed feeling better prepared to discuss complex matters with patients, attributing this improvement to SBL.

I had no tool before, but I have tried to be conscious about communication and the words I use and such things... However, it is much better now after the course. You become more conscious.

(Karlsen et al., 2017, p. 99)

Additionally, a participant in Markiewicz et al. (2023) emphasised the practical non-verbal aspects of communication that could be improved, stating:

This experience helped me think of new ways to handle things like therapeutic touch, silence, reassurance, and chaplain presence.

(p. 5)

5.3.3 | Interprofessional learning

Interprofessional learning in healthcare simulation fostered camaraderie among participants and enhanced their understanding of roles and expertise within the healthcare team (Ballangrud et al., 2014; Dante et al., 2021; Karlsen et al., 2021; Leclair et al., 2018). The ability to practice and improve the capacity to function as a team was clearly identified.

[...] since simulations were performed in groups of three, it contributed to my professional training, mainly as regards teamwork.

(Dante et al., 2021, p. 5)

The interprofessional nature of learning was also able to add substantive contextual perspectives that enhanced learning.

I was a bit surprised about how different the various group members had experienced the very same scenario...I think every single one of us who participated saw things from a different angle and had a different focus; it was actually exciting.

(Ballangrud et al., 2014, p. 183)

Tempering this benefit, limitations on the composition of the interprofessional team impacted the success of SBL, with the absence of a physician in some of Ballangrud et al. (2014) simulations noted as a limitation that hindered learning. Similarly, Karlsen et al. (2021) identified that some students expressed a desire for more active roles and opportunities to practice with diverse scenarios to improve their experience.

5.3.4 | Empowerment

Participants expressed increased empowerment in their practice and the acquisition of insights from more experienced staff (Atherton et al., 2020; Ballangrud et al., 2014; Dante et al., 2021,

2022; Karlsen et al., 2017, 2021). Debriefing sessions following the simulation were highlighted as pivotal in this facet of the learning process. They provided a platform for exploring simulation experiences, reflecting upon practice, and identifying strengths and areas for improvement.

... it is important to have some debriefing, to sit down and take some time to reflect on what we did and what we could have done better in this special situation.

(Ballangrud et al., 2014, p. 184)

Feedback on communication techniques and patterns gained during debriefing sessions was highly valued (Karlsen et al., 2017, 2021; Markiewicz et al., 2023). It enhanced knowledge and led to improved interactions with future patients and their families. Participants expressed that these debriefing sessions offered opportunities for self-improvement.

Nice to hear other perspectives and learn what resources are available for the patients and families.

(Markiewicz et al., 2023, p. 5)

SBL was also identified as playing a role in deepening self-awareness, helping nurses understand their limits and recognising workplace mistakes that occur within professional roles,

[...] it has certainly contributed to understanding my own limits and the mistakes that I fail to consider in the workplace but are essential to consider.

(Dante et al., 2022, p. 9)

5.3.5 | Building confidence

Participants from various studies highlighted the significant contribution of SBL to their confidence (Atherton et al., 2020; Dante et al., 2021, 2022; Karlsen et al., 2017, 2021). SBL empowered participants to initiate conversations on challenging topics such as organ donation and provided them with valuable information about available resources for families. It enabled individuals to build confidence in addressing critical situations and applying theoretical knowledge safely in clinical practice.

[...] approaching directly with the clinical situation helped me to become confident, from the theoretical and practical point of view [...].

(Dante et al., 2021, p. 6)

Without having done that simulation I probably would never have felt confident enough to have the words and be able to answer any questions from the family.

(Atherton et al., 2020, p. 26)

This confidence underpinned self-assurance.

Without having undergone that simulation, I probably would never have felt self-assured enough to articulate my thoughts and provide answers to any inquiries from the family.

(Atherton et al., 2020, p. 26)

Ultimately, this led to empowerment.

I feel more empowered to initiate palliative and end-of-life conversations with patients and families.

(Markiewicz et al., 2023, p. 4)

6 | DISCUSSION

This meta-synthesis provides valuable insights into ICN perceptions of SBL. These findings offer a multifaceted view of the role of SBL in nursing education and its impact on nurses' preparedness, confidence, teamwork and communication skills.

