

CHAPTER 2

PREPARING HEALTH PROFESSIONALS FOR WORKPLACE VIOLENCE: A SYSTEMATIC REVIEW OF DIGITAL SIMULATION-BASED TRAINING INTERVENTIONS

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Abstract

Workplace violence is a critical concern in healthcare and social service education, particularly for students placed in emotionally demanding and high-risk clinical environments. Despite growing awareness, most curricula prioritise technical and procedural competence while neglecting the emotional and interpersonal skills required to navigate violent encounters. This chapter provides a systematic review of digital simulation-based training interventions, examining how they prepare undergraduate healthcare students for workplace violence through competencies such as de-escalation, emotional regulation, and situational confidence.

A systematic review of 19 studies published between 2019 and 2025 was conducted using a multi-phase search strategy across PubMed, Scopus, EBSCOhost, Google Scholar, and WorldCat. The review focused on digital simulation-based interventions for undergraduate healthcare students, including virtual reality and gamified learning environments. Findings are presented thematically and organised around three core areas: the design features of simulation-based interventions, reported educational and psychosocial outcomes, and the underlying pedagogical assumptions shaping preparedness for workplace violence.

Digital simulation-based education was found to enhance student confidence and perceived preparedness but also revealed significant limitations. Most interventions relied on self-report data, lacked long-term follow-up, and insufficiently engaged with student identity and equity, including gendered, racialised, and socially situated factors influencing exposure to workplace violence, learning processes, and emotional complexity. To address these gaps, the chapter introduces the concept of affective fidelity to foreground the importance of emotional realism in simulation design and evaluation. It offers a synthesis of current evidence and provides direction for more inclusive, context-aware pedagogical approaches to workplace violence preparedness in health professions education.

Keywords: workplace violence, simulation-based education, emotional regulation, virtual reality, de-escalation, artificial intelligence

1 Introduction and background

Workplace violence refers to any incident in which a healthcare or social service professional is subjected to physical, verbal, non-verbal, or sexual abuse, threatened, or assaulted while performing their professional duties (Boyle & Wallis, 2016). Violence of this kind is not confined to a single role or setting – it occurs in hospitals, clinics, community health centres, and the homes of patients (Arnetz et al., 2015; Kessi et al., 2021; Veronesi et al., 2023). Whether a paramedic responds to an emergency call, a nurse manages a ward, or a social worker enters a volatile family dispute, such encounters reflect a shared risk across healthcare professions. Physicians, clinical psychologists, and allied health practitioners are similarly exposed to intimidation, physical assault, and emotional or sexual harassment in the course of patient care (Pretorius & Herbst, 2022). While workplace violence can include violence from multiple sources, this chapter focuses primarily on client-initiated aggression as the most common form encountered in clinical training and the focus of most simulation interventions.

Across regions, the stories converge, but so does a troubling sense of inevitability. A nurse in South Asia is shoved while explaining discharge instructions – just one of the 61.9% of nurses and 47.6% of physicians in the region who experienced workplace violence in a single year (Bhusal et al., 2023). Globally, between 30% and 80% of health and social care professionals report similar experiences (El Ghaziri et al., 2014; İçbay & Şevik, 2024; Kessi et al., 2021; Li et al., 2022; Njaka et al., 2020; Olusegun, 2022; Wang et al., 2022). These are not outliers; they are increasingly characteristic of the environments into which healthcare students are socialised. When violence becomes routine, so too does the expectation that future professionals will learn to endure it in silence.

As workplace violence becomes normalised within clinical training environments, students do not encounter these experiences in the same way. How violence is perceived, endured, reported, or managed is shaped by socially situated factors that influence vulnerability, power, and emotional labour during training. In this chapter, identity is understood as

the constellation of characteristics – such as gender, race, ethnicity, professional role, and prior exposure to trauma – that shape how students encounter and respond to workplace violence (Zhu et al., 2022). Social identity further highlights how group membership structures power relations and interactional dynamics within clinical settings (Bochatay et al., 2019). Equity, in turn, refers not to uniform training experiences, but to whether educational interventions adequately account for differential risk, emotional burden, and learning needs across diverse student groups (Smith et al., 2017). These concepts provide an interpretive frame for examining how simulation-based training may differentially prepare students for workplace violence.

Workplace violence during clinical training is a documented concern for students in the healthcare professions across diverse settings. In Israel, more than half of nursing and medical students report verbal abuse during placements, with physical assault rates ranging from 5% to 64% across disciplines (Kwok et al., 2012; Warshawski, 2021). In the UK, 52% of physiotherapy students have encountered violent or aggressive behaviour (Stubbs et al., 2011), and a large-scale study found that 81% of nursing students have experienced non-physical aggression, 56% physical aggression, and 40% sexual harassment during clinical training (Hallett et al., 2021). Despite these figures, most incidents go unreported – only one-third of non-physical and half of physical aggression cases are formally disclosed – and students often lack sufficient training or confidence to respond effectively. In one UK study, 94% of physiotherapy students felt unprepared to manage workplace aggression (Dafny et al., 2024; Stubbs et al., 2011).

