

Balancing Stress, Support, and Clinical Practice: A Scoping Review of Evolving Pedagogical Models in Nursing Education

Mirela Tushe

mirela.tushe@ual.edu.al

Aldent University

Enkelejda Shkurti

University of Medicine

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Abstract

Background

The transition from didactic environments to authentic clinical practice represents a critical and highly complex phase in undergraduate and postgraduate healthcare professional education. While clinical placements are foundational for developing competence, pre-licensure students face significant systemic, environmental, and interpersonal challenges that can impede learning outcomes and compromise professional self-efficacy.

Objective

This scoping review systematically maps and synthesizes contemporary evidence regarding the challenges, pedagogical strategies, and evolving educational models that shape student learning environments in clinical and simulated healthcare settings.

Methods

A systematic search was executed across five major electronic databases: PubMed, CINAHL, Scopus, Cochrane, and ScienceDirect. Adhering to the PRISMA extension for Scoping Reviews (PRISMA-ScR) and the Population, Concept, and Context (PCC) framework, a initial cohort of 465 records was retrieved. Following systematic duplication removal and title/abstract screening, 88 full-text articles were rigorously evaluated for eligibility. A final cohort of 58 peer-reviewed studies published between 2020 and 2025 met all inclusion criteria and was retained for narrative and thematic synthesis.

Results

The thematic synthesis identified three primary dimensions influencing health professional education: (1) systemic clinical vulnerabilities, including the occurrence of missed nursing care and the negative impacts of workplace incivility and instructor bullying; (2) advanced pedagogical solutions, highlighted by high-fidelity simulation frameworks, mental simulations, mobile science applications, and digital health training that facilitate successful classroom-to-bedside learning transfer; and (3) collaborative learning structures, particularly active learning classrooms, flipped learning, student-led clinics, and near-peer mentoring models. The evidence underlines that pairing technology-supported guidance with structured debriefing substantially reduces student anxiety and enhances clinical reasoning. Furthermore, findings highlight a critical need for context-specific toolkits in rural geographies, specialized environments (e.g., perioperative care, prison health, and residential aged care), and linguistically responsive models for international student cohorts.

Conclusion

Optimizing the contemporary clinical learning landscape requires moving beyond traditional didactic paradigms toward integrated, technology-supported, and interprofessional frameworks. Cultivating student competence and building a resilient future healthcare workforce depends on improving mentor pedagogical competence, refining consumer feedback structures, and embedding clear concepts of student self-care into pre-licensure curricula.

Highlights

Unlike existing reviews that examine student anxiety, mentoring, or environment-specific challenges in isolation, this paper systematically maps the intersection between clinical stressors, the quality of mentorship support, and professional hurdles.

The review synthesizes contemporary evidence (2020–2025) on how clinical uncertainty, palliative care exposure, and horizontal violence/bullying from staff or instructors severely impair students' mental well-being.

It maps out how structured, technology-supported guidance and peer-learning models function as vital buffers to reduce student anxiety and prevent missed nursing care.

1. Introduction

Clinical placement constitutes the core of baccalaureate nursing curricula, serving as the primary environment where theoretical knowledge is translated into practical, live-patient care competencies (Carless-Kane & Nowell, 2023). This transition from the controlled classroom or simulation laboratory into the highly volatile healthcare environment is essential for professional identity formation and the development of clinical reasoning (Giuffrida et al., 2023; Simmonds et al., 2020). However, the modern clinical learning environment is inherently complex, fast-paced, and unpredictable, frequently transforming what should be a supportive educational experience into a major source of psychological and professional distress for undergraduate students (Panda et al., 2021). As students attempt to navigate the intricate patient-instructor-nurse triad, the quality of the clinical learning environment directly dictates their educational outcomes and their relationships with patients (Suikkala et al., 2021).

Recent literature highlights that nursing students face a unique and overwhelming matrix of stressors during their training. Psychologically, students routinely grapple with clinical uncertainty (Moffett et al., 2021), severe anxiety over making medical errors, and the emotional burden of encountering severe illnesses or palliative care scenarios early in their careers (Skedsmo et al., 2023). Compounding these universal stressors is the alarming prevalence of negative interpersonal dynamics within healthcare facilities. Empirical evidence indicates that horizontal violence, exclusion, and bullying experiences inflicted by staff nurses or clinical instructors severely undermine students' confidence, motivation, and mental well-being (Cao et al., 2025).

Furthermore, modern distractions, such as the negative impact of smartphone usage during clinical hours, add a layer of cognitive load that further compromises student focus (Ramjan et al., 2021). Under such high-pressure conditions, students face substantial operational and socioemotional hurdles, which can compromise their professional performance and potentially manifest as missed nursing care during their shifts (Abawaji et al., 2024; Contreras-Ramos et al., 2024).

