

The Integration of Artificial Intelligence in Nursing Education: A Narrative Literature Review

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Abstract

Aims: This study aimed to synthesize the scientific literature on the integration of artificial intelligence (AI) into nursing education to significantly enhance learning outcomes. The application of AI in clinical teaching can enhance nursing students' preparation for a technologically advanced healthcare environment.

Methods: This study used a narrative literature review. Key electronic databases, including CINAHL, MEDLINE, Scopus, and Google Scholar, were searched according to the PRISMA guidelines. The review included articles published between 2020 and 2024, written in English, and employing qualitative and quantitative research designs. The search items included AI, ChatGPT, challenges, opportunities, nursing education, technology, students, teaching, and learning. Data were synthesized by summarizing the main results of the included studies.

Results: Ten studies met the inclusion criteria and were included in the review. The findings showed that AI can enhance clinical teaching, improve nursing students' self-efficacy, and support teaching and learning. However, challenges related to academic integrity, assessment quality, unequal access to AI, and inadequate skill development were also identified.

Conclusion: The findings of this study revealed that the use of AI in nursing education is instrumental in improving the acquisition of clinical skills and teaching and learning. Nursing education institutions should create awareness of the safe use of AI. Furthermore, policies should be implemented to ensure that AI use is controlled and adequately monitored. All stakeholders, including patients, students, nurses, and nurse educators, should be developed and provided with adequate resources for effective AI implementation.

Keywords: artificial intelligence, challenges, ChatGPT, learning, nursing education

Introduction

Since the inception of the Fourth Industrial Revolution (4IR), most higher education institutions have had no option but to keep pace with the evolution and development of new technologies. Similarly, healthcare facilities are highly digital environments (Araújo, 2020). The integration of AI into nursing education is crucial for aligning teaching and learning with rapid technological advancements in healthcare systems. Gunawan, Marzilli, and Aungsuroch (2022) envision that nurses will use technology to monitor and provide comprehensive care to patients with chronic conditions in the future. When using AI, nurses must be prepared to address the complex ethical dilemmas related to privacy and equality that may arise (De Gagne, 2023). In support, Dwivedi et al. (2023) posit that nurse educators play a pivotal role in ensuring that nursing students are well-grounded to render quality care in complex technological healthcare systems. Evidently, nurse educators must have insight into the benefits, challenges, and limitations of AI to make informed decisions about its

integration into nursing education (Abdulai & Hung, 2023; Dwivedi et al., 2023). One emerging technology that can support students' learning and nursing education is ChatGPT (Castonguay et al., 2023). The use of AI will help improve the learning experience and better prepare nurses for their roles in the healthcare industry (Liu et al., 2023). As healthcare increasingly relies on digital innovations and AI, nursing programs must adapt by providing comprehensive instruction in these domains.

ChatGPT is a generative pre-trained transformer that uses natural language processing to fulfill text-based user requests (Archibald & Clark, 2023). In this regard, it could offer more advanced, learner-centered content. Lecturers can use ChatGPT to provide individualized learning and customized, personalized feedback to their students (Lund & Wang, 2023). In addition, AI-enabled virtual patients can be used to replicate real-world situations (Secinaro et al., 2021). These scenarios help alleviate anxiety and enhance decision-making when solving problems. The integration of AI into nursing education has garnered significant attention because of its potential to revolutionize learning processes.