On the African continent, students placed in mental health, emergency, and community settings similarly report encountering client aggression and traumatic experiences without adequate support (Graj et al., 2019). In Ghana, psychology and nursing students describe frequent hostility during clinical training contributing to anxiety, emotional withdrawal, and disengagement from learning (Amoo et al., 2021; Galvin et al., 2015). These effects are often compounded by limited field supervision and the absence of formal debriefing processes (Booth & O'Connor, 2019). In Ethiopia, paramedicine and midwifery students noted that emotional competencies

are rarely included in formal curricula, pointing to a broader misalignment between education and the realities of clinical practice (Kibwana et al., 2017). Exposure to workplace violence has been linked to reduced confidence, higher dropout rates, and long-term disengagement from the healthcare profession (Galvin et al., 2015). These early impacts reflect broader patterns of stress and burnout that continue into professional practice, particularly in under-resourced settings where more than 40% of work-related illness in the healthcare sector is attributed to stress-related conditions (Labour, 2018).

Despite evidence of student exposure to workplace violence during clinical training, conventional healthcare education curricula prioritise clinical reasoning, procedural safety, and technical competence (Brentnall et al., 2022; Elvén et al., 2023). While foundational, these competencies do not adequately prepare students for the interpersonal and emotional demands of managing conflict or responding to aggression in real-world settings. Skills such as emotional regulation, de-escalation and decision-making under pressure are critical to safe and ethical care (Lavelle et al., 2024; Zavala et al., 2017). However, these skills are rarely taught, practised, or assessed as core competencies (Cleak et al., 2020; Finley & Levenson, 2017; Martins et al., 2020; Mokoena-de Beer et al., 2024). Higher Education Institutions may lack the time, pedagogical training, or institutional mandate to integrate more reflective and interactive approaches, particularly in rural or high-risk placements where exposure to violence is common.

In response, some institutions have introduced digital simulation tools into healthcare education. These tools create opportunities for students to practise emotional regulation, communication and decision-making in controlled, yet realistic environments (Ndawo, 2021). In one scenario, a student might engage with a computer-generated character designed to mimic a distressed patient (Darwish, 2025; Talbot et al., 2012). In such cases, the student must respond to the tone, hesitation, or escalating behaviour of the virtual agent. In another, they may navigate a branching dialogue in a gamified simulation, where each choice shapes the outcome and reveals consequences in real time (Christopoulos & Mystakidis, 2023). A third student might put on a virtual reality headset and find themselves inside a

fully immersive emergency room, required to de-escalate a volatile situation while monitoring both their clinical and emotional responses (Bhowmik, 2024). Some of these tools follow scripted sequences; others use artificial intelligence (AI) to adapt dynamically to the student's decisions and behaviour (Bacon et al., 2017; Bosse et al., 2016; Hughes & Ingraham, 2016).

The educational value of these tools is yet to be comprehensively evaluated. Early studies suggest that digital simulation-based approaches may reduce anxiety, increase confidence, and improve emotional readiness for clinical practice (Holland et al., 2017; Rohde et al., 2024). However, the evidence specific to workplace violence preparedness remains limited. Few studies focus on preparing students to manage client aggression or workplace violence, and their long-term integration into competency-based training is rarely assessed.

2 Problem statement and aim

Despite early signs of promise that digital simulation-based tools may enhance students' confidence and emotional readiness for managing workplace violence in clinical practice, significant gaps remain in understanding how these tools are designed, implemented, and evaluated for this purpose. Although workplace violence is increasingly recognised as a critical concern in healthcare and social service sectors, students in clinical training continue to encounter aggression without adequate preparation. Existing curricula prioritise technical and procedural competencies but often fail to equip students with the emotional and interpersonal skills required to navigate high-stress or violent encounters. This leaves students vulnerable – not only to harm, but to emotional withdrawal, disengagement from learning, and eventual burnout. While digital and AI-driven simulations present a promising strategy to address this gap, current research remains fragmented. There is little consolidated evidence on how these tools are used to develop core competencies such as de-escalation and emotional regulation, particularly in low-resource settings where exposure to violence is often most acute.

This chapter critically examines how digital and AI-supported simulations are used to prepare undergraduate healthcare professionals for client aggression and workplace violence. Drawing on 19 international studies, it explores how simulation-based interventions engage competencies such as emotional regulation, de-escalation, and situational confidence – confidence in one’s ability to respond effectively during escalating encounters (Ezell, 2021). No studies meeting the inclusion criteria were identified from South Africa or other low-income contexts; as such, this review draws exclusively on international studies.

This scope was necessary to capture the most current evidence on digital and AI-supported simulations, while recognising that the absence of local studies reflects a significant gap that warrants further research. The systematic review also critically examines the design and pedagogical focus of these tools, highlighting wide variation in how they were delivered (e.g., virtual reality, gamification, screen-based modules) and how their outcomes were evaluated (e.g., self-report, OSCEs, follow-up assessments). Finally, it considers the challenges of applying these approaches in under-resourced contexts, where access to high-tech infrastructure may be limited and student exposure to violence disproportionately high. The aim of the study is therefore to provide a systematic review of digital simulation-based training interventions, examining how they prepare undergraduate healthcare professionals for workplace violence through the development of competencies such as de-escalation, emotional regulation, and situational confidence.