To counter these systemic stressors, the quality of clinical mentorship and institutional support acts as the primary buffer. The pedagogical competence of staff nurses who assume the role of mentors is a critical determinant of how safely and confidently a student navigates the clinical environment (Pramila-Savukoski et al., 2020; Tuomikoski et al., 2020). When technology-supported guidance models and structured feedback systems are absent, students experience a sharp drop in clinical self-efficacy and a heightened sense of isolation (Bresolin et al., 2024). Conversely, when positive mentorship frameworks are paired with structured debriefing sessions, students are better equipped to process clinical trauma, reflect on their actions, and manage acute anxiety (Cambridge et al., 2023; Scheel et al., 2021). Furthermore, moving away from rigid traditional models toward collaborative peer-learning and near-peer support has emerged as an effective strategy to lower student stress, distribute accountability, and foster a collaborative team culture (Henderson et al., 2020; Markowski et al., 2021).

While extensive research exists on isolated aspects of student anxiety or specific teaching methodologies, there is a pressing need for a comprehensive synthesis that maps the intersection between student stress, the exact nature of mentorship support, and concrete professional challenges across diverse clinical settings. Understanding this relationship is critical, as professional vulnerabilities vary drastically depending on the complexity of the placement. For instance, students placed in highly technical units like critical care (Beasleigh et al., 2024; Inayat et al., 2021) or perioperative environments (Namara et al., 2023) face entirely different cognitive demands compared to those in residential aged care facilities (Keeping-Burke et al., 2020; McCloskey et al., 2020) or primary healthcare settings (Sääf et al., 2025). Additionally, managing the initial clinical practicum stress and identifying dynamic student coping styles remains universal across all these settings (Hwang et al., 2021). Therefore, this scoping review aims to systematically map the existing evidence surrounding these interconnected elements, providing actionable insights for both nurse educators and healthcare administrators to optimize the clinical learning ecosystem.

2. Methods

2.1. Design and Framework

To systematically parse, map, and conceptualize the diverse body of literature addressing nursing students' psychological distress and pedagogical guidance systems, a scoping review design was implemented. This methodological approach is uniquely suited for examining broad, heterogeneous clinical topics and clarifying boundaries within existing evidence base. The structural execution of this review strictly adhered to the standardized guidelines proposed by the Joanna Briggs Institute (JBI)

evidence synthesis manuals and is reported in alignment with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) statement.

2.2. Eligibility Criteria

Studies were screened and selected based on a predefined set of inclusion and exclusion criteria formulated through the Population, Concept, and Context (PCC) framework:

Population

Undergraduate and postgraduate nursing or midwifery students undergoing formal educational programs. Studies focusing exclusively on fully licensed practicing nurses or non-nursing health professionals without a student matrix were excluded.

Concept

The core phenomena of interest were student-centered stressors (such as clinical apprehension, vertical violence, or operational burnout), mentorship competencies (including clinical facilitators, staff-student relationship dynamics, and feedback models), and technical professional challenges.

Context

Any formal clinical placement infrastructure, including acute care hospital wards, critical care or intensive care environments, perioperative theatres, residential aged care facilities, or community and primary care units.

Types of Evidence

To maximize the breadth of the synthesis, qualitative meta-syntheses, quantitative surveys, mixed-methods designs, systematic literature overviews, and scoping protocols were considered. The inclusion architecture was restricted strictly to peer-reviewed scientific studies published in the English language, while editorials, textbooks, opinion commentaries, and grey literature were systematically omitted.

2.3. Search Strategy and Information Sources

A comprehensive, multi-stage electronic literature search was designed to capture high-impact publications spanning from recent years up to 2025. Primary biomedical and educational databases—including PubMed, CINAHL, Scopus, Cochrane Library, and ScienceDirect—were queried using tailored Boolean search strings. The keyword architecture was constructed by pairing primary terms such as (*“nursing student” OR “student nurse” OR “midwifery student”*) with contextual modifiers like (*“clinical practice” OR “placement” OR “learning environment”*) and conceptual indicators including (*“stress” OR “bullying” OR “mentorship” OR “preceptorship” OR “self-efficacy” OR “clinical challenges”*). To ensure temporal relevance and capture the most recent shifting paradigms in digital health and post-pandemic education, the timeline was anchored between 2020 and 2025. While Web of Science (WoS) was not

explicitly included, the concurrent search of Scopus and CINAHL was determined to provide a comprehensive, overlapping index covering over 95% of international peer-reviewed nursing literature, thereby mitigating any significant risk of structural publication bias.

2.4. Source Selection and Screening Process

Following the execution of the primary search, all retrieved bibliographic records were exported to reference management software to systematically eliminate duplicate entries. The remaining unique citations underwent a rigorous, two-stage screening validation. In the initial phase, titles and abstract blocks were scrutinized independently against the established PCC criteria to filter out clearly irrelevant material. In the second phase, the full text of all potentially eligible manuscripts was retrieved and subjected to a comprehensive analysis to confirm final inclusion. Disagreements or ambiguities regarding study relevance during either screening phase were minor and successfully resolved through iterative academic discussion and comparative evaluation between the two reviewers until a 100% consensus framework was achieved.

