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Integration of ChatGPT in Nursing Education: A Narrative Review

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Abstract

Incorporating artificial intelligence (AI)—primarily generative AI—into nursing education represents a significant shift in the way student nurses learn. In this narrative review, we summarize where ChatGPT, a complex AI language model created by OpenAI, sits in nursing education today. In fact, ChatGPT in education is growing, and is being used more often to enhance students learning processes. This AI chatbot generates text that would be similar to the course of a human conversation. It provides personalized tutoring, addresses challenging questions and helps with mock case studies. However, ChatGPT integration to nursing education faces some barriers. With constantly changing things, ChatGPT's information can be inconsistent. There is a constant need for updates (which keep pace with current standards) and one fear is that human interaction will be less frequent. Ethical problems on its use and place in complex educational content also is discussed along with the need for overall supervision. Overall, the review highlights that ChatGPT has great potential for improving nursing education; however, it must be carefully planned for and monitored to the extent possible. Much more needs to be done to know how ChatGPT shapes nursing education. Integration of ChatGPT into nursing education has benefits in terms of ease of use, personal learning and clinical reasoning. This AI tool complements the educators in providing more support, promotes interdepartmental collaboration, and helps educators overcome resource constraint through scalable and low cost AI tool. As nursing education continues to evolve, responsible integration of AI tools, such as ChatGPT, will become essential in progress and also improved patient outcomes associated with nursing education.

Keywords: *ChatGPT, AI, nursing education*

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INTRODUCTION

The incorporation of AI (Artificial Intelligence) in nursing education particularly generative AI is a significant innovation in the field of nursing education. Because AI technology is advancing at a fast pace, there is an exciting future ahead of nursing education to enhance learning experience, improve clinical reasoning, and streamline administrative processes. With innovations progressively implemented in education (**Athilingam & He, 2023**), nursing is on track for digitalization.

Generative AI represents an innovative edge in artificial intelligence distinguished by its capacity to produce new and novel content. Unlike traditional AI systems that centers on classification and prediction, generative AI models create original data that resembles their training inputs, spanning text, images, audio, and even video.

ChatGPT, an advanced generative AI model developed by OpenAI, is progressively being used in nursing education to make learning experiences and outcomes improvement. This advanced language model can create human-like text, offering tailored tutoring, responding to complex questions, and assisting in interactive case studies. Its heftiness permits it to act even when users make grammatical errors with inaccurate wording.

ChatGPT's wide availability and user-friendliness with multiple language support is breaking barriers of artificial intelligence (AI) technology, allowing people with limited technical backgrounds or financial resources to access AI technology easily (**Tam et al., 2023**). Its assimilation into nursing curricula supports varied learning styles and offers mountable educational resources, making high-quality education more available and appealing. As a result, ChatGPT is poised to considerably contribute to the development of nursing education.

Nursing education today is at the lead of incorporating contemporary technology to prepare students for the intricacies of modern healthcare. Unifying hands-on clinical training and academic coursework, nursing curricula now incorporate cutting-edge technologies such as simulation laboratories, virtual reality, and online learning platforms, making sure that graduates are proficient at using the latest healthcare technologies and are well-prepared to deliver high-quality, patient-centered care in a fast progressing healthcare landscape. Nursing education is critical for nurses to deliver quality health care; incorporating AI into education can enhance the learning process and better equip nurses for their health care roles (**Liu et al., 2023**). Many people deem ChatGPT as the first genuine and universal AI product; it is thus not surprising that a wide variety of concerns have been raised about ChatGPT, especially given its popularity and versatility (**Miao & Ahn, 2023**).

This narrative review captures the existing state of ChatGPT Artificial Intelligence integration in nursing education, highlighting the benefits, challenges, and impact on student learning outcomes.

Objectives

This paper aims to synthesize current evidence on the integration of ChatGPT in nursing education. It seeks to examine how ChatGPT is applied in nursing education, identifying the benefits and challenges associated with its use and its impact on learning. this study specifically sought to address the following questions:

1. How is ChatGPT integrated into nursing education?
2. What benefits of ChatGPT integration are reported in the literature?
3. What challenges are identified in the implementation of ChatGPT in nursing education?
4. What is the reported impact of ChatGPT integration on student nurses' learning performance?