3 Research design and methodology

This study used a theory-informed systematic review design with thematic synthesis to examine how digital simulation-based interventions prepare undergraduate healthcare students for workplace violence. This approach allows for the integration of empirical findings with conceptual and pedagogical analysis (Huang & Schmidt, 2022). PRISMA 2020 reporting standards (Page et al., 2021) were used to ensure transparent reporting of search, screening, and selection processes. This design was selected for its

ability to enable transparent inclusion criteria, multi-level screening, and theory-informed synthesis across diverse intervention types and settings (Kirk et al., 2015). Unlike scoping or narrative reviews, it supports replicable methods and deeper pedagogical analysis of outcomes such as de-escalation, emotional regulation, and simulation-based learning design.

3.1 Search strategy

The search process followed a multi-phase, theory-aligned model, refined in collaboration with a research librarian. Five databases were searched: PubMed, Scopus, EBSCOhost including Academic Search Premier and CINAHL, and WorldCat. Google Scholar was used as a supplementary search tool to identify additional or hard-to-index studies not retrieved through traditional databases. These were selected to represent a balance between clinical, educational, and interdisciplinary research. The search was conducted through an iterative, staged process designed to ensure both breadth and precision:

- Phase 1: An exploratory Boolean search tested conceptual combinations to gauge platform responsiveness.
- Phase 2: Platform-specific syntax was applied to develop structured strings, adapted to each database's indexing system.
- Phase 3: Thematic clusters were searched (e.g., simulation + violence, AI + de-escalation, VR + coping), using terms extracted from abstracts and disciplinary taxonomies.

All search strings were documented per platform, and the final database exports were consolidated for screening, in line with established guidance for systematic review search strategies (Booth et al., 2016).

3.2 Inclusion and exclusion criteria

Studies were eligible for inclusion if they:

- Targeted undergraduate or student-level healthcare professionals (e.g., nursing, medicine, social work, psychology, occupational therapy (OT), physical therapy (PT))

- Evaluated a digital, simulation-based, or AI-driven educational intervention
- Addressed training related to workplace violence, emotional regulation, de-escalation, or coping
- Were published between 2019 and 2025

While the primary focus was undergraduate/student populations, studies involving clinical preceptors or broader healthcare worker samples were retained where the intervention was explicitly designed for training contexts relevant to student preparedness or where outcomes were reported in ways directly transferable to student training.

Studies were excluded if they focused solely on in-service healthcare professionals, lacked digital/simulation components, or did not address violence or related emotional competencies. Although the criteria did not exclude South African or low- and middle-income country (LMIC)-based studies, no eligible studies from these contexts were identified during screening. Consequently, all included studies were international, a gap that is further discussed as a limitation.

3.3 Screening and selection

Search results from the selected platforms were compiled into a master database and filtered by relevance and publication year (2019–2025), resulting in 382 unique records. These were imported into Rayyan, a web-based tool designed to facilitate collaborative screening in systematic reviews (Ouzzani et al., 2016). Rayyan’s automatic deduplication removed 24 duplicates, yielding 358 titles and abstracts for screening.

Two reviewers independently screened all records against the predefined inclusion criteria. Discrepancies were resolved through discussion, and exclusion reasons were tagged in Rayyan to ensure transparency and auditability. Cohen’s kappa coefficient ($\kappa = 0.83$) was calculated, indicating substantial interrater agreement (McHugh, 2012). Full-text articles were retrieved for all studies marked as “included” or “maybe” and were subjected to a second round of double review. After full-text screening, 19

studies met the final inclusion criteria. These articles were critically appraised using the Mixed Methods Appraisal Tool (MMAT), version 2018 (Hong et al., 2018). Each study was evaluated independently by both reviewers, with any disagreements resolved through dialogue.

The majority of the studies (n = 16) met four or more MMAT criteria, reflecting high methodological quality. These appraisals informed the interpretation of findings, particularly in weighing evidence strength across intervention types and professional disciplines. Figure 2.1 summarises the number of records identified, screened, excluded, and included, as per the PRISMA 2020 flow diagram (Page et al., 2021).