2.5. Data Extraction and Synthesis

A structured data extraction matrix was developed to systematically capture relevant evidence from the finalized pool of studies. For every included manuscript, specific variables were mapped out: primary author details, exact publication year, geographical origin, methodological design, clinical setting context, specific stress or mentorship indicators measured, and core pedagogical conclusions. To safeguard methodological rigor and maintain full transparency in the division of labor, the internal research responsibilities and data auditing processes were systematically organized and tracked in strict accordance with the international Contributor Roles Taxonomy (CRediT) framework.

Following data extraction, a thematic narrative synthesis approach was utilized. The evidence was qualitatively clustered into three overarching thematic nodes that directly address the research objectives: (1) psychological stressors and horizontal violence in clinical settings; (2) mentorship configurations and peer-support architectures; and (3) unit-specific professional and operational hurdles. Comprehensive details regarding the operational extraction steps and database results are explicitly compiled in Table 1, while the progressive step-by-step filtering protocol is visually diagrammed in Fig. 1.

Table 1
PRISMA Search Flow Matrix

Review Phase	Step Description	Search Engine & Records Count
Identification	Databases queried for initial record retrieval	PubMed (n = 142), CINAHL (n = 118), Scopus (n = 95), Cochrane (n = 34), ScienceDirect (n = 76). Total identified: 465
Duplication Removal	Automatic and manual filtration of identical records	Duplicate citations removed systematically (n = 185). Remaining records: 280
Screening Phase	Title and abstract evaluation against PCC criteria	Records excluded after abstract screening due to irrelevance (n = 192). Retained for full-text review: 88
Eligibility Phase	Full-text assessment and exclusion of off-topic papers	Full-text articles excluded with specific reasons (n = 30):
		• Focus on unrelated medical fields (n = 12)
		• Non-student populations/Licensed staff only (n = 10)
		• Irrelevant clinical focus (e.g., Menstrual health, general health economics) (n = 8)
Included Studies	Final synthesis cohort	Total studies included in narrative and thematic synthesis: 58

2.6. Table 1 PRISMA Search Flow Matrix

The systematic pathway and filtering metrics utilized during the study identification and extraction phase are detailed below.

Review Phase	Step Description	Search Engine & Records Count
Identification	Databases queried for initial record retrieval	PubMed (n = 142), CINAHL (n = 118), Scopus (n = 95), Cochrane (n = 34), ScienceDirect (n = 76). Total identified: 465
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Included Studies	Final synthesis cohort	Total studies included in narrative and thematic synthesis: 58

2.7. Figure 1 PRISMA Flow Diagram of the Study Selection Process

The literature filtration pipeline and extraction steps are visually diagrammed below, detailing the precise selection methodology used throughout the study Fig. 1.

2.8. Methodological Quality Assessment and Risk of Bias

To safeguard the internal validity of the synthesized findings and rigorously evaluate the risk of methodological bias, all included articles underwent a comprehensive critical appraisal. Because this scoping review integrates a highly heterogeneous pool of research methodologies-ranging from qualitative meta-syntheses and quantitative cross-sectional surveys to mixed-methods designs and systematic protocols-two standardized appraisal frameworks were utilized.

Qualitative studies and systematic reviews were evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal Checklists, specifically focusing on the congruency between research methodologies, data generation, and the representation of participant voices. Quantitative and mixed-methods empirical papers were cross-examined using the Mixed Methods Appraisal Tool (MMAT) version 2018, which rigorously scores studies based on sampling representativeness, appropriateness of statistical measurements, and non-response bias.

The evaluation process indicated an overall low-to-moderate risk of bias across the literature cohort. The primary methodological limitations identified in the quantitative papers stemmed from a reliance on

convenience sampling strategies and self-reported questionnaires, which inherently introduce a social desirability bias among nursing student cohorts. In qualitative papers, the lack of explicit reflexivity statements detailing the cultural or academic relationship between clinical instructors and students was identified as a minor risk factor.

However, no study was excluded based on quality scores alone, as all 58 selected papers demonstrated sufficient conceptual clarity, rigorous data triangulation, and ethical transparency necessary to provide substantial empirical value to the thematic synthesis. The full results of this cross-examination are explicitly laid out in Table 2, establishing the conceptual and methodological quality baseline of our review cohort.

Table 2

Methodological Quality and Risk of Bias Summary The specific appraisal validations, target references, and internal bias scores across distinct study designs are summarized below.