Several studies investigating the use of AI have revealed that AI is predominantly applied in direct patient care rather than nursing management and education. Nurses' and midwives' involvement in AI varied, with some taking an active role in testing, using, or evaluating AI-based technologies. However, these studies did not focus on the challenges and opportunities of AI integration into nursing education. The reported benefits were primarily potential, as most studies trained and tested AI algorithms. Risks and limitations included poor-quality datasets that could introduce bias, the need for clinical interpretation of AI-based results, privacy and trust issues, and inadequate AI expertise among professionals. El Arab, Al Moosa, Abuadas, and Somerville (2025) conducted the study synthesized findings on the impact of AI on ethical considerations, social implications, and educational strategies within the nursing profession. The study identified critical ethical and social challenges, including data privacy breaches, algorithmic bias, and a lack of transparency and accountability in AI-driven decision-making (El Arab et al., 2025). Martinez-Ortigosa et al. (2023) found that AI-based tools can improve patient care by accelerating diagnosis, enabling effective clinical decision-making, and optimizing the workflow. Although the advantages of AI-driven chatbots in educational settings are promising, there is a critical need for a comprehensive evaluation of the current research in this area. This entails identifying existing knowledge gaps and examining the successes and challenges of incorporating AI into the nursing curriculum. By conducting a literature review, we gained an understanding of AI's role in enriching the learning experience. This study aimed to synthesize the existing literature on integrating AI into nursing education.

Methods

A narrative literature review was conducted to explore and describe the challenges and opportunities of AI use in nursing education. This review followed the five steps outlined by Ferrari (2015) and provided a comprehensive overview. While systematic reviews aim for exhaustive and highly structured evidence synthesis, the current review sought to explore trends, conceptual developments, and emerging issues in a rapidly evolving field. Therefore, elements of the PRISMA framework were applied to enhance transparency in the search and selection process; however, this review did not aim to meet the strict methodological requirements of a systematic review. Instead, PRISMA was used as a guiding framework for rigor and reproducibility, to improve reporting.

The first step sets the study pace by providing a brief description of the phenomenon under study: the rationale, organization of the collected information, objectives, and

scope (Ferrari, 2015). To begin a narrative literature review, it is imperative to formulate a clear research question. This question should be specific enough to allow for an in-depth analysis, yet broad enough to encompass significant aspects of the topic. Defining a precise research question ensures that the review has a focused direction and purpose to achieve its objectives. The background and overview of AI and nursing education are outlined in the first section of this article.

The next step was to conduct a thorough literature search to identify relevant databases and sources, such as academic journals, books, and conference papers. The use of relevant search terms related to the research topic was a key aspect. A literature search entails a search strategy (databases, keywords), inclusion/exclusion criteria (types of studies, languages, time periods), verification of the availability of selected studies, and citation and listing of the references researched. PRISMA was carefully applied to systematically select relevant articles (Figure 1). The review focused on the following databases: CINAHL, EBSCOhost, ERIC, Google Scholar, MEDLINE, PsycINFO, PubMed, ScienceDirect and Scopus. The MESH guidelines were used to identify relevant key search concepts, which included the following: “Artificial Intelligence”; “ChatGPT”; “challenges”; “opportunities”; “Nursing Education” (Figure 2), (Table 1).

Table 1. Search strategy

Databases	Search Terms (Keywords and MeSH Terms)	Search Combination (Boolean Operators)
CINAHL	Artificial Intelligence; ChatGPT; Nursing Education; Students; Teaching and learning; Challenges; Opportunities	(“Artificial Intelligence” OR “Artificial Intelligence” OR “ChatGPT”) AND (“Nursing Education” OR “nursing students”) AND (“teaching” OR “learning”) AND (“challenges” OR “opportunities”)
MEDLINE (via PubMed)	Artificial Intelligence; Nursing Education; Technology; Students; Simulation; Chatbots	(“Artificial Intelligence” OR “machine learning”) AND (“Nursing Education”) AND (“students”)
Scopus	Artificial Intelligence; ChatGPT; Higher education; Nursing; Clinical training	(“Artificial Intelligence” OR “ChatGPT”) AND (“Nursing Education” OR “clinical training”)
Google Scholar	Artificial Intelligence; Nursing Education; Learning outcomes; Barriers; Implementation	(“Artificial Intelligence” AND “Nursing Education” AND “students”)
ERIC	Educational technology; Artificial Intelligence; Nursing training; Teaching strategies	(“Artificial Intelligence” AND “education” AND “nursing”)
PsycINFO	Artificial Intelligence; Learning behavior; Student engagement	(“Artificial Intelligence” AND “learning” AND “student engagement”)

According to Juntunen and Lehenkari (2021), selecting relevant literature involves gathering the most pertinent research articles. This process involved applying the inclusion and exclusion criteria to filter out studies that did not address the research question. The studies that met the inclusion criteria were peer-reviewed English-language articles published between 2020 and 2024. The inclusion and exclusion criteria were critically applied (Table 2).