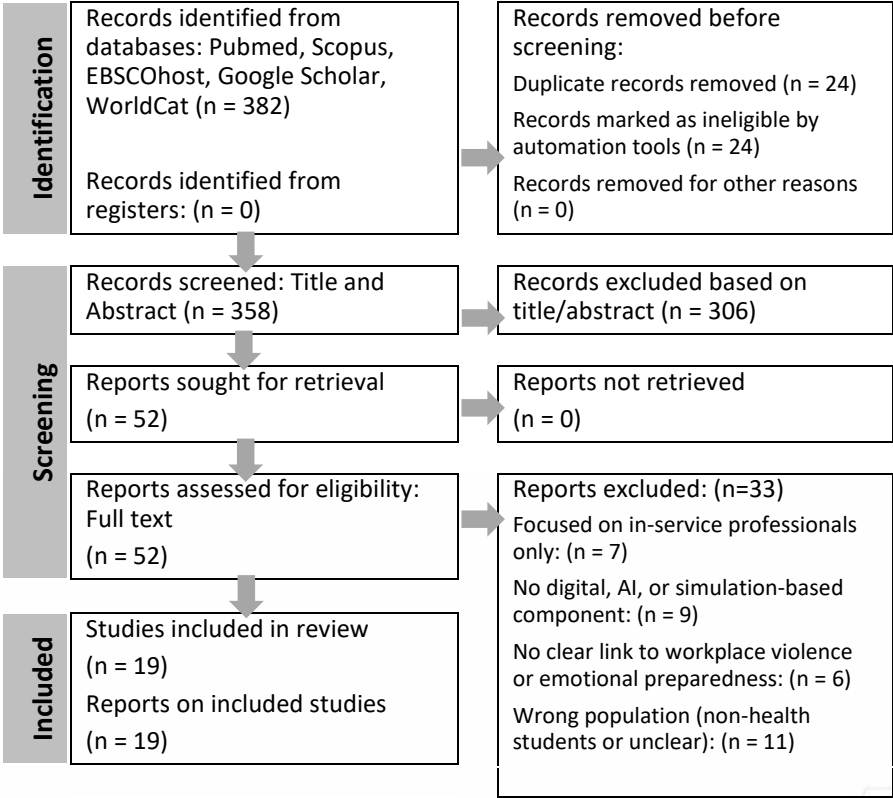


Figure 2.1: PRISMA flow diagram

3.4 Data extraction and thematic synthesis

Following full-text inclusion, key information was extracted from each included study using a structured Excel template developed specifically for this review. Extraction fields included bibliographic details, study context, intervention characteristics, targeted outcomes, pedagogical strategies, evaluation methods, and key findings. This approach ensured consistency and comparability across studies (Gough et al., 2017).

A thematic synthesis was conducted following Thomas and Harden (2008), informed by Braun and Clarke's (2006, 2020, 2021) guidance on theme development. Inductive coding was used to identify patterns across studies, with themes developed iteratively and refined for conceptual coherence.

Coding was conducted manually in Excel. Two reviewers independently reviewed all codes and thematic categories, resolving discrepancies through collaborative discussion. This process enhanced transparency and analytic rigour in line with best practices for qualitative evidence synthesis (Thomas & Harden, 2008).

3.5 Ethical considerations

This study received ethics clearance from the North-West University Health Research Ethics Committee (HREC), reference number NWU-00201-25-A1. As a systematic review of publicly available secondary data, there was no direct contact with human participants, and no new data were generated.

In an effort to uphold the ethical standards for secondary research, accuracy, transparency, and accountability received particular attention throughout all methodological processes (Page, 2021). The search strategy, inclusion criteria, screening decisions, and data extraction procedures were fully documented (Gough et al., 2017). Independent reviewer screening and collaborative resolution of discrepancies further supported the integrity and auditability of the review process (Page, 2021).

4 Findings

The findings are presented in two parts: first, a descriptive overview of the included studies, covering participant groups, simulation types, study designs, and reported outcomes; followed by a thematic presentation of findings organised around three core areas: (1) simulation formats and design, (2) emotional engagement and reflection, and (3) skill-building and readiness.

4.1 Overview of included studies

This section summarises the scope and characteristics of the 19 included studies. Table 2.1 details each study's country of origin, participant types, simulation formats, study designs, and primary outcome measures.

Table 2.1: Included studies

No	Title of study	Date	Country of origin	Study design	Participants	Simulation tool type	Primary outcome
1	Virtual reality training to reduce workplace violence in healthcare	2025	USA	Narrative review	Nursing; healthcare workers	VR/AR platforms	Improved confidence, emotional regulation, skills acquisition
2	Evaluating an aggression management education that incorporated virtual reality: Pre-post pilot study with nursing students	2025	Australia	Pre/post pilot study	Healthcare	VR	Improved confidence and attitudes toward aggression; no change in empathy or mental health literacy; high participant engagement and perceived usefulness of debriefing.
3	A quantitative study teaching de-escalation with virtual reality simulation to associate nursing students: Measuring effectiveness, learning, and confidence	2025	USA	Quasi-experimental, pre/post	Nursing	SimX VR software	Improved learning, confidence, effectiveness perception

4	Using virtual simulation to teach substance use screening and brief intervention skills across the health professions: Examining training outcomes among an interprofessional graduate student sample	2025	USA	Mixed methods, pre/post	Interprofessional (social work, therapy, nursing, psychology, etc.)	Virtual simulation (Kognito)	Improved SBIRT preparedness, confidence, collaboration
5	Creation of a novel virtual reality simulation to Increase Nursing Skills in Management of Workplace Violence	2025	USA	Quantitative	Nursing	VR simulation	Improvements in WPV recognition, de-escalation, and post-incident coping
6	Exploring the effectiveness of different “escape room simulation teaching” methods on clinical preceptors’ knowledge and skills in judging and handling violent situations in the healthcare profession	2025	Taiwan	Double-blind RCT, pre/post	Multidisciplinary (clinical preceptors)	Gamified: escape room (physical and online)	Improved knowledge, efficacy, satisfaction (esp. physical escape room)
7	Effect of theme game-based learning on psychiatric violence risk assessment and response knowledge, skills, and self-confidence of nursing	2025	China	RCT with pre/post	Nursing	Theme game-based learning	Improved skills, confidence, and management ability

	students: A randomised controlled trial						
8	Comparison of learning outcomes between virtual simulation experiments and offline scenario-based learning for early intervention in psychiatric violence among undergraduate nursing students	2025	China	RCT with standardised tools	Nursing	Virtual simulation (Unity3D)	Improved knowledge retention, OSCE, reduced cognitive load
9	Educating a new generation of nurses about workplace violence using an innovative virtual simulation module	2024	USA	Quasi-experimental, pre/post	Nursing	Screen-based simulation	Improved knowledge
10	The role of virtual simulation in de-escalating a patient demonstrating escalating behaviour	2024	Canada	Quantitative pre/post	Nursing	Screen-based virtual simulation	Improved confidence, perceived de-escalation success
11	The use of virtual reality for student training on bias and microaggressions	2024	USA	Mixed methods	Occupational therapy	Immersive VR	Improved empathy, awareness, and preparedness
12	Immersive virtual reality aggression and violence management education	2024	Australia	Pre/post/follow-up	Nursing	Immersive VR	Improved confidence sustained over time