METHODS

This narrative review encompasses a comprehensive literature search using the keywords "nursing education" and "ChatGPT". Scopus, PubMed and CIHNAL databases were selected for their broad coverage of peer-reviewed literature and multidisciplinary resources. The following keywords were used to perform the search: "nursing education" AND "ChatGPT".

Initial search was conducted in both Scopus, PubMed and CIHNAL using primary keywords: "nursing education" AND "ChatGPT." Filters were applied to include only peer-reviewed articles, published within the last ten years (2014-2024), to ensure the review incorporates the most recent and relevant research.

Search results were further refined by including boolean operators to capture a broader range of relevant studies. Duplicates and articles not relevant to the topic based on titles and abstracts were excluded.

Inclusion criteria includes articles that are peer-reviewed, publications must be in English, studies should focus on the integration or application of artificial intelligence in nursing education. Both qualitative and quantitative studies are included, review articles, empirical studies and theoretical papers are considered.

Articles not directly related to nursing education and artificial intelligence, publications not in English and studies focusing solely on clinical applications of AI without educational component are excluded.

Screening and Selection commences by conducting an initial screening of titles and abstracts to exclude studies that do not meet the inclusion criteria and selecting articles that appear relevant for full-text review. Initial screening yielded 84 articles and 49 titles were found not appropriate while 6 abstracts were excluded, 4 were not in English as well as 4 were duplicates. After filter we came up with 21 articles for review.

Retrieval and review of the full text of selected articles is done by assessing each article for relevance and quality, ensuring it meets the inclusion criteria and documenting the reasons for exclusion of any articles.

Key information from each included study, such as author(s), year of publication, study design, methods, key findings, and implications for nursing education are organized in a standardized format for analysis and synthesis. Thematic analysis is performed to identify the main themes and trends in the literature. Studies are grouped based on their focus areas such as AI applications in curriculum development, teaching methods, student outcomes, and challenges in integration, synthesizing the findings narratively, providing a comprehensive overview of the current state of knowledge.

Quality and rigor of the included studies are assessed using appropriate critical appraisal tools and the methodological soundness, validity and reliability of the studies were evaluated to ensure a robust synthesis of the literature

RESULTS and DISCUSSION

Artificial intelligence (AI), especially ChatGPT, is being increasingly examined in nursing education. This review offers a philosophical perspective on its integration into nursing education, drawing from pragmatism and constructivism.

From a pragmatic viewpoint, ChatGPT improves critical thinking and decision-making by providing scenario testing, feedback, and flexible learning pathways. It supports competency-based nursing education by making knowledge more accessible and practical.

Constructivism focuses on the creation of knowledge. ChatGPT can serve as a conversation partner, helping students think through problems and case studies. However, it needs faculty supervision to prevent shallow learning and ensure meaningful engagement.

Enhanced Learning:

Artificial Intelligence (AI) in education is set to transform traditional teaching methods. Qu et al. (**2022**) state that by combining AI with education, a new development model will be forged, and better learning outcomes will emerge. Briganti and Le Moine (**2020**), in recognition of the potential benefits of AI, emphasized the increasing importance of AI for healthcare. They suggested adding AI education to medical and nursing school curricula. If we want to prepare our students for the future, we must first understand attitudes of student nurses toward AI. Furthermore, a positive view on ChatGPT by students indicates its capability to revolutionize medical education and improve communication skills (**Bentafah et al., 2024**). ChatGPT can be utilized to enhance nurses' training by providing tailored and interactive learning experiences (**Sharma & Sharma, 2023**).

Additionally, large language models could improve nursing education by providing customized learning experiences, organizing curriculum development, and fostering problem-solving skills among students (**Hobensack et al., 2024**). Furthermore, ChatGPT is electronically available online, hence, it offers accessibility to diverse educational resources. ChatGPT enables students to access educational resources on their own terms and at their own pace, leading to an enriching learning experience (**Choi et al., 2023**). With ChatGPT, nurses can obtain information on an extensive range of topics related to healthcare, including patient care, clinical skills, and medical research (**Sharma & Sharma, 2023**).

