Applications and Effectiveness of AI Chatbots in Clinical Simulation-Based Nursing Education: A Scoping Review

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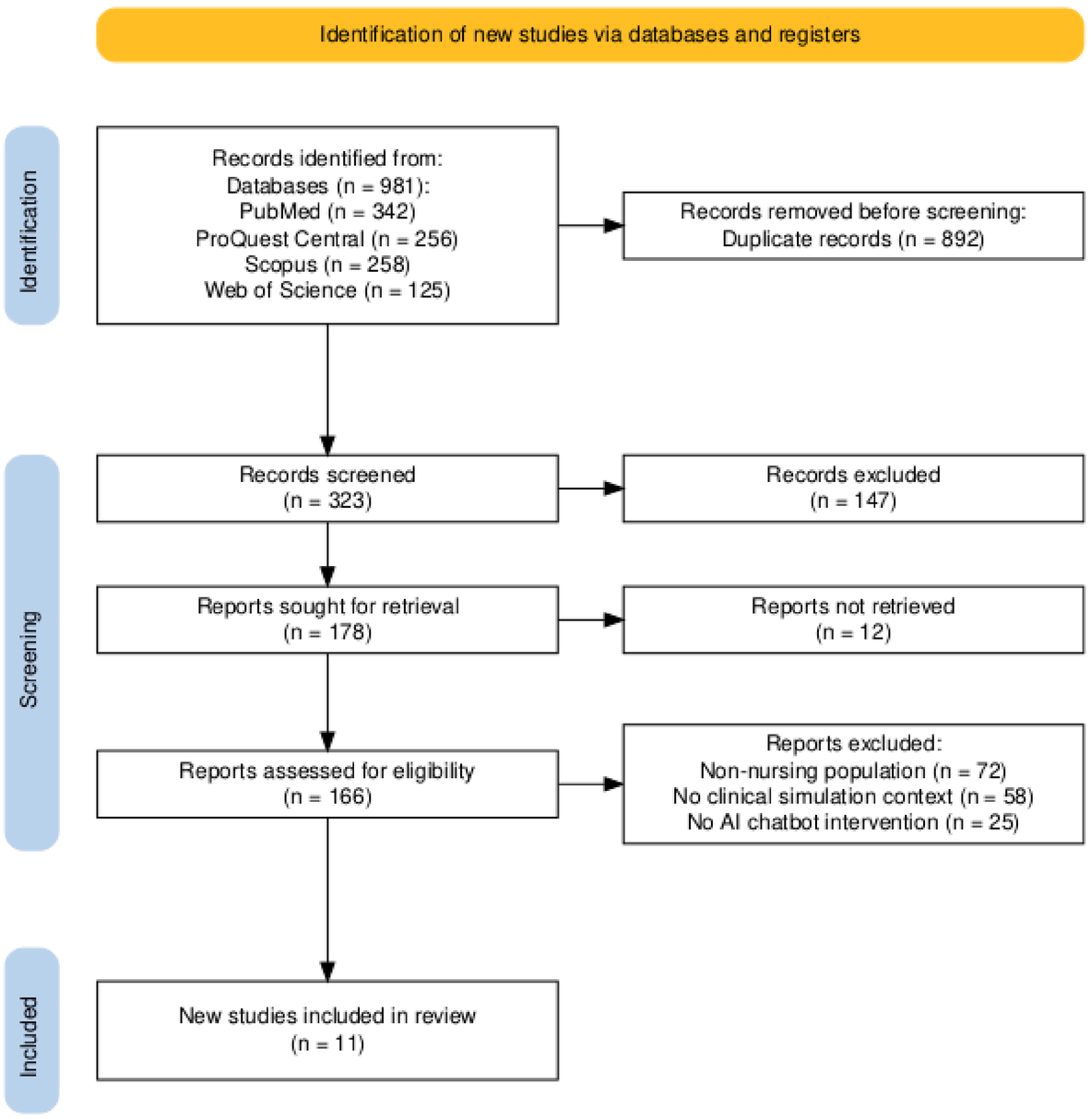
Background: The rapid advancement of artificial intelligence (AI) chatbots, including generative models like ChatGPT, presents new opportunities and challenges for clinical simulation-based nursing education. Evidence related to their roles in pre-briefing, scenario guidance, feedback delivery, and standardized learning are still undefined.

Objective: This literature review aims to identify the best evidence related to AI chatbot applications across the phases of clinical simulation, synthesise evidence of their effectiveness in healthcare education and future directions.