	for nursing students: A pre-test, post-test, follow-up evaluation			quantitative			
13	An online escape room-based lesson plan to teach new nurses violence de-escalation skills	2023	Taiwan	Pre/post/follow-up quantitative	Nursing	Online escape room	Improved knowledge, confidence, satisfaction
14	Learning to manage de-escalation through simulation: An exploratory study	2023	Australia	Exploratory qualitative	Nursing	Standardised-patient simulation	Improved emotional readiness, preparedness
15	CaregiVR: Building self-efficacy in dementia care through immersive education	2023	Canada	RCT with mixed methods	Nursing	Immersive VR	Improved self-efficacy, safe practice, empathy
16	The role of virtual simulation in undergraduate nursing students' confidence when de-escalating a patient demonstrating escalating behaviour	2022	Canada	Pre/post quantitative	Nursing	Web-based virtual simulation	Improved confidence, knowledge
17	A virtual, simulated code white for undergraduate nursing students	2022	Canada	RCT with mixed methods	Nursing	Scenario-based simulation (screen)	Realism rated high, gaps remained

18	Computerised clinical training simulations with virtual clients abusing alcohol: Initial feasibility, acceptability, and effectiveness	2021	USA	Pre/post mixed methods	Social work	AI-enhanced computer-based simulation	Improved self-efficacy, preparedness
19	A virtual counselling application using artificial intelligence for communication skills training in nursing education: Development study	2019	Singapore	Mixed methods	Nursing	AI-powered virtual avatars	Improved self-efficacy, attitudes

This review included 19 studies published between 2019 and 2025. The majority were conducted in high-income countries, with the United States contributing seven ($n = 7$), followed by Canada ($n=4$) and Australia ($n = 3$). Taiwan and China were represented by two studies each ($n = 4$), and one study came from Singapore ($n=1$). None were set in low-income contexts.

Across the included studies, nursing students formed the most common participant group ($n = 15$). Participants ranged from vocational to undergraduate levels. Several studies also included interprofessional cohorts ($n = 2$), bringing in students from social work, psychology, counselling ($n = 1$), occupational therapy, and rehabilitation ($n = 1$). While the professional mix varied, all studies maintained an educational focus on healthcare or health-related disciplines.

Simulation modalities varied: immersive virtual reality was used in six studies; screen-based or web-based simulations in six; escape-room-style gamified formats in three; AI-enhanced modules in two; and standardised patient simulations in one. Four studies integrated more than one delivery method. Modes of delivery included in-person lab-based sessions ($n = 6$), online-only formats ($n=9$), and hybrid approaches ($n = 4$). Thirteen simulations were delivered as standalone modules; six were embedded within broader curricula or orientation programmes.

Study designs were predominantly quasi-experimental ($n = 6$), pre-post ($n = 8$), or mixed methods ($n = 6$). Outcome data were most frequently collected via self-report tools measuring learner confidence, knowledge, preparedness, or affective change ($n = 16$). Three studies used structured assessment approaches such as OSCEs or observation tools. Only three studies included follow-up beyond immediate post-intervention, typically spanning several weeks.

While methodological quality varied, most studies ($n = 17$) reported ethics approval and provided sufficient intervention descriptions. Common limitations included overreliance on self-reporting ($n = 16$), lack of standardised outcome measures ($n = 15$), and minimal engagement with equity, identity, or broader structural contexts (e.g., absence of

disaggregated analysis, culturally situated scenarios, or equity-focused learning outcomes) (n = 17).

4.2 Thematic findings

Three thematic domains were identified to address the study's objective of understanding how simulation-based interventions prepare students for workplace violence: (1) simulation formats and design; (2) emotional engagement and reflection; and (3) skills-building and readiness. These themes were developed through the thematic synthesis of included studies (Clay et al., 2025; Conrad et al., 2024; Johnson et al., 2024; Power et al., 2023; Zhao et al., 2025; Zhu et al., 2025). Each theme reflects recurrent patterns while also illustrating variation across settings, technologies, and assessment strategies. Together, these domains illustrate how simulation-based interventions contribute to preparing undergraduate healthcare students for workplace violence.

4.2.1 Theme 1: Simulation formats and design

Theme 1 captures the range of simulation formats and instructional designs used across studies. Interventions included high-immersion VR simulations (Clay et al., 2025; Johnson et al., 2024; Lim et al., 2025; Tobias et al., 2024), AI-supported or computerised simulations with branching decision pathways (Shorey et al., 2019; Smith et al., 2021), gamified escape-room formats (Hsu et al., 2023; Wu et al., 2025), screen-based role-plays and virtual scenarios (Power et al., 2023; Stephen et al., 2022), and asynchronous or web-based modules (Brandau & Lloyd, 2024).