Table 2. Inclusion and exclusion criteria of articles

Inclusion criteria	Exclusion criteria
- Peer-reviewed published articles in the years 2020 -2024 - Published in English - Type of articles: Qualitative, quantitative, mixed-method studies - Search terms relevant to the study - Articles addressing challenges and opportunities of AI in nursing education	- Unpublished reports, conference proceedings - Articles published in non-peer-reviewed journals - Any type of literature reviews - Articles with the population of any other discipline except for nursing - Not focusing on the topic under study - Published in any other language

Organizing the literature involves grouping studies according to themes, methodologies, or theoretical frameworks. Creating an outline that logically arranges the literature into sections or categories helps to structure the review. Highlighting the key findings, debates, and gaps in each section provides a clear and coherent narrative. This organization facilitates the synthesis of literature. The selection of articles followed the PRISMA guidelines, as depicted in Figure 1 (Moher et al., 2009). The application of the PRISMA flow chart in this literature review ensured transparency and credibility and virtually demonstrated how the literature was narrowed. In the initial search, 842 articles were identified. After checking for duplicates and screening titles and abstracts for relevance to the topic, 102 possible full-text articles were obtained. Subsequently, further screening excluded 92 articles, leaving 10 articles that met the inclusion criteria (Figure 1).

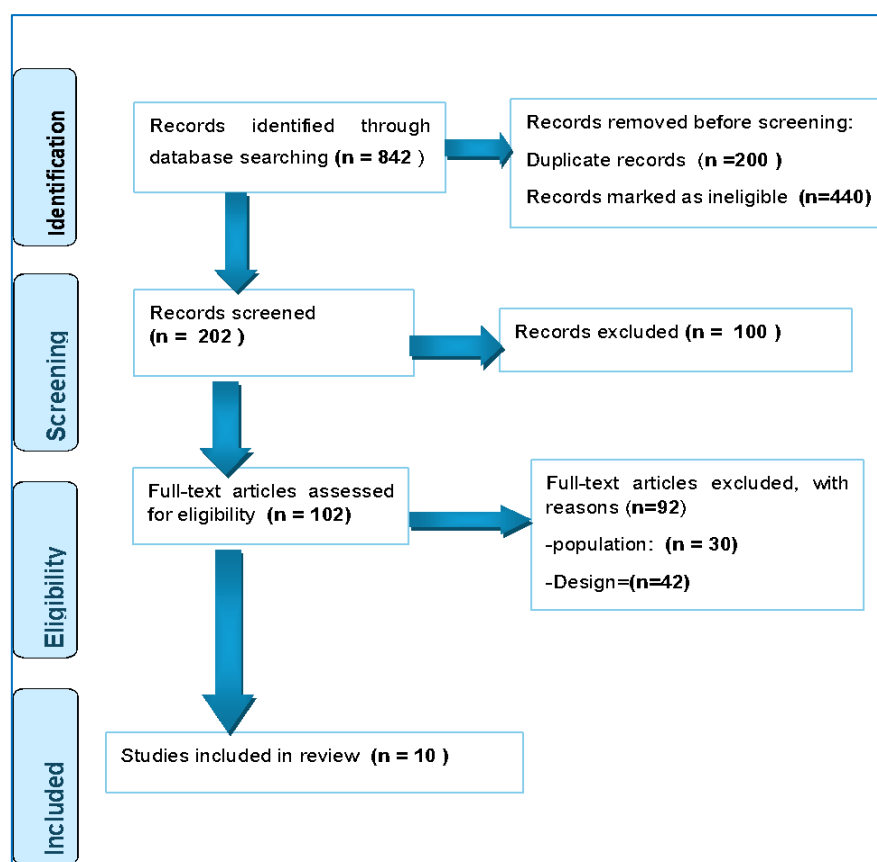


Figure 1. PRISMA flow diagram

This literature synthesis step involved engaging with, thoroughly reading, and interpreting the included research articles. This step also includes coding, categorizing, and classifying them together. The two authors participated in this

stage to minimize errors in the literature synthesis. Grade guidelines were also applied to eliminate any bias in the design, methodology, setting, results and sample selection (Balshem et al., 2011). Furthermore, the methodological quality of the selected studies was independently assessed by the two reviewers using the Critical Appraisal Skills Program (CASP, 2018). Ten methodological items were evaluated to assess the quality of the qualitative research articles (CASP, 2018). The methodology of all qualitative articles was rated as “yes (Y)” (Table 3).

Table 3. Critical Appraisal Checklist for qualitative studies included