Managing the expectations and emotions of simulation participants is vital to ensuring a quality experience. Pre-briefing is essential in setting the participants up for success (Leigh & Steuben, 2018). This opportunity for familiarisation with the simulation scenarios, physical equipment and participant roles, can help ameliorate emotions such as uncertainty and anxiety identified in the review, as well as provide reassurance to those with low expectations of simulation as a learning activity (Dante et al., 2021). Pre-briefing can address these perceptions and manage expectations to ensure maximum engagement (Leigh & Steuben, 2018). Critically, this pre-briefing must be conducted in a manner that is safe for participants.

In our review, debriefing was perceived as critical for knowledge and skill acquisition (Atherton et al., 2020; Ballangrud et al., 2014; Dante et al., 2021, 2022; Karlsen et al., 2017, 2021). Although many debriefing structures and frameworks have been designed and employed, a gold standard approach has not been identified yet (Sawyer et al., 2016). However, the majority of debriefing techniques involve similar essential elements that can be effective if used correctly by skilled facilitators (Cheng et al., 2017).

Effective debriefing provided a structured approach for learners to reflect on their actions and receive constructive feedback (Atherton et al., 2020; Ballangrud et al., 2014; Dante et al., 2021, 2022; Karlsen et al., 2017, 2021). However, the effectiveness of debriefing can vary depending on the skill and experience of the facilitator, highlighting the need for comprehensive training (Guerrero, Ali, & Attallah, 2022; Guerrero, Tungpalan-Castro, & Pingue-Raguini, 2022). Facilitating SBL requires diverse skills, including relational, pedagogical, emotional, clinical, technical and SBL abilities (Solli et al., 2022). Facilitators must be able to adjust cues individually to accommodate different learning styles.

The role of the simulation facilitator was clearly identified as impactful in simulation experiences (Dante et al., 2021; Markiewicz et al., 2023), particularly in providing a safe environment (Ballangrud et al., 2014; Karlsen et al., 2021; Weatherall et al., 2019). This provision of safety extends through all stages of the simulation experience. As an example, multiple studies in our review reported participants' discomfort with being video recorded during the SBL (Dante et al., 2022; Karlsen et al., 2017; Leclair et al., 2018). Video-recording of simulation activity can be extremely useful as part of learning during the debriefing process, producing better learning outcomes (Niu et al., 2021). To facilitate psychological safety and support an accurate demonstration of capacity, video-assisted debriefing should be addressed during pre-briefing to ensure participants understand the reasoning behind videoing the SBL experiences (Leigh & Steuben, 2018). Consequently, facilitators must use strategies such as ensuring confidentiality to help manage participants' discomfort with being recorded (Roh & Jang, 2017).

High-fidelity and actor-patient simulations were perceived in this review as the most engaging and effective modes of simulation (Atherton et al., 2020; Dante et al., 2022; Karlsen et al., 2021), with fidelity significantly impacting nurses' ability to engage with the simulation (Atherton et al., 2020; Ballangrud et al., 2014; Dante et al., 2022; Karlsen et al., 2021). Implementation of simulation requires physical space and resources, which ultimately depends on available funding and support (Davis & Hayes, 2018). Institutional budgets and annual operating plans must include funding for simulation and cost analysis reports should inform the budget allocation (Moabi & Mtshali, 2022). A cost/benefit analysis and ensuring that the simulation activities use the correct level of fidelity to meet learning outcomes is needed here.

The environment in which the simulation is provided must be considered (Villemure et al., 2016). The usefulness of in-situ simulation, as opposed to a simulation conducted in specific clinical laboratories, is a subject of debate within the literature. Villemure et al. (2016) found that 77% of respondents in their study reported little or no impact on patient care during their shifts, indicating that ISS can integrate into clinical practice seamlessly without affecting care quality. In contrast, a study by Gundrosen et al. (2014) found that in situ simulation (ISS) did not significantly improve non-technical skills in nursing teams, with Meurling et al. (2013) reporting similar findings, demonstrating ISS' minimal effect on non-technical skills.