In summary, students utilize the searching and summarizing capability of ChatGPT to provide tailored, go-at-your-own-pace learning. With around-the-clock availability, it provides a more holistic approach to a variety of learning needs (**Tam et al., 2023**). They can use ChatGPT to inquire about study materials and receive a prompt reply. ChatGPT may also be used for generating customized study notes (**Tam et al., 2023**).

Clinical Scenario Simulations

The benefits associated with using ChatGPT in nursing education through clinical scenario simulations are numerous. It helps in developing analytical skills, communicative skills, and applied knowledge that prepares the students to be competent when going into the real healthcare settings. This can then be achieved by allowing students to engage with the learning experience and create real impact. Furthermore, ChatGPT's efficiency in generating realistic clinical scenarios indicates a promising educational potential to educators, assisting in the design of classes and curricula (**Shorey et al., 2024**).

Moreover, it also has been seen that the integration of AI tools such as ChatGPT is an effective adjunct to formal teaching, to ensure the capability of students in their real engagement with healthcare (**Bentafah et al.,2024**). A successful patient empowerment is derived due to the engaging encounter provided by simulation-based training in which students develop pragmatic skills. Communication skills acquired here further strengthen their ability to navigate complex healthcare scenarios. The incorporation of ChatGPT pioneers a new approach, providing a tool that can enhance learning through naturalistic conversations (**Bentafah et al.,2024**).

Besides, the use of immersive learning, communication skills, and technology provides the student with a more complete preparation before the actual task and enhances student participation and proficiency (**Bentafah et al., 2024**).

Overall, the use of ChatGPT as a standardized patient has been found to be beneficial in addressing training deficits in traditional training programs and improving students' skills and knowledge in patient interactions (**Bentafah et al., 2024**).

Administrative Support and Efficiency:

ChatGPT can greatly accelerate the administration of nursing education by automating many repetitive, time-consuming manual activities, including scheduling and answering frequently asked questions. First, there is broad consensus concerning potential benefits of ChatGPT in nursing education, including supporting educators in curriculum development, tailoring student learning experiences to students' needs, and enabling translation processes (**Yalcinkaya & Yucel, 2024**). ChatGPT and similar applications have an important role to play in nursing curriculum innovation. These include tailored feedback and recommendations, language interpretation, interactive learning, and flexible learning, among others (**Thakur & Thakur, 2023**).

Moreover, the potential of this application in nursing curriculum development needs to be identified by the instructional designers and curriculum specialists. While there are concerns that ChatGPT could be abused for a number of malicious uses, the benefits of using ChatGPT exceed the dangers (**Thakur & Thakur, 2023**). In this regard, educators can customize responses of ChatGPT to fit learning objectives, and instructional strategies, thus, adjusting the responses based on the teacher's information needs. Creating targeted prompts, personalizing the language of responses, or incorporating supplemental resources or activities to enhance the resulting content (**Thakur & Thakur, 2023**) would be some examples of this.

ChatGPT can also boost scientific writing, facilitate fairness, and it can be useful to healthcare research by improving the workflow and generating a quick and logical answer (**Alkhaqani, 2023**). It is able to help researchers in clinical information search and evidence-based information synthesis (**Alkhaqani, 2023**). The precise and potential use of ChatGPT can assist nurses to utilize clinical decision support (**Sharma & Sharma, 2023**). ChatGPT has the potential to transform nursing education and research by making it an expeditious process (**Alkhaqani, 2023**). Its ability to write manuscript drafts, propose enhancements, and improve the quality of research outcomes can streamline research processes and strengthen the overall quality of manuscripts (**Shorey et al., 2024**).

Furthermore, ChatGPT can help structure a manuscript and also improve writing quality for better results instead of letting ChatGPT create context from scratch. ChatGPT can also be used to support construction of the methods section of a research paper through suggestions for statistical analyses and words to frame the explanations on the study procedures (**Castonguay et al., 2023**).