The technological format influenced student experience. In-person VR laboratory simulations were more frequently associated with higher perceived realism, immersion and situational intensity (Clay et al., 2025; Johnson et al., 2024; Tobias et al., 2024). By contrast, remote or screen-based simulations offered greater accessibility and flexibility but were reported to provide less embodied interpersonal engagement (Brandau & Lloyd, 2024; Power et al., 2023). Gamification formats such as escape rooms were associated with increased engagement, teamwork, and motivation (Hsu et al., 2023; Wu et al., 2025), although these studies also noted that

time pressure and game mechanics could shift attention away from deeper emotional processing.

Instructional design features shaped reported outcomes. Studies that incorporated structured debriefing, collaborative problem-solving tasks, and explicit performance criteria or checklists were more likely to report improvements in student confidence and perceived skill (Conrad et al., 2024; Johnson et al., 2024; Zhao et al., 2025). However, across the reviewed literature, there was no consistent framework guiding simulation duration, sequencing, or fidelity. Several studies explicitly described adapting simulation formats to institutional constraints, including the use of lower-tech or resource-light approaches (Brandau & Lloyd, 2024; Power et al., 2023).

4.2.2 Theme 2: Emotional engagement and reflection

This theme reflects how simulation supported emotional and relational learning. Across multiple studies, students reported experiencing stress, anxiety, uncertainty, and heightened emotional arousal during high-intensity violence or aggression scenarios (Clay et al., 2025; Conrad et al., 2024; Johnson et al., 2024; Lim et al., 2025). At the same time, simulations were frequently perceived as psychologically safe, where students could make mistakes without real-world consequences (Power et al., 2023; Stephen et al., 2022).

Debriefing emerged as a critical mechanism for emotional processing. Studies that incorporated facilitated debriefing sessions reported that these discussions supported reflection, emotional regulation, and meaning making following challenging scenarios (Conrad et al., 2024; Johnson et al., 2024; Stephen et al., 2022). Simulations explicitly focused on empathy, bias, microaggressions, or dementia-related aggression were particularly likely to prompt relational insight and perspective-taking (Hamed et al., 2024; Vogelsang, 2023). In contrast, studies that reported minimal or absent debriefing noted lingering emotional discomfort or unresolved reactions among some participants (Lim et al., 2025; Power et al., 2023).

Despite frequent references to emotional intensity, few studies formally prioritised affective outcomes in their evaluation designs. Emotional engagement was most often captured through general self-report questionnaires or open-ended feedback rather than validated affective or trauma-informed measures (Clay et al., 2025; Conrad et al., 2024; Johnson et al., 2024). Some participants described emotional fatigue or a lack of emotional closure following simulations, particularly when scenarios were highly immersive but debriefing time was limited (Lim et al., 2025; Power et al., 2023).

These findings point to the importance of affective fidelity in simulation design, a concept referring to the extent to which simulations authentically engage emotional and relational dimensions of care. While several studies demonstrated high technical or visual fidelity (Clay et al., 2025; Tobias et al., 2024), far fewer explicitly addressed emotional containment, psychological safety, or the sustained processing of affective responses.

4.2.3 Theme 3: Skills-building and readiness

Theme 3 consolidates findings related to learner outcomes associated with managing workplace violence. Across studies, participants reported improvements in de-escalation strategies, communication skills, situational awareness, and clinical reasoning following simulation-based interventions (Conrad et al., 2024; Johnson et al., 2024; Zhao et al., 2025; Zhu et al., 2025). These outcomes were most assessed using pre-post self-report surveys, confidence or self-efficacy scales, and, less frequently, structured performance assessments such as OSCE-style evaluations (Johnson et al., 2024; Stephen et al., 2022).

Interventions using active role-play, branching pathways, and real-time feedback yielded stronger reported learning gains (Power et al., 2023; Smith et al., 2021; Zhao et al., 2025). However, only a small number of studies included follow-up assessments to examine skills retention beyond the immediate post-intervention period (Johnson et al., 2024; Lim et al., 2025). Emotional and cognitive learning outcomes were typically measured separately, with limited integration between technical skill acquisition and emotional regulation.

Some studies reported demographic variation in outcomes. Differences in post-intervention confidence by gender or race were observed in a small subset of studies, although these findings were not consistently explored or theorised (Zhao et al., 2025; Zhu et al., 2025). Importantly, few interventions explicitly incorporated equity, social identity, or structural competence into their design or evaluation frameworks.

While most participants reported feeling more prepared following simulation training, several studies noted discrepancies between increased self-reported confidence and objectively measured performance, suggesting that perceived readiness did not always align with demonstrated competence (Conrad et al., 2024; Johnson et al., 2024).

5 Discussion of findings

These three thematic domains identified in this review highlight both the promise and the limitations of simulation-based interventions for preparing students for workplace violence. To interpret these patterns more deeply, the discussion that follows examines how preparedness is constructed, prioritised, and evaluated within the reviewed literature.

5.1 Constructing Preparedness: Dominant Frames and Discourses

Simulation-based training for workplace violence functions not only as a pedagogical strategy, but also as a mechanism through which professional norms and expectations are reinforced. Across the reviewed studies, preparedness was most commonly constructed in terms of individual competence, emotional regulation, and procedural execution, rather than as a collective, organisational, or structural responsibility (Clay et al., 2025; Conrad et al., 2024; Zhao et al., 2025). It functions as a discursive tool that may shape how students understand professional identity, competence, and the nature of violence itself. Drawing on institutional discourse theory (Shore & Wright, 1997) and Bacchi's (2016) 'What's the Problem Represented to Be?' (WPR) framework, this review is attentive to how

simulation-based interventions may frame preparedness, emotional regulation, and authority in high-risk encounters.