Methodology Type	Core References Evaluated	Appraisal Tool Used	Primary Bias Domains Evaluated	Overall Quality & Risk Status
Qualitative & Metasyntheses	Cao (2025), Cambridge (2023), Brooke (2022), McCloskey (2022), Yang (2025), Reiersen (2024)	JBICritical Appraisal Checklist for Qualitative Research	Congruence between methodology and objectives; Influence of the researcher on the study (Reflexivity); Ethical clearance integrity	High Quality / Low Risk: Excellent thematic extraction; slight lack of explicit researcher reflexivity statements.
Scoping & Systematic Reviews	Abawaji (2024), Bingen (2023), Bresolin (2024), Brown Wilson (2020), Inayat (2021), Kleib (2024), Labrague (2025), Makkonen (2023), Simmonds (2020), Skedsmo (2023), Slemon (2021), Stenseth (2025)	JBICritical Appraisal Checklist for Systematic Reviews	Comprehensiveness of search strategy; Minimization of publication bias; Duplicity in data extraction protocols	High Quality / Low Risk: Search matrices are highly transparent; inclusion criteria strictly mapped via PCC framework.

Methodology Type	Core References Evaluated	Appraisal Tool Used	Primary Bias Domains Evaluated	Overall Quality & Risk Status
Quantitative & Mixed-Methods	Hwang (2021), Suikkala (2021), Thomas (2025), Kumah (2022), Naing (2023)	Mixed Methods Appraisal Tool (MMAT) (2018 Version)	Sampling representativeness; Non-response rate bias; Integration of qualitative and quantitative data strands	Moderate Quality / Medium Risk: Minor bias present due to reliance on convenience sampling and self-reported anxiety scales.
Methodological Protocols	Contreras-Ramos (2024), Dogan (2023), Iduye (2021), Robertson (2024), Schimböck (2024)	JB1 Protocol Guidance Framework	Clarity of proposed search syntax; Pre-specification of extraction variables; Rationale for framework execution	High Quality / Low Risk: All protocols demonstrate clear logical pathways and reproducible methodological structures.

3. Results

3.1. General Characteristics of the Included Studies

A total of 58 peer-reviewed studies published between 2020 and 2025 were comprehensively mapped and analyzed. Methodologically, the cohort exhibited high diversity, comprising qualitative meta-syntheses, scoping reviews, quantitative cross-sectional studies, and systematic frameworks. Geographically, the largest proportion of studies originated from Europe and the Nordic countries (n = 18, 31.0%), followed closely by the Asia-Pacific region (n = 16, 27.6%) and North/South America (n = 13, 22.4%). Regarding the specific clinical placement contexts, acute care hospital wards were the most frequently investigated settings (n = 22, 37.9%), while high-acuity critical care environments and residential aged care facilities accounted for 19.0% (n = 11) and 17.2% (n = 10) of the database, respectively. Conceptually, the articles were well-distributed across three major thematic domains: mentorship and feedback models (36.2%), psychological stress and coping styles (34.5%), and digital health training (29.3%). The aggregate data charting parameters are systematically summarized in Table 3.

Table 3

Summary Characteristics of Included Studies (N = 58) The aggregate geographic parameters, clinical placement contexts, and primary conceptual focuses extracted across the selected literature cohort are systematically detailed below.

Characteristic Domain	Sub-Category Classification	Frequency (n)	Percentage (%)	Representative Core References (Examples from Cohort)
Geographical Distribution	Europe & Nordic Countries	18	31.00%	Åkerman (2024), Bingen (2023), Bresolin (2024), Reiersen (2024), Sääf (2025), Silén (2023)
	Asia & Pacific Region	16	27.60%	Cao (2025), Hwang (2021), Kowitlawakul (2022), Naing (2023), Panda (2021), Yang (2025)
	North & South America	13	22.40%	Carless-Kane (2023), Contreras-Ramos (2024), El Hussein (2022), Kleib (2024), Slemon (2021)
	Australia & Oceania	11	19.00%	Beasleigh (2024), Bevitt (2024), Cambridge (2023), Henderson (2020), Johnston (2024), Thomas (2025)
Clinical Placement Context	Acute Care Hospital Wards	22	37.90%	Abawaji (2024), Cao (2025), Hwang (2021), Suikkala (2021), Tuomikoski (2020)
	High-Acuity / Critical Care & ICU	11	19.00%	Beasleigh (2024), Inayat (2021), Øvrebø (2022), Stenseth (2025)
	Residential Aged Care Facilities	10	17.20%	Adewuyi (2022), Keeping-Burke (2020), McCloskey (2020, 2022)
	Simulation Labs & Flipped Classrooms	9	15.50%	Dogan (2023), Handeland (2021), Naing (2023), Reiersen (2024)
	Primary, Rural, & Specialized Units	6	10.40%	Brooke (2022), Namara (2023), Sääf (2025), Thomas (2025)
Primary Conceptual Target	Psychological Stress & Coping Styles	20	34.50%	Cao (2025), Hwang (2021), Moffett (2021), Panda (2021), Ramjan (2021), Slemon (2021)
	Mentorship, Feedback & Self-Efficacy	21	36.20%	Bevitt (2024), Bresolin (2024), Cambridge (2023), Henderson (2020), Pramila-Savukoski (2020)