Study/Criterion*	Reed et al., (2023)	Park et al.,(2022)
1. Aim and objectives clearly described	Y	Y
2. Methods appropriate	Y	Y
3. Design appropriate to address the aim	Y	Y
4. The recruitment of participants was adequately described.	Y	Y
5. Data collection was addressed.	Y	Y
6. The relationship between the researcher and participants has been adequately considered	Y	Y
7. Ethical issues adequately taken into consideration	Y	Y
8. Data analysis sufficiently rigorous	Y	Y
9. Findings clearly described	Y	Y
10. Value of the research is adequately described	Y	Y

(The Joanna Briggs Institute, 2017).

Key: Yes: Y; Can't tell =CN; No=N

The methodological quality of the quantitative and mixed-methods studies was assessed using eight methodological items, each scored as “Yes (Y),” (Table 4).

Assessing the strengths and weaknesses of each study and discussing its methodological limitations is essential. Highlighting the implications of the findings for the research question adds depth and insight to this review. In general, each article was critically evaluated based on the following: key results, limitations, suitability of the methods used to test the initial hypothesis, quality of the results, interpretation of the results, and impact of the conclusions. The included studies met 100% of the critical appraisal criteria.

The synthesis identified 10 articles that met the inclusion criteria and employed a diverse range of research designs. Among the included articles, seven were quantitative, two were qualitative, and one was a mixed-methods study. All articles were further classified according to author, year, country, and sample size. The author, year, country, and sample size further classified the 10 articles that met the inclusion criteria. The quality appraisal, together with these characteristics (Table 5). One article was published in each of the following countries: Australia, Israel, Jordan, Korea, the Philippines, Saudi Arabia, Singapore, Taiwan, Turkey, and the USA. Of the 10 articles, the majority (n=7; 70%) used a quantitative research design (Frost, Delaney, & Fitzgerald, 2020; Chang, Hwang, & Gau, 2022; Al-Qerem et al., 2023; Labrague et al., 2023; Simsek-Cetinkaya & Cakir, 2023; Makhoul et al., 2024; Saban & Dubovi, 2024). Two studies (20%) used a qualitative design (Park et al., 2022; Reed et al., 2023), while one used a mixed-methods design (Liaw et al. 2023) (Table 5)

Table 4. Critical Appraisal Checklist for quantitative and mixed-method studies included