Although the studies employed a wide range of simulation modalities, they were overwhelmingly situated within nursing education. Most interventions focused on bedside clinical encounters and inpatient care settings (Conrad et al., 2024; Johnson et al., 2024; Tobias et al., 2024), with only limited inclusion of interprofessional or social work cohorts (Patton et al., 2025; Smith et al., 2021). This disciplinary concentration shapes how workplace violence is conceptualised, privileging clinical management and interpersonal technique over scenarios more common in community-based, psychiatric, or social service contexts.

Across the reviewed studies, workplace violence was typically represented as an expected feature of care work – something to be managed through individual composure, communication skills, and situational awareness (Clay et al., 2025; Johnson et al., 2024; Zhao et al., 2025). Preparedness was operationalised through self-reported gains in confidence, self-efficacy, and perceived competence, rather than through sustained behavioural or relational outcomes (Conrad et al., 2024; Lim et al., 2025; Zhu et al., 2025).

Emotional responses like fear, distress, and uncertainty were acknowledged descriptively across several studies but were rarely positioned as explicit learning outcomes (Power et al., 2023; Thomas et al., 2017). Where structured and facilitated debriefings were incorporated, simulations created space for emotional reflection and meaning making (Conrad et al., 2024; Johnson et al., 2024). However, in many interventions, emotional engagement appeared to be treated as something to be managed or resolved, rather than critically examined or integrated into learning design (Brandau & Lloyd, 2024; Hsu et al., 2023; Lim et al., 2025).

5.2 What is left out: Identity, equity, and evaluation gaps

Despite their stated aim of preparing students for complex, real-world encounters, the reviewed literature revealed notable silences around identity, structural context, and equity. Except for one study focusing on bias and microaggressions (Hamed et al., 2024), most simulations were designed

as culturally neutral experiences, with little attention to how student identity might shape experiences of workplace violence or preparedness training.

A small number of studies reported differences in confidence or learning outcomes across demographic groups, including gender and race, but these findings were rarely interrogated or theoretically contextualised (Alfred et al., 2018; Thomas et al., 2017; Zhao et al., 2025; Zhu et al., 2025). None of the reviewed studies explicitly incorporated frameworks of structural competence, intersectionality, or professional precarity into their simulation design or evaluation strategies.

Methodologically, the dominance of self-report measures raises important questions about how preparedness is conceptualised and assessed. While confidence and perceived competence are meaningful indicators, several studies demonstrated that increases in self-reported readiness did not always align with objective or observed performance (Conrad et al., 2024; Darby-Littlejohn, 2025; Goh et al., 2020; Johnson et al., 2024). Moreover, few studies employed longitudinal designs, limiting insight into skills retention or behavioural transfer over time (Johnson et al., 2024; Lim et al., 2025).

Finally, the evidence base was geographically and economically narrow. All included studies were conducted in high- or upper-middle-income settings, typically assuming access to advanced simulation infrastructure and dedicated training facilities (Clay et al., 2025; Tobias et al., 2024; Wu et al., 2025). The absence of studies from low-resource contexts raises questions about whose pedagogies and assumptions shape dominant models of “best practice” in simulation-based violence preparedness.

Beyond questions of learner outcomes, these gaps extend to the pedagogical labour underpinning simulation-based education. This silence also extends to the educators themselves. Few studies described how facilitators were prepared to hold emotional space, respond to student distress, or engage with identity-based tensions during debriefing. This absence may reflect a broader undervaluing of facilitation as a relational and

ethical skillset in simulation leadership (de Wijse-van Heeswijk, 2021; Macdiarmid, 2017).

Few studies used objective behavioural assessments, and even fewer included follow-up data to examine long-term effects. This short-termism reinforces a “tick-box” logic of simulation success – focused more on momentary reassurance than enduring professional growth (Houlden & Crichton, 2024). It also reflects the challenges of assessing complex learning outcomes such as moral reasoning, emotional resilience, and interprofessional communication (Amin et al., 2024) – domains that may be difficult to measure but are central to real-world violence preparedness.

5.3 Rethinking simulation: Toward an inclusive pedagogy

The findings of this review suggest that simulation-based interventions tend to frame workplace violence preparedness as an individual responsibility, grounded in skills acquisition and emotional regulation. While these elements are undoubtedly important, they do not capture the full scope of preparedness required across diverse care environments.

Simulations that integrated reflective debriefing, relational learning, and emotionally credible scenarios demonstrated greater potential to support holistic preparedness, particularly by enabling students to process uncertainty, discomfort, and ethical tension (Conrad et al., 2024; Hamed et al., 2024; Johnson et al., 2024). However, such approaches remain the exception rather than the norm.

These patterns point to the need for a more critically reflective simulation pedagogy – one that moves beyond procedural mastery and emotional control to engage with identity, equity, and structural conditions shaping workplace violence. Rather than treating these dimensions as optional enhancements, the reviewed evidence suggests they are central to preparing students not only to manage violent encounters, but to navigate the complex emotional and social realities of frontline professional practice.