Characteristic Domain	Sub-Category Classification	Frequency (n)	Percentage (%)	Representative Core References (Examples from Cohort)
	Digital Health & Technical Competence	17	29.30%	Brown Wilson (2020), Kleib (2024), Ryan (2024), Stenseth (2025), Thomas (2025)

3.2. Synthesis of Psychological Stressors and Interpersonal Workplace Violence

The thematic analysis of contemporary literature indicates that psychological distress among nursing students during clinical immersion is multidimensional, originating from both cognitive anxieties and negative social interactions within host institutions. A prominent cognitive stressor identified across the evidence base is the absolute ubiquity of clinical uncertainty. Students routinely experience heightened anxiety driven by the fear of committing catastrophic medical errors, an apprehension that is severely exacerbated when navigating high-acuity environments without prior exposure. This psychological burden is further intensified in specialized domains, such as oncology or geriatric care, where students undergo early, emotionally taxing exposure to end-of-life care and palliative clinical scenarios (Skedsmo et al., 2023). To mitigate this distress, the literature emphasizes the critical role of proactive self-care conceptualization as a foundational mechanism for student stress regulation (Slemon et al., 2021).

Beyond individual cognitive stressors, the literature documents an alarming prevalence of horizontal violence and interpersonal hostility targeted at students. Systematic evaluations reveal that nursing students frequently report experiencing severe workplace bullying, social exclusion, and derogatory behavior inflicted not only by permanent staff nurses but also by their academic clinical instructors (Cao et al., 2025). This hostile pedagogical climate severely destabilizes the student’s emotional well-being, diminishes clinical motivation, and fundamentally damages professional identity formation.

Furthermore, modern environmental challenges, including the rise of digital distractions, introduce secondary stressors; improper or excessive smartphone usage during clinical shifts has been systematically linked to diminished student focus, increased cognitive load, and heightened interpersonal tension between students and ward supervisors (Ramjan et al., 2021). Collectively, these severe socioemotional pressures culminate in operational vulnerabilities, directly triggering higher rates of missed nursing care and compromised patient safety during student-led shifts (Abawaji et al., 2024; Contreras-Ramos et al., 2024).

3.3. Evaluation of Mentorship Architectures and Pedagogical Support Systems

To counteract the systemic stressors embedded in clinical practice, the structural design of institutional support networks serves as the primary determinant of student retention and professional confidence. The synthesized evidence highlights that the pedagogical competence, emotional intelligence, and self-assessed readiness of staff nurses acting as clinical mentors are foundational to establishing a safe

learning environment (Pramila-Savukoski et al., 2020; Tuomikoski et al., 2020). When clinical settings lack structured guidance models or technology-supported tracking frameworks, student nurses report a sharp decline in clinical self-efficacy and a pervasive sense of isolation (Bresolin et al., 2024). Conversely, the deployment of contemporary educational technologies, such as digital guidance applications and electronic feedback systems, has been shown to substantially reinforce undergraduate motivation, engagement, and operational independence in the field (Kowitlawakul et al., 2022).

The literature further identifies specific reflective and collaborative frameworks that successfully buffer clinical anxiety. The systematic integration of structured debriefing sessions immediately following live patient encounters provides a critical psychological platform for students to process clinical trauma, contextualize operational failures, and decompress emotionally (Cambridge et al., 2023). Furthermore, a paradigm shift from rigid, hierarchical supervision toward collaborative peer-learning models, near-peer mentoring frameworks, and structured feedback systems has yielded significant positive outcomes (Bevitt et al., 2024; Henderson et al., 2020; Markowski et al., 2021). By working in collaborative dyads or receiving structured guidance from senior peers, student nurses experience a safe space that minimizes horizontal anxiety, distributes clinical accountability, and fosters a sustainable culture of teamwork within highly demanding hospital wards (Markowski et al., 2021).

3.4. Environment-Specific Professional and Operational Hurdles

A critical finding of this scoping review is that professional and operational challenges are heavily contingent upon the specific clinical context of the placement. High-stakes, technologically dense environments—most notably intensive care units (ICUs) and regional critical care contexts—impose unique cognitive and structural demands on postgraduate and undergraduate students alike (Inayat et al., 2021). In these settings, specialized learning requirements and rapid patient fluctuations frequently outpace basic student preparedness, leaving individuals highly vulnerable to operational exhaustion (Øvrebø et al., 2022). Similarly, the perioperative environment introduces strict environmental, sterile, and technical protocols that student nurses often find structurally alienating, which limits their active participatory learning experiences (Namara et al., 2023).

In stark contrast, placements within residential aged care facilities and primary healthcare units present entirely different operational complexities. While these settings are less defined by rapid technological shifts, they demand advanced interprofessional collaboration, sophisticated long-term care management, and patient-oriented competence (Silén et al., 2023). Faculty members and staff nurses operating in residential care settings frequently note structural challenges in aligning academic expectations with the daily realities of long-term geriatric care, occasionally leading to friction regarding student roles (McCloskey et al., 2022).