Study/Criterion*	Simsek-Cetinkaya & Cakir (2023)	Chang, et al., (2022)	Frost et al., (2020)	Saban & Dubovi (2024)	Labrague et al. (2023)	Makhlouf, et al., (2024)	Al-Qerem, et al., (2023)	Liaw et al., (2023)
1. Inclusion criteria were clearly defined	Y	Y	Y	Y	Y	Y	Y	Y
2. Participants and the setting were described	Y	Y	Y	Y	Y	Y	Y	Y
3. Exposure was measured accurately.	Y	Y	Y	Y	Y	Y	Y	Y
4. Objective, standard criteria were used for the measurement of the condition	Y	Y	Y	Y	Y	Y	Y	Y
5. Were confounding factors identified?	Y	Y	Y	Y	Y	Y	Y	Y
6. Strategies to deal with confounding factors were stated	Y	Y	Y	Y	Y	Y	Y	Y
7. Outcomes measured in a reliable way	Y	Y	Y	Y	Y	Y	Y	Y
8. Appropriate statistical analysis was used	Y	Y	Y	Y	Y	Y	Y	Y

Source: JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies (2017)

Key: Yes=Y; No=N; Unclear=U; Not Applicable=N/A

Table 5. Grid synthesis of the articles included in the review. (n=10)

No.	Author; year; country	Type of AI	Methods	Sample	Summary of the findings
1	Simsek-Cetinkaya & Cakir (2023) TURKEY	AI Assisted Interactive Screen-Based Simulation	Quantitative comparative	Nursing students (n=103)	AI increased students' satisfaction, while their anxiety increased. AI-assisted simulation helped students acquire breast self-examination skills.
2	Reed <i>et al.</i> (2023) USA	AI image-generation	Qualitative exploratory descriptive design	Nursing students (n=4)	Positive emotional responses to images, gaining knowledge, and experience with AI. Self-reflection on students' moral and professional identity development and on biases/stereotypes of nurses that are not based on contemporary realities.
3	Chang, et al., (2022) TAIWAN	Chatbot	Quantitative quasi-experimental	Nursing students (n=36)	A mobile chatbot significantly improved students' learning achievements and self-efficacy. Students generally believed that the mobile chatbot could promote their self-efficacy, learning engagement, and performance in the vaccine training program.
4	Frost <i>et al.</i> (2020) AUSTRALIA	Mixed Reality technology	Quantitative and qualitative	Nursing students (n=171)	100% of students stated that the experience assisted in their learning: engagement in learning, and developing clinical judgment. This emerging technology has the potential to enhance clinical judgment and develop the ability to recognize physical cues in patients. The implementation of MR may also enhance student motivation.

No.	Author; year; country	Type of AI	Methods	Sample	Summary of the findings
5	Saban & Dubovi (2024) ISRAEL	Chat-based generative pre-trained transformer models (ChatGPT)	Quantitative cross-sectional	Emergency room registered nurses (n=30) ;nursing students (n=38)	ChatGPT depicted indecisiveness in initial assessments. ChatGPT suggested unnecessary diagnostic tests; -ChatGPT responses were inaccurate
6	Labrague <i>et al.</i> (2023). PHILLIPINES	AI technology	Quantitative cross-sectional	Nursing students (n=323)	Student nurses demonstrated moderate readiness to embrace AI. Moderate barriers to accessing AI technology. Potential barriers to accessing AI technology include a lack of computer skills and knowledge of AI, as well as time constraints.
7	Liaw <i>et al.</i> (2023) SINGAPORE	AI-enabled virtual reality simulation (AI-enabled VRS)	Mixed design	Nursing students (n=32)	Significant improvements in communication, knowledge, and self-efficacy were observed after learning. Positively on the acceptability, feasibility, and usability of AI-enabled VRS. The "human-like" feature of the AI medical doctor was rated the lowest. Experiences of virtual learning emerged: "relate to the real world", "AI versus human intelligence" and "complement with face-to-face learning."
8	Park <i>et al.</i> , (2022) KOREA	AI interview	Qualitative	Nursing students (n=14)	Vagueness, find your way, fight between AI and me, strong questions about interview evaluation, new experience, learn your own tricks for artificial selection interviews, setting up the environment for Artificial insemination interview, establishment of information system