Improved interprofessional teamwork and enhanced communication were commonly perceived in our review as benefits of SBL (Ballangrud et al., 2014; Dante et al., 2021; Karlsen et al., 2021; Leclair et al., 2018), with a lack of interdisciplinary presence perceived in one study as limiting nurse engagement (Ballangrud et al., 2014). In contrast, Flentje et al. (2020) reported that nurses preferred to undergo SBL without the presence of other disciplines. These contrasting results could be due to a range of factors, including differing workplace cultures, the nature of the simulation activity, participants previous experiences with SBL, pre-existing workplace relationships between

participants or the quality of facilitation. It is well-documented that effective interdisciplinary cooperation, communication and teamwork are invaluable for patient safety and job satisfaction (Bendowska & Baum, 2023; Hall & Weaver, 2001; Lemieux-Charles & McGuire, 2006; Nancarrow et al., 2013). When implementing a SBL intervention, selecting the team carefully to ensure an appropriate representation of the needs of the learning activity, is essential. The value of SBL lies in a team that works together effectively (Gundrosen et al., 2014), and it is necessary to consider the workplace and team culture while choosing open and willing participants to maximise the potential for success (Hall & Weaver, 2001).

Regular SBL sessions were seen to improve nurses' readiness and proficiency (Ballangrud et al., 2014), with the desire for increased duration and frequency of training attributed to the positive learning experience nurses commonly described experiencing during SBL (Ballangrud et al., 2014; Dante et al., 2022; Karlsen et al., 2021; Leclair et al., 2018). This aligns with best practice in nursing education, which recognises that frequent exposure to high-fidelity simulation significantly improves nurses' skill acquisition and maintenance (Anderson et al., 2019; Boling & Hardin-Pierce, 2016; Hardenberg et al., 2019, 2020; Hillier et al., 2022; Jung et al., 2023; Karageorge et al., 2020).

The positive learning experience expressed frequently in our review was commonly aligned with a significant increase in participant's confidence (Atherton et al., 2020; Dante et al., 2021, 2022; Karlsen et al., 2017, 2021). It is well-documented that confidence in one's role as a nurse positively impacts job satisfaction and patient outcomes (Abu Sharour et al., 2022; Fry & MacGregor, 2014; Guerrero, Ali, & Attallah, 2022; Guerrero, Tungpalan-Castro, & Pingue-Raguini, 2022; Satuf et al., 2018). Implementing quality SBL in a safe environment produces genuine learning and empowers participants with confidence in their own clinical practice.

Recently, a few reviews have examined the use of SBL in ICN education (Jansson et al., 2013; Linn et al., 2019; Villemure et al., 2016), however, the reviews largely focussed on participants achievement of learning outcomes and did not explore the perceptions or experiences of ICNs. A review conducted by Tamilselvan et al. (2023) explored undergraduate nursing students' experiences with SBL and found similar outcomes including, improved skill proficiency, confidence, communication, and teamwork following a SBL intervention. Their findings are like findings from our review.

6.1 | Strengths and limitations

This review targeted the experiences of simulation for ICNs only, and as such, findings may not be generalisable beyond this specialist clinical area. When conducting systematic reviews, bias is possible due to the methodology used, including reflexivity, selection bias, selective outcome reporting and attribution bias (Owens, 2021). The search approach targeted research articles written in English within the past decade (2013–2023), which could have resulted in a publication or language bias (Owens, 2021). However, the critical

appraisal process carried out in this review reduced the risk of bias affecting the outcome of the review (Long et al., 2020). This meta-synthesis was conducted with rigour following established validated processes, adding to the strength of the findings (Lachal et al., 2017).

7 | CONCLUSION

This study is significant as it is the first systematic review and meta-synthesis that explores the perceptions of ICNs regarding SBL. The findings of this review provide insight into tailoring SBL interventions to enhance ICN's professional development and elevate patient outcomes. The review has shed light on the facilitators, barriers, benefits, and limitations of SBL implemented with intensive care nurses, findings which can be used to tailor education programmes to meet the unique demands of the intensive care environment.

Findings of this study will serve as a valuable resource for educators and organisations contemplating the feasibility and potential challenges of incorporating SBL initiatives in their nursing education programmes. Careful consideration of both themes will underpin quality in future simulation activities. Ultimately, the review highlights the balance needed in finding the appropriate simulation approach, with the right level of fidelity, conducted at appropriately regular intervals, incorporating the correct makeup of professional team members, conducted in the right environment and facilitated by a skilled facilitator, to ensure best outcomes and return on investment for ICN's education.

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CONFLICT OF INTEREST STATEMENT

The authors assert that no conflict of interest exists.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ORCID

Nancy Zhang  <https://orcid.org/0000-0001-8368-8725>

Adam Burston  <https://orcid.org/0000-0002-1135-3413>

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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