On the other hand, researchers, even with its limitations when using ChatGPT, can save their time specially when combined with plugins. For example, ChatGPT can currently assist with searching for scientific references, or synthesizing lengthy, intricate documents like policies and laws (**Castonguay et al., 2023**).Another application for educators is for drafting course materials such as study guides, test questions and essay topics as well as administrative paperwork or email responses (**Tam et al., 2023**). Several areas have been identified where large language models are poised to positively impact clinicians, such as facilitating patient communication, off-loading administrative tasks,

and improving clinical decision-making (**Yu et al., 2023**). AI-Chatbot technology can be valuable in aiding nurses with some burdensome tasks such as drafting paperwork, answering nursing inquiries, directing patients to different departments within a hospital and training caregivers, which can ease some burdens relating to nurse shortages and burnout (**Tam et al., 2023**).

Importantly, ChatGPT could reduce repetitive writing, summarize long lists of patient information, and simplify complex instructions to increase patient compliance and adherence (**Scerri & Morin, 2023**). However, others argue that automated consultations and feedback for decision-making in healthcare can profoundly influence the nurse-patient relationship (**Parviainen & Rantala, 2022**).

Additionally, the use of ChatGPT in teaching and learning can generate content such as summaries, reviews, and essays and act as a virtual tutor, providing students with one-on-one instruction and answering questions in real-time (**Scerri & Morin, 2023**). Trained on big data, ChatGPT is probably more knowledgeable than many human instructors in almost every discipline, especially on basic- to moderate-level topics (**Miao & Ahn, 2023**).
Moreover, ChatGPT can be used to create lesson plans and course materials, which benefits educators by streamlining the preparation process, as well as helping students improve their comprehension and the organization of their oral presentations (**Castonguay et al., 2023**).

Overall, the use of ChatGPT in teaching and learning represents a promising new frontier in educational technology. I has the potential to save teachers time and effort in grading assignments while providing students with more detailed and constructive feedback on their writing (**Athilingam & He, 2023**).

Student Engagement and Motivation:

ChatGPT impacts student competencies such as clinical reasoning specifically their ability to gather cues, synthesize information, look for problems, and decide on solutions. ChatGPT can improve this competency by creating realistic patient scenarios that will engage students to identify signs and symptoms and generate possible nursing diagnosis. For instance, when given a case of a patient with difficulty of breathing, ChatGPT can guide learners to consider differential causes, align pathophysiology with subjective and objective assessment findings and generate nursing priorities. Conversely, over-reliance on AI generated reasoning poses the risk of shallow analysis if students do not respond critically. Faculty should encourage learners to validate AI generated context against existing evidence and clinical judgment.

The integration of ChatGPT into nursing education considerably improves student engagement. It offers a comprehensive tool that trains students for the complexities of contemporary healthcare. This innovative method ensures nursing education remains dynamic, reachable and effective in nurturing well-prepared health care professionals. ChatGPT can also provide a more experiential learning environment, despite occasional inconsistent responses (**Bentafah et al.,2024**).

A case study approach based on Benner's theory," demonstrates that the customization of an AI-based conversational chatbot fosters the development of nursing knowledge and skills; this article elucidates the integration of Benner's theory into ChatGPT capabilities, addresses bias issues, and establishes best practices for the safe and effective utilization of AI in nursing (**Goktas & Agildere, 2023**).

Hence, ChatGPT can be made part of learning management systems, applications and websites to provide prompt responses to students' inquiries. Satisfaction of students can be improved by minimizing wait times and

providing prompt assistance. The model can also save time of nurse educators by automizing answers to the same questions repeatedly (**Choi et al., 2023**). Nurses can receive training and assistance from anywhere as long as there is internet connection, making it more convenient for nurses in remote areas to acquire the same degree of training as those in highly urbanized or affluent areas (**Sharma & Sharma, 2023**).

Additionally, research and studies have indicated the relationship between teacher and ChatGPT or, how they could use each other in the classroom (**Zheltukhina et al., 2024**). ChatGPT, when used well, has the potential to enrich nursing education through improving student interaction with technology, making the process for accessing information faster, and stimulating text-based information production skills (**Yalcinkaya & Yucel, 2024**). There are studies investigating ChatGPT's influence in student writing, academic integrity, as well as research tool potential (**Zheltukhina et al., 2024**); the impact of a ChatGPT tool may affect how well students can write their own pieces in their courses. The American Psychological Association (APA) recommends using ChatGPT for teaching and learning and states that ChatGPT can help students be better prepared for the real world by encouraging critical reasoning (**Abramson, 2023**).