No.	Author; year; country	Type of AI	Methods	Sample	Summary of the findings
9	Makhlouf,et al., (2024) SAUDI ARABIA	knowledge-based AI chatbot system	Quantitative	Nursing students (n=73)	AI provides access to evidence-based knowledge, offers quick and up-to-date answers and resources, empowers nurses to make informed decisions, and serves as a communication platform to enhance their practice.
10	Al-Qerem, Eberhardt, et al. (2023) JORDAN	NOT STATED	Quantitative	Healthcare professionals and nursing students (n=403)	Moderate AI knowledge was observed. Attitudes toward AI replacing human teachers. The barriers included a lack of knowledge, access, time constraints, and curriculum gaps.

The included studies met 100% of the critical appraisal criteria, as depicted in Tables 3 and 4 (CASP, 2018). Two themes emerged from the study, as depicted in Table 6, namely: 1) Opportunities regarding the use of AI in nursing education; 2) Challenges regarding the use of AI in nursing education

There are several opportunities for using AI in nursing education (Table 6). Seven of the ten articles stipulated that AI-enhanced clinical teaching and learning (Frost et al., 2020; Park *et al.*, 2022; Liaw *et al.*, 2023; Reed *et al.*, 2023; Makhoul et al., 2024) assisted nursing students in acquiring clinical skills, improving patient care developing clinical judgment and enhancing professional communication skills. Furthermore, the studies revealed that AI boosted self-efficacy among nursing students through a positive emotional response, learning satisfaction and motivation, self-confidence, self-reflection, and professional identity (Frost et al., 2020; Chang et al., 2022; Liaw et al., 2023; Reed et al., 2023; Simsek-Cetinkaya & Cakir, 2023). Eight of the ten studies found that AI improved teaching and learning (Frost et al., 2020; Chang et al., 2022; Liaw et al., 2023; Reed et al., 2023; Simsek-Cetinkaya & Cakir, 2023). According to Liaw et al. (2023), Makhoul et al. (2024), and Chang et al. (2022), AI effectively enhances students' CT. In addition, AI assists nursing students in gaining knowledge and experience, supports assessment and research, and provides timely feedback (Frost et al., 2020; Liaw et al., 2023; Reed et al., 2023; Simsek-Cetinkaya & Cakir, 2023; Makhoul et al., 2024).

The evidence from the reviewed studies highlighted several challenges related to the use of AI in nursing education (Park et al., 2022; Al-Qerem et al., 2023; Labrague et al., 2023; Simsek-Cetinkaya & Cakir, 2023; Saban & Dubovi, 2024). These studies cited threats to the integrity and quality of assessment: high plagiarism possibilities, bias and inaccuracies, and unfair advantage. Barriers to the use of AI in nursing education were also identified as challenges: lack of awareness and knowledge of AI, limited Internet access, and negative attitudes (Park et al., 2022; Al-Qerem et al., 2023; Labrague et al., 2023). Inadequate skills acquisition was also identified as a challenge due to ineffective skill development, inadequate physical interaction, and increased anxiety (Liaw et al., 2023; Simsek-Cetinkaya & Cakir, 2023; Saban & Dubovi, 2024)

Table 6. Themes and subthemes that emerged from the study (n=10)

Themes	Subthemes	Categories
Opportunities regarding the use of AI in nursing education	Enhanced clinical teaching and learning	Improved patient care Acquisition of clinical skill Development of clinical judgment Enhanced professional communication skills Positive emotional responses
	Improved self-efficacy amongst the nursing students	Learning satisfaction and motivation Self-confidence Self-reflection and professional identity This effectively enhances students' critical thinking
	Improving teaching and learning	Training in knowledge and experience with AI Assistance with assessment and research Timeous feedback

Themes	Subthemes	Categories
Challenges regarding the use of AI in nursing education	Threat to the integrity and quality of the assessment	Bias and inaccuracies Unfair advantage Lack of awareness and knowledge regarding AI
	Barriers to access to AI	Lack of access to the internet Negative attitudes Ineffective in gaining clinical skills Inadequate physical interactions
	Inadequate skills acquisition	Increased anxiety among students