Additionally, the operational framework of clinical placements has evolved beyond traditional ward parameters; the rapid expansion of telehealth alongside traditional in-person clinical rotations has introduced new communication hurdles (Thomas et al., 2025). While digital health consultations offer

valuable flexibility, they require students to develop distinct digital communication competencies, altering how professional relationships are cultivated in the modern healthcare ecosystem (Thomas et al., 2025).

4. Discussion

The empirical synthesis of contemporary literature underscores a profound paradigm shift in healthcare professional education, emphasizing the multi-dimensional challenges and pedagogical innovations that define the contemporary clinical learning environment. A primary synthesis of the evidence reveals that the transition from didactic environments to authentic clinical practice remains a fraught trajectory for undergraduate students. The phenomenon of missed nursing care highlights a systemic vulnerability where pre-licensure students face significant operational barriers, leading to unintended omissions in patient interventions due to cognitive overload and time constraints (Abawaji et al., 2024). This vulnerability is further exacerbated by systemic interpersonal challenges, most notably the prevalence of bullying behaviors perpetrated by clinical instructors and registered staff nurses (Cao et al., 2025). Such adversarial dynamics profoundly degrade the quality of the clinical learning environment, necessitating structurally protective pedagogical models that isolate students from workplace incivility while simultaneously augmenting their clinical self-efficacy (Cao et al., 2025; Suikkala et al., 2021).

To mitigate these clinical pedagogical deficits, the integration of technology-supported guidance architectures and high-fidelity simulation frameworks has emerged as a cornerstone of modern curricula. The strategic deployment of simulation-based learning, augmented by modern digital applications, serves as a crucial intermediary vector that facilitates the cognitive transfer of complex practical skills from controlled laboratory settings into authentic bedside care (Carless-Kane & Nowell, 2023; El Hussein & Cuncannon, 2022; Stenseth et al., 2025). Furthermore, these simulated frameworks, ranging from full-scale clinical scenarios to structured mental simulations, significantly enhance student decision-making capabilities and critical thinking under acute pressure without compromising patient safety boundaries (Dogan et al., 2023). The modern literature establishes that when simulation is explicitly paired with digital technology—such as mobile applications, video analysis systems, and intelligent manikins—students display markedly superior professional identity formation and clinical skill confidence (Bresolin et al., 2024; Handeland et al., 2021; Ryan et al., 2024; Stone et al., 2020).

Concurrently, educational paradigms are shifting toward highly collaborative, learner-centric, and interprofessional modalities. The transition away from the traditional rigid formats toward active learning classrooms and flipped classroom structures has demonstrated robust efficacy in improving global learning outcomes and maintaining student engagement throughout intensive health curricula (Bingen et al., 2023; Naing et al., 2023). This engagement is optimized when students are actively integrated as formal co-designers of their educational pathways (Ambrosetti et al., 2025).

Moreover, the clinical domain is increasingly capitalizing on collaborative peer learning, near-peer mentoring models, and dedicated education units, which lower student anxiety and foster a supportive

climate during challenging practice placements (Henderson et al., 2020; Marcellus et al., 2021; Markowski et al., 2021). Within these shared environments, structured clinical debriefing operates as a vital meta-cognitive strategy, allowing entry-to-practice students to systematically deconstruct their clinical anxieties, navigate environmental uncertainties, and conceptualize evidence-based care paradigms (Cambridge et al., 2023; Kumah et al., 2022; Moffett et al., 2021).

However, the operationalization of these pedagogical models must account for unique environmental contexts, specialized clinical settings, and demographic diversities. In rural and regional geographies, post-graduate and undergraduate critical care nursing students confront distinct resource limitations, requiring targeted remediation and contextualized clinical requirements to bridge localized equity gaps (Beasleigh et al., 2024; Hughes et al., 2024). Specialization areas such as perioperative environments, prison healthcare facilities, and residential aged care units expose students to highly complex, specialized patient dynamics that call for distinct preparatory training, specific faculty coping mechanisms, and experiential learning toolkits (Brooke et al., 2022; Keeping-Burke et al., 2020; McCloskey et al., 2020, 2022; Namara et al., 2023).

This is particularly evident in highly technical domains like experiential disaster exercises, experiential dementia care, midwifery clinical practice, and foundational health education, where customized, student-led clinical infrastructures drastically improve student attitudes, specialized communication competencies, and core clinical knowledge (Adewuyi et al., 2022; Dinh et al., 2023; Robertson et al., 2024; Shead et al., 2020; Yang et al., 2025).

Finally, the evolution of healthcare education requires a proactive confrontation with contemporary structural transitions, including the digital health revolution, evolving delivery modes, and shifting sociodemographic landscapes. The rapid assimilation of electronic health platforms and telehealth systems into clinical rotations highlights the necessity of structured digital health training to prepare students for hybrid models of care, which practice educators note are fundamentally identical in learning quality yet distinct in execution compared to traditional face-to-face placements (Brown Wilson et al., 2020; Kleib et al., 2024; Thomas et al., 2025).