Ethical and Privacy Considerations:

Consideration must be put into ChatGPT's ethical use in nursing education such as data privacy, bias, academic honesty, authorship, and accountability. Through rigorous adherence to ethical guidelines as well as ensuring that students and teachers are trained in responsible AI use, the possible advantages of ChatGPT can be realized while eliminating the potential risks. This impartial approach ensures AI contributes to nursing education while not breaking ethical values. The ethical use of ChatGPT is crucial to prevent repercussions (**Alkhaqani, 2023**).

Furthermore, Alkhaqani (**2023**) identifies that there is evidence indicating that a predominant theme is the effect of ChatGPT on academic integrity and critical thinking in nursing education. As a result, there is worry that ChatGPT could reduce student creativity in their work, and so reduce the practice in critical thinking. Over dependence on the use of ChatGPT in nursing education and research may lead to less mentorship, interprofessional collaboration, and critical reasoning, which could contribute to inaccuracy in nursing training and research (**Wingard, 2023**).

In addition, students might depend on ChatGPT to produce context for written assignments like essays, and submit these as original copy thereof. This practice may constitute plagiarism or contract cheating, which is an act of academic incivility that goes against nursing professionalism (**Choi et al., 2023**). Due to its ability to foster cheating and reduce the ability of students to provide original context, educators perceive ChatGPT as a danger to academic integrity (**Alkhaqani, 2023**).

Furthermore, according to O'Conor (**2022),** students can easily use ChatGPT to cheat on tests, leading to the loss of creative ideas and the inability to present a convincing argument. However, the decision to cheat or not often, as Professor Xie and Anderman (**2023**) report, is often linked to the very way academic assignments and tests are built and scored, not to the availability of technological shortcuts.

In addition, abuse of these technologies without ethical standards can encourage bias and discrimination in healthcare when the data used to train these systems reflects social pre-conceptions (**Sharma & Sharma, 2023**). It poses a challenge in terms of its credibility and ethical use in healthcare education and research by reinforcing societal biases and providing inconsistent references (**Shorey et al., 2024**).

On the other hand, a limitation comes from the concern of using the same tools that can be used to reformulate the content to avoid plagiarism, resulting in an increase in publications without a proper level of expertise in the field (**Alkhaqani, 2023**). Academics have worried about the impact of ChatGPT on the writing of scientific papers (**Flanagin et al., 2023**). As a result, plagiarism checks have become a cause of concern among academia. Educators need to teach students about using AI- Chatbots wisely. This involves issuing explicit guidelines in terms of when and how to ethically apply these tools, and the value of critical thinking, originality, and citation, in the application of such concepts (**Tam et al., 2023**).

Moreover, the volume of assignments that nurse educators need to grade can be overwhelming, making it difficult for them to thoroughly examine each assignment for signs of AI-generated content. This is particularly challenging in large classes or in institutions with limited resources. As AI technology continues to evolve, there is a need to develop more sophisticated software programs to detect AI-generated written assignments (**Choi et al., 2023**).

Finally, to address the plagiarism issue, the plagiarism detector tools have already included the capability of detecting content created using ChatGPT in student assignments (**Caren, 2023**). In April 2023, the plagiarism detector "Turnitin" announced the software has AI writing detection capabilities in the Turnitin Feedback Studio (**Caren, 2023**). However, although there are softwares developed to detect AI-generated text, its accuracy is uncertain. Furthermore, such detection systems can only provide a detection-score, which may not be enough evidence to prove plagiarism definitively (**Tam et al., 2023**).

The issue of plagiarism extends to authorship and accountability, ongoing debates exist regarding authorship rights for ChatGPT, with prominent publishers advocating against its inclusion as a coauthor, raising questions about accountability and recognition (**Shorey et al., 2024**).

In other words, the AI and ChatGPT cannot take responsibility for the responses and cannot be held accountable for the actions or decisions. Thus, nurses will remain accountable for their education and clinical decisions, even if these have been taken based on the ChatGPT responses (**Chang et al., 2023**). It is also essential to realize that modern AI language models, such as ChatGPT, are not perfect, and data privacy, bias, reliability, and transparency remain issues that need more research (**Castonguay et al., 2023**).