Discussion

This narrative literature review aimed to synthesize the available literature on the use of AI in nursing education. The ten reviewed studies revealed two broad themes: 1) Opportunities regarding the use of AI in nursing education; 2) Challenges regarding the use of AI in nursing education (Table 6)

The reviewed studies unanimously agreed that AI offers several opportunities for nursing students (Hoffman et al., 2019; Frost et al., 2020; Park et al., 2022; Liaw et al., 2023; Reed et al., 2023; Makhoul et al., 2024). These results are consistent with those of Athilingam and He (2024). According to Athilingam and He (2024), ChatGPT can enhance personalized learning and ensure prompt, constructive feedback to students. Nursing students are expected to acquire the skills necessary to provide quality patient care. AI enhances clinical learning in nursing students. This notion may be related to the fact that all the studies highlighted that nursing students learned key communication skills and enhanced their clinical judgment. According to Buchanan *et al.* (2021), the use of AI simulation virtual patients allows students to practice and perfect their communication skills. Furthermore, AI helps nursing students advance their critical thinking skills and prepare for real-world patient care situations (De Gagne, 2023). According to Goktas, Kucukkaya, and Karacay (2024), AI tools such as ChatGPT can be incorporated into nursing education using Benner's novice-to-expert theory. Both lecturers and students can engage in ChatGPT-based virtual mentorship grounded in Benner's theory of skill acquisition. In this regard, the lecturer, as a mentor, uses ChatGPT to provide unique, individualized feedback that considers the nursing student's current level and stage of skill development (Goktas et al., 2024). The advantage of using generative AI chatbots is that the question-and-answer approach can be customized to support nursing knowledge and skills within Benner's framework (Goktas et al., 2024).

Most studies emphasized that AI enhances self-efficacy among nursing students (Frost et al., 2020; Liaw *et al.*, 2023; Reed *et al.*, 2023; Simsek-Cetinkaya & Cakir, 2023). As a result, nursing students developed self-confidence and emotional intelligence, leading to a more engaged and proactive approach to their education and future roles in healthcare. According to Kwak, Seo, and Ahn (2022), a positive attitude and Increased self-efficacy is likely to enhance the intention to use AI. This study revealed that AI improved teaching and learning among nursing students (Hoffman et al., 2019; Frost et al., 2020; Liaw et al., 2023; Reed et al., 2023; Simsek-Cetinkaya & Cakir, 2023; Makhoul et al., 2024). Nursing students are expected to learn and acquire important skills to analyze and solve problems and subsequently make informed and critical decisions (Kim, 2019; Benfatah *et al.*, 2024). The current study revealed that AI effectively enhances nursing students' critical thinking skills (Liaw et al., 2023; Makhoul et al., 2024). Similar findings have been emphasized by

Hoffman et al. (2019), Bates et al. (2014), and Topol (2019). The assertion is that AI allows students to explore and seek more information and facts to complete given tasks. This helps to sharpen the mind in seeking solutions, thus enhancing critical thinking skills.