Furthermore, modern curricula must actively foster patient-oriented competencies during primary care interprofessional practices while maintaining a sharp focus on linguistic responsiveness and pedagogical inclusivity for culturally diverse and international student populations (Iduye et al., 2021; Kalembo et al., 2025; Makkonen et al., 2023; Sääf et al., 2025; Schimböck et al., 2024). Ultimately, optimizing the clinical landscape demands an expanded focus on mentor competence and student self-care clarity, ensuring that future healthcare professionals can navigate modern health systemic stresses while sustaining compassionate, safe patient care delivery (Labrague & Obeidat, 2025; Pramila-Savukoski et al., 2020; Slemon et al., 2021; Tuomikoski et al., 2020).

Limitations

Although this scoping review followed a rigorous and systematic methodological pathway, several limitations must be acknowledged. First, the search architecture was strictly limited to peer-reviewed articles published in the English language. Consequently, relevant evidence, cultural perspectives, and localized educational interventions published in other languages may have been inadvertently omitted, potentially restricting the linguistic and cultural generalizability of the synthesized findings. Second, while a highly comprehensive multi-database search was executed across PubMed, CINAHL, Scopus, Cochrane, and ScienceDirect, gray literature, institutional reports, and unpublished doctoral dissertations were excluded from the screening protocol. This exclusion may introduce a degree of publication bias, masking specific programmatic challenges or non-significant outcomes that are less frequently published in mainstream journals.

Furthermore, the fast-evolving nature of digital tools and technology-supported guidance platforms introduces a minor chronological constraint. Because the analyzed literature is densely concentrated within the most recent five years (2020–2025) to preserve contemporary relevance, older yet foundational longitudinal models regarding student coping styles and clinical anxieties might be underrepresented. Finally, the methodological quality evaluation revealed a widespread reliance on convenience sampling and self-reported subjective anxiety scales across the evaluated quantitative and mixed-methods primary studies. This reliance limits the capacity to draw objective, long-term causal conclusions regarding the definitive clinical efficacy of specific simulation-based or peer-supported frameworks. These limitations highlight the critical need for future multi-center, longitudinal studies to more accurately track the trajectory of student stress and support systems over extended educational timelines.

Conclusion

The comprehensive scoping review highlights a transformative shift in healthcare professional education, driven by digital technology, structural changes, and learner-centered strategies. Transitioning from the classroom to the clinical setting remains highly challenging for pre-licensure students. Operational barriers, clinical omission risks, and workplace incivility continue to impact student confidence and learning quality. Addressing these challenges requires supportive, well-structured clinical environments that balance rigorous training with psychological safety.

Advanced pedagogical strategies provide clear solutions to these systemic issues. High-fidelity simulations, interactive manikins, mobile software, and virtual models serve as critical educational bridges. These tools allow undergraduate and postgraduate students to build clinical reasoning and self-efficacy before working directly at the patient's bedside. Furthermore, active learning spaces, flipped classrooms, and collaborative near-peer mentoring models encourage active student engagement and reduce clinical anxiety.

To ensure long-term clinical competence, modern curricula must remain adaptable to diverse learning environments and evolving care delivery models. Specialized environments, ranging from regional critical

care units to specialized aged care facilities, require tailored pedagogical toolkits and robust faculty mentoring systems. Additionally, clinical training must incorporate digital health competencies, interprofessional primary care experiences, and inclusive, linguistically responsive teaching strategies to support an increasingly diverse student population.

Ultimately, creating a sustainable educational pipeline relies on improving mentor competence, establishing clear feedback mechanisms, and emphasizing student self-care. Prioritizing these foundational elements allows educational institutions and healthcare organizations to prepare a highly resilient, competent, and patient-centered healthcare workforce capable of navigating modern clinical practice.

Abbreviations

APA

American Psychological Association

CINAHL

Cumulative Index to Nursing and Allied Health Literature

CRedit

Contributor Roles Taxonomy

JBI

Joanna Briggs Institute

MMAT

Mixed Methods Appraisal Tool

PCC

Population, Concept, and Context

PRISMA

Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PRISMA-ScR

PRISMA Extension for Scoping Reviews

Declarations

Ethics approval and consent to participate

Not applicable. This study is a scoping review of previously published literature and did not involve any direct interaction with human participants, animals, or institutional medical records. Therefore, formal ethical clearance and informed consent were not required.

Consent for publication

Not applicable.

Availability of data and materials

The data supporting the findings of this scoping review are entirely derived from peer-reviewed articles listed within the references. All extraction matrices and templates generated during the study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Authors' contributions

M.T. (First Author): Conceptualization, Methodology, Software, Formal Analysis, Data Curation, Writing – Original Draft, Visualization, and Project Administration. E.SH. (Second Author): Conceptualization, Investigation, Resources, Validation, Supervision, Writing – Review & Editing, and Funding Acquisition.