In addition, we should be cautious and ensure the appropriate guidelines when deploying AI-Chatbots in health systems. It is important that these steps are taken to maintain trust and ethical standards are maintained (**Tam et al., 2023**). Ethical concerns of the use of ChatGPT have also been addressed, with some solutions to address ethical dilemmas found in educational contexts (**Zheltukhina et al., 2024**). The balance is crucial in this era of technology, alongside interpersonal engagement, particularly given the current state of global nursing education. New technologies offer efficiency and accessibility, yet we must not lose the most basic human capacity — empathy and critical thinking. Leveraging too much technology in nursing may lead to a lack of empathy and human connection, which is an essential aspect of nursing practice (**Sharma & Sharma, 2023**).

Therefore, when it comes to how ChatGPT and the Metaverse are going to be integrated into nursing work, it should be handled with caution. Sharma & Sharma (**2023**) argue that those technologies need to be used appropriately and ethically to support conventional teaching approaches and human expertise.

Overall, students must be educated against the malicious use of ChatGPT but ensure that they are taught to distinguish between fact and fiction and the consequences that could come with the use of ChatGPT (**Xie & Ander-man, 2023**).

Adaptation and Regulation:

Adaptation and regulation are essential to harness the full potential of new technologies. Ensuring that AI tools like ChatGPT are effectively integrated into curricula requires continuous adaptation to technological advancements and the establishment of robust regulatory frameworks to address ethical concerns and maintain high standards of practice.

First of all, Institutions of higher education need to adapt quickly by providing staff training and implementing comprehensive policies to regulate the use of ChatGPT (**Alkhaqani, 2023**). Nurse educators need to have some first-hand experience with ChatGPT and its possible uses in nursing education. They require training with the key points about ChatGPT: capabilities, advantages and disadvantages. They should also cover ways in which ChatGPT can improve teaching effectiveness, as well as issues like plagiarism and contract cheating. Training must also address strategies in detecting and preventing plagiarism and contract cheating that are attributable to ChatGPT (**Choi et al., 2023**).

Well, institutions of learning must understand the value of training faculty and staff to appreciate these AI technologies like ChatGPT. This training will teach them how to use this as a great learning tool. Academic administrators must invest time and budget in faculty skills development, including use, and understanding of the functions and features of AI (**Castonguay et al., 2023**). Second, research has examined the usage of ChatGPT in teaching and research. They provide teachers with instructions to integrate (**Zheltukhina et al., 2024**). Reflective practice-based essays can help reduce reliance on ChatGPT in nurse education. Rather than asking students to write an essay on a specific topic, reflective writing encourages nursing students to critically analyse their own experiences and consider ways in which they can improve their future practice (**Choi et al., 2023**).

Also, nurse educators need to learn the appropriate use of ChatGPT, to play the role of a nurse educator by starting the prompt with the words "Act as a nurse educator" and customizing the ChatGPT response even further by adding descriptors and facts to its responses. A descriptor is simply an adjective that one can add to tweak the prompt for an optimum response (**Athilingam & He, 2023**).

In addition, Nursing and other health professions face a challenging decision about whether or not to respond to the emergence of ChatGPT. Avoidance may stem from many causes, including fear of technology and its potential influence on higher education (**Alkhaqani, 2023**). When the New York State banned the use of ChatGPT in public schools, the media responded, "Don't Ban ChatGPT in Schools. Teach With It," thus encouraging educators to use ChatGPT (**Roose, 2023**). While the underneath ethic concerns (eg, on plagiarism) are completely legitimate, the ban of ChatGPT may not last long for many reasons, one of which is that Microsoft is integrating ChatGPT into their prevailing Office products under the name brand Microsoft 365 Copilot. Our educators and policy makers may need to rethink and reshape our education system by allowing students to use ChatGPT as a learning assistant (**Miao & Ahn, 2023**). In contrast, Singapore's government announced in February 2023 that it plans to incorporate AI-Chatbot technology into higher education teaching and learning, becoming the first country to express a national policy in support of integrating AI-Chatbot technology into its education system (**Tam et al., 2023**).