The studies highlighted several challenges in the use of AI in nursing education (Park *et al.*, 2022; Al-Qerem *et al.*, 2023a; Labrague *et al.*, 2023; Simsek-Cetinkaya & Cakir, 2023; Saban & Dubovi, 2024). These challenges threaten the integrity and quality of assessments, hindering skill acquisition. The use of AI in nursing education has been viewed as a threat to the integrity and quality of assessments (Park *et al.*, 2022; Saban & Dubovi, 2024). According to Abd-Elaal et al. (2019), despite the availability of plagiarism detection tools, AI still offers ample opportunities for undetectable academic misconduct, which can be very difficult to prove. This could be attributed to the fact that some students might not even be aware of such an omission and thus, plagiarize and compromise the quality of assessments. Therefore, strict measures should be implemented to avoid compromising the integrity of assessments (Park *et al.*, 2022). Al-Qerem et al. (2023) and Labrague et al. (2023) identified barriers to the use of AI in NE, including a lack of awareness and knowledge of AI, lack of Internet access, negative attitudes, and difficulty in developing clinical skills. This could be related to the fact that most students, especially those from disadvantaged backgrounds, are likely to be labeled as having received “basic education without technology” and thus have limited use of electronic devices and gadgets. Individuals born before the widespread adoption of digital technologies may demonstrate lower initial adaptability to AI-based tools in NE than digital-native cohorts do. Students and educators with advanced technological proficiency are most likely confident in embracing and using AI (Labrague *et al.*, 2023). In that regard, Labrague *et al.* (2023) recommend that nursing students be adequately equipped with technological skills to prepare them to use AI and ultimately improve nursing care.

Inadequate skill acquisition was identified as another challenge regarding the use of AI in nursing education (Liaw et al., 2023; Simsek-Cetinkaya & Cakir, 2023; Saban & Dubovi, 2024). Nurses who utilize advanced technologies in healthcare settings, particularly those incorporating AI, must be prepared to navigate the complex ethical concerns related to privacy and equity arising from their use (De Gagne, 2023). Therefore, nursing education programs should equip students with the competencies required to excel in technologically advanced healthcare settings. This involves incorporating subjects such as data understanding, cyber ethics, and ethical considerations associated with the deployment of AI (De Gagne, 2023). In addition, Castonguay et al. (2023) suggested that when using AI in teaching, nurse educators should amend the curriculum and incorporate skills such as communication, human interactions, therapeutic use of self, critical thinking, and problem-solving. Thus, tools like ChatGPT can serve as important resources for both educators and students in nursing, aiding the practical application of Benner’s theory (Goktas et al., 2024)

Limitations

Some limitations were identified in this review. There was a dearth of literature conducted in the Sub-Saharan African countries, such as South Africa, resulting in a lack of evidence from this context, and a reduction of the generalizability of the study findings. Only English-language written studies were included in the study, which may have excluded valuable relevant studies in other languages indexed in other databases. Irrespective of these limitations, this review still contributes evidence about an imperative contemporary perspective on AI in nursing education

Contribution to Global Nursing Practice

Regarding global nursing practice, the study provides evidence that AI is used not only in patient care but also in nursing education. This clearly shows that the nursing students are also being prepared to practice in the technologically innovative global context. The study highlighted crucial findings indicating that implementing AI in nursing education is important, as it helps enhance quality patient care, which is a mandate of the WHO. At the same time, the gaps in the application of AI in nursing education should be addressed to ensure that global nursing practice is not compromised.

Conclusion

The findings of this study revealed that the use of AI in nursing education is instrumental in improving the acquisition of clinical skills in teaching and learning. nursing education institutions should raise awareness of the safe use of AI. Curriculum design must incorporate AI modules. Nursing education institutions should develop clear policies that establish guidelines on when and how AI tools can be used in teaching, learning, and clinical practice. Nursing students should be empowered to use AI as a support tool and not as a replacement for independent reasoning or original work. All stakeholders, including patients, students, nurses, and nurse educators, should be developed and provided with adequate resources for effective AI implementation. Although AI methods can enhance teaching and learning, they should not be used solely to replace the fundamental human interactive skills that are critical to providing quality patient care. Lecturers should incorporate AI into clinical training simulation laboratories, electronic health records, and remote patient monitoring tools to mirror real-world practices. Future studies should describe and explore measures to ensure the effective and safe application of AI in nursing education.

Conflict of interest

The authors declare that there is no conflict of interest

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Author contributions

CP conceptualized the study and conducted a literature review of the relevant literature. SHK applied the research methods used in this study. Both authors confirmed and validated the articles included in this study. CP and SHK collaboratively analyzed the data, finalized the manuscript, and proofread the manuscript.

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