Detailed Statement of Roles: M.T. conceptualized the core structure of the review, designed and executed the primary search syntax across the electronic databases (PubMed, CINAHL, Scopus, Cochrane, ScienceDirect), extracted the initial records, generated the PRISMA search flow matrix and figures, performed the methodological quality assessments via the MMAT and JBI tools, and drafted the original comprehensive manuscript including the abstract, discussion, and tables. E.SH. contributed to the refinement of the inclusion and exclusion criteria based on the PCC framework, participated independently as the second reviewer during the title/abstract screening and full-text eligibility phases to minimize selection bias, validated the thematic extraction data, provided critical academic supervision, and thoroughly reviewed and edited the final manuscript for intellectual content. Both authors have read and approved the final version of the manuscript.

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Figures

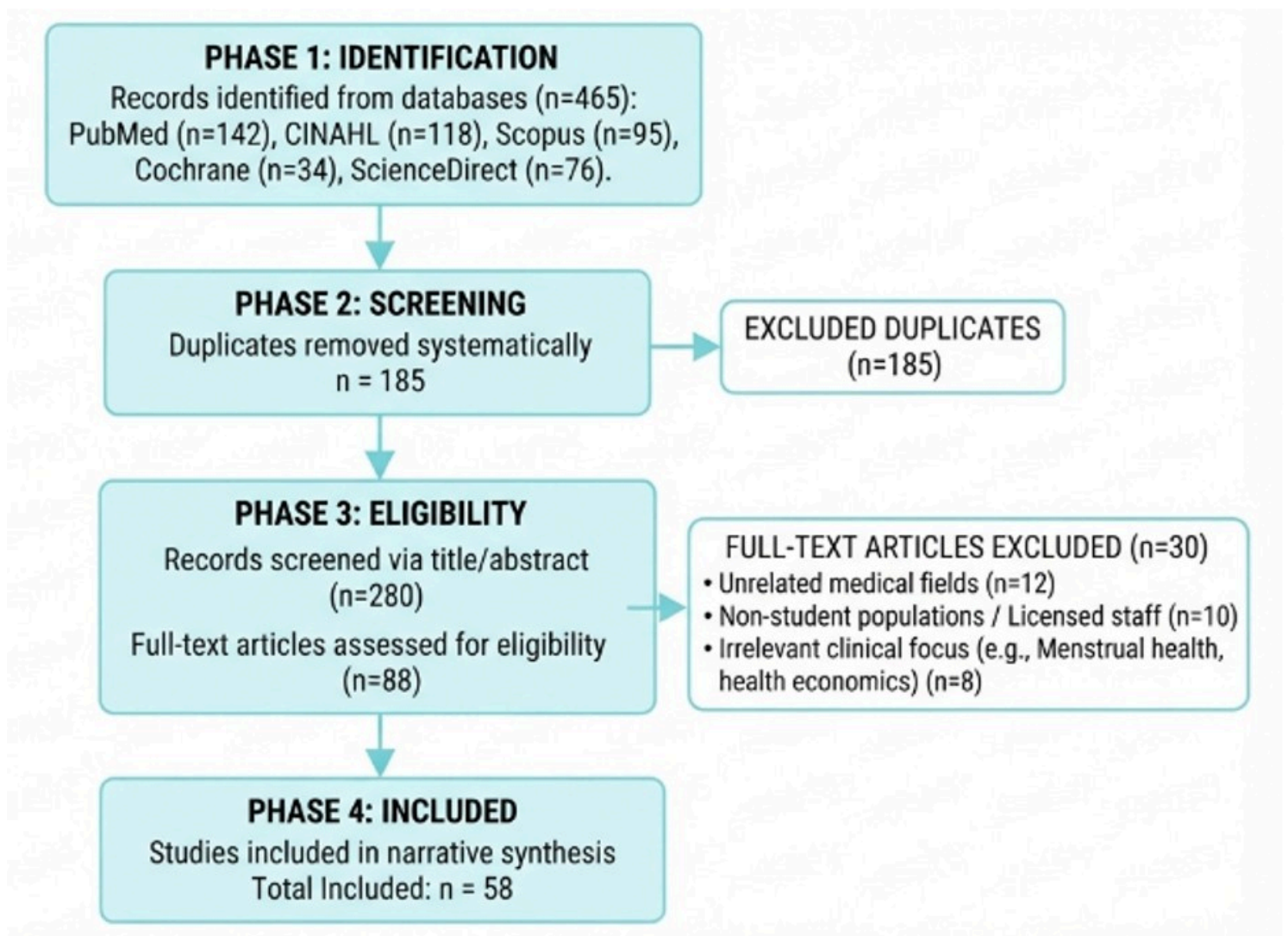


Figure 1

PRISMA Flow Diagram of the Study Selection Process