6 Conclusion

Workplace violence in healthcare and social service professions is both prevalent and deeply complex – emotionally charged, ethically demanding, and difficult to prepare for using conventional teaching methods. This systematic review examined how digital simulation-based training interventions have been used to prepare undergraduate healthcare students for workplace violence, with particular attention to de-escalation, emotional regulation, and situational confidence.

Across 19 studies, the review identified an emerging but uneven field. While the use of immersive simulation, gamification, and virtual platforms reflects substantial pedagogical innovation, the design and evaluation of these interventions often remained narrow in scope. Workplace violence was framed as an individual challenge, most commonly within nursing education, and assessed through short-term self-report metrics. Emotional safety, identity, and structural context were frequently absent, suggesting that simulations, despite their technical sophistication, may replicate rather than challenge existing assumptions about professionalism and resilience.

This review contributes a novel lens by foregrounding the affective, discursive, and equity dimensions of simulation. It introduces the concept of affective fidelity – the capacity of a simulation to engage emotional and relational realities – as a critical but underdeveloped feature of current training. It also challenges the prevailing idea that procedural mastery alone constitutes preparedness, particularly in the face of escalating aggression and occupational risk.

As interest in simulation continues to grow globally, the findings of this review signal the importance of rethinking not just how we simulate workplace violence, but what kind of professional practice those simulations promote. In under-resourced and emotionally demanding contexts, effective violence preparedness will depend not only on access to tools, but on their capacity to reflect the psychological, cultural, and structural realities that shape professional experience. Ultimately, preparing health professionals for workplace violence requires training interventions

that extend beyond technical competence to embrace emotional fidelity, equity, and structural awareness.

7 Limitations and recommendations

7.1 Limitations

While this review offers a critical synthesis of simulation-based interventions for workplace violence preparedness, several limitations warrant consideration. Conceptually, the included studies varied significantly in how they defined simulation, artificial intelligence, and competence. This lack of consistency complicated comparison and limited interpretive depth. For example, interventions using asynchronous screen-based modules and high-immersion virtual reality were often grouped under the same umbrella, despite clear differences in pedagogical potential and learner experience.

Geographically, the review is marked by a strong bias toward high- and upper-middle-income countries. All 19 studies were conducted in technologically resourced environments, with none originating from low-income settings. This overrepresentation reflects a broader inequality in simulation research, where access to advanced infrastructure may be wrongly equated with global applicability. The result is an evidence base that may not fully capture the realities, constraints, or innovations of under-resourced education systems.

Methodologically, many of the studies reviewed were limited by small sample sizes, a reliance on self-report tools, and short-term post-intervention assessments. Only a few used objective behavioural measures, and even fewer included follow-up data to assess longer-term outcomes. Emotional responses – although frequently reported – were rarely theorised or assessed with validated affective tools. Similarly, few studies disaggregated findings by identity variables such as race, gender, or prior trauma exposure, limiting insight into how different students experienced and benefited from simulation-based training.

Finally, the review itself was limited to English-language publications and peer-reviewed sources. While necessary for feasibility, this exclusion may have resulted in selection bias and the omission of relevant grey literature or non-English studies, especially from LMICs. The initial scoping phase was broad, and although refinement occurred over screening rounds, some relevant but non-standardised interventions may have been missed due to inconsistent terminology.

7.2 Recommendations

Despite these limitations, the review offers clear directions for future research and practice. First, there is a need for longitudinal studies that track how simulation-based training influences students' responses to workplace violence over time. These studies should include mixed-method evaluations, combining performance metrics with learner narratives, affective changes, and contextual variables. In particular, trials in low- and middle-income countries are needed – not only to expand geographic representation, but to surface adaptive, locally relevant simulation strategies that may be overlooked in high-tech paradigms.

For educators and curriculum designers, the findings point to the importance of designing for emotion, not just procedural knowledge. Simulations should integrate structured debriefings, space for emotional reflection, and assessment strategies that go beyond confidence scores. The concept of affective fidelity can guide this process.

Simulation scenarios should also prioritise relational realism. Culturally responsive role-plays, identity-diverse avatars, and interdisciplinary cases can help students engage with the complexity of real-world violence. Rather than reducing scenarios to controlled clinical scripts, educators can introduce ambiguity, emotional tension, and interpersonal conflict to cultivate deeper reflection.

Equally important is the preparedness of simulation facilitators. Those leading violence-related simulations must be trained not only in logistical setup, but in trauma-informed pedagogy, emotional containment, and

equity literacy. Without these capabilities, even well-designed simulations risk becoming emotionally unsafe or pedagogically shallow.

Future research should move beyond self-report evaluation. The field would benefit from the development or adaptation of validated instruments that measure performance, emotional insight, and structural understanding. Simulation outcomes should not be limited to what students say they feel confident about – they must include what students can demonstrate, reflect on, and carry forward into practice.

Finally, equity must be central. Simulation design, implementation, and evaluation should monitor for differential outcomes across gender, race, and background. Inclusive casting, identity-sensitive facilitation, and culturally grounded case development are not just ethical imperatives – they are pedagogical necessities.

By critically interrogating how simulation-based education frames workplace violence, this review offers a platform for reimagining both research and teaching. It invites scholars and practitioners to design interventions that are emotionally resonant, structurally aware, and attuned to the diverse realities of frontline professionals. Simulation holds immense potential – but only when grounded in context, care, and critical consciousness.

8 References

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