Methods: Arksey and O'Malley framework (1) and PRISMA-ScR guidelines was adopted in the review process (2). This review includes studies published in English, through the literature search using ScienceDirect, PubMed, ProQuest Central, Scopus, and Web of Science (January 2015 to September 2025). Reference lists of included studies and relevant reviews were hand-searched for additional sources. Titles and abstracts were independently screened by two reviewers using standardized eligibility criteria, with disagreements resolved through discussion with a third reviewer.

Studies were included if they: (a) focused on AI chatbots (e.g., generative models such as ChatGPT or conversational agents) applied in clinical simulation-based nursing education; (b) involved undergraduate or postgraduate nursing learners as participants; (c) evaluated applications across simulation phases (for example pre-briefing, implementation or debriefing) in terms of outcomes including but not limited to knowledge, skills, confidence/ self-efficacy; (d) published between January 2015 and December 2025; and (e) reported in English. Exclusions comprised non-nursing disciplines, non-simulation contexts.

Data was charted using a 'Population-Concept-Context' strategy. Critical appraisal of individual sources was not conducted in this scoping review. Data were narratively synthesized



Results: Eleven studies involving nursing students or educators using AI chatbots in simulation were included.

Author, year, Affiliation of countries	Study location, population characteristics	Study methods	Description of intervention group
Benfatah, Elazizi (3), Morocco	Second-year nursing students enrolled in a nursing education program (N = 60, 30 per group)	Randomized controlled experimental	**Prebriefing** supported by an AI-powered chatbot that provided interactive, personalized guidance based on each student's profile
Benfatah, Marfak (4), Morocco	Nursing students from Higher Institute of Health Sciences (N = 12)	Single group descriptive quantitative study	**Intervention**: ChatGPT to practice communication skills
Benfatah, Youlyouz-Marfak (5), Morocco	Nursing students (N = 40, 20 per group)	Comparative study	**Debriefing** supported by AI-assisted chatbot
Lee, Kim (6), Korea	Final-year medicine students (N=19)	Randomized controlled experimental	**Intervention**: The AI chatbot provides scenario-driven responses and automated feedback
Liaw, Tan (7), Singapore	Nursing student in the university (N = 32)	one-group pretest-posttest mixed method design	**Intervention**: A voice chatbot learning to train the AI doctor.
Liaw, Tan (8), Singapore	University Nursing student (N = 64, 32 in each group)	A randomized controlled trial study (2 armed)	**Intervention**: A voice chatbot learning to train the AI doctor.
Reed and Dodson (9), United States	Nursing students (N=13)	Qualitative study	**Intervention**: The AI chatbot provides scenario-driven responses for cases of congestive heart failure and chronic renal failure
Rodriguez-Arrastia, Martinez-Ortigosa (10), Spain	Final-year nursing students (N=114) into 12 focus groups	Qualitative descriptive study	**Intervention**: AI chatbot to support nursing students in assessing and managing acute pesticide poisoning in a simulated rural primary care setting.
Vaughn, Ford (11), United States	Nursing Simulation facilitators (N=6)	Pilot exploratory study	**Debriefing**: A personalised chatbot to evaluate facilitator debriefing skills
Warlick, Clifton (12), United States	University nursing students enrolled in the Cardiovascular Perfusion Program (N = 21)	Pilot randomized, controlled trial. Pre-post intervention	**Intervention**: Chatbot as the education tool
Simsek-Cetinkaya and Cakir (13), Turkey	First year nursing students (N = 103)	Comparative intervention trial	**Intervention**: AI avatar to interact with participants in the screen-based simulation

Positive impacts have been found on students' confidence (N=3), student engagement (N=4), skill performance and knowledge development (N=5), while also reducing clinical anxiety (N=1) during preparation. Yet, barriers also existed such as technical limitations, integration complexity and ethical considerations. Faculty readiness and resistance are also the concerns.

Discussion/ implication: Across the literature, reported outcomes point to improvements in learner confidence, competencies in reltaed knowledge, and engagement when AI chatbots are integrated into simulation activities. Learners often value the immediacy and non-judgmental nature of chatbot feedback, which may lower the threshold for asking questions and permit repeated practice. However, limited evidence on effectiveness of AI chatbots are available and therefore it is in doubt that chatbots can translate into measurable improvements in clinical competence. Nevertheless, AI chatbots still have great potential to support structured debriefing, simulation development, and pre and post simulation reflection.

Conclusion: AI chatbots represent a promising innovation for simulation-based nursing education. To fully leverage their educational value, ongoing research and faculty training are necessary to maximize its value, ensure seamless integration and evaluate long-term educational impact.

Keywords: artificial intelligence, chatbot, clinical simulation, nursing education, generative AI, digital literacy, debriefing.

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Simulation for Synergy: Advancing Interprofessional Collaboration

References

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