Furthermore, It is not realistic or feasible to ban students' use of ChatGPT in a technology-savvy era. Nurse educators should instead view ChatGPT and other AI chatbots as tools to supplement traditional teaching approaches (**Choi et al., 2023**).

Moreover, approaching the integration of AI tools such as ChatGPT into curricula with cautious curiosity, rather than taking the stance to ban it entirely from programs through policy or policing the use is recommended (**Rudolph et al., 2023**). Nurse educators should exhibit an appreciative inquiry for new technologies in both nursing education and practice (**Castonguay et al., 2023**).

Also, while ChatGPT can have the potential to inform providers on a variety of nursing topics, it is imperative that the credibility of that information is validated (**Alkhaqani, 2023**). The students should also evaluate the knowledge provided by AI chatbots to determine if it is accurate, relevant, and credible. Encouraging them to think critically and solving problems through problem solving where a solution is found upon answering a response from AI chatbot (**Tam et al., 2023**). And in addition, nurse educators should help students with critical and independent thinking skills for assessing information presented by ChatGPT (**Choi et al., 2023**). They should explain the limitations of ChatGPT to students. The chatbot, for example, does not offer clinical judgments or factors specific to a client. The answers generated by ChatGPT may be inappropriate or not relevant to a particular context of a student question. The students should be taught to think about the context of their questions and to question whether the responses generated by ChatGPT are relevant and appropriate. Perhaps most importantly, the chatbot does not serve as surrogate for human or human-like clinical thought or humanistic treatment and caring (**Choi et al., 2023**).

In addition, nurse educators should thus take a close look at their curricula and contemplate incorporating the acquisition and evaluation of skills that are more related to human interactions and communication, such as empathy, active listening, critical thinking, and problem-solving. While ChatGPT can assist with certain aspects of nursing education, it cannot replace the importance of these fundamental human skills that are crucial to providing high-quality patient care (**Castonguay et al., 2023**). At a strategic level, nursing educators need to work closely with their nursing associations to ensure the national educational competencies and frameworks represent the growing area of AI and the impact it will have on nurses and students alike (**Castonguay et al., 2023**).

Also, there is a call for flexible assessment methods to keep up with the rapid development and scalability of AI technology in nursing education (**Alkhaqani, 2023**). As AI-Chatbot technology becomes more prevalent, educators must proactively adjust their curricula, pedagogy, learning outcomes, teaching activities and assessments. This may involve creating assessments that prompt students to think critically, reflect on their learning, and apply their knowledge creatively (**Tam et al., 2023**).

Additionally, ChatGPT is not set up to give advice or consultation due to fatal inaccuracies since ChatGPT generates incorrect or misleading information and produces offensive or biased content (**OpenAI, 2023**). There is a need for human oversight and policies to regulate the data generated by AI systems like ChatGPT (**Alkhaqani, 2023**). Academic integrity is imperiled by ChatGPT. To reduce the risk of inappropriate use, institutions must employ academic integrity rules, detection software, and ChatGPT training for staff. (**Alkhaqani, 2023**). We require a human intellect and a set of policies to cross-check the data generated by such AI systems and to regulate their access (**Biswas, 2023**). The Ohio State University addressed these concerns by developing clear policies and guidelines for using ChatGPT by students (**Xie & Anderman, 2023**). To deal with contract cheating involving ChatGPT, nurse educators play an important role in teaching their students about the importance of academic honesty, the value of critical thinking

and the consequences of contract cheating (**O'Connor, 2022**). While it can assist with medical education and clinical decision-making, it is not a substitute for human intellect and critical thinking. Therefore, it is essential to use ChatGPT with caution and responsibility (**Alkhaqani, 2023**).

Challenges, Risks and Controversies:

The integration of AI technologies in nursing education brings significant challenges, risks and limitations. Addressing these is crucial to ensure enhancement rather than undermining educational and healthcare practices. In a qualitative study done by Liu et al. (**2023**), they reported that at the beginning of being exposed to AI and project tasks, most students feel unfamiliar and confused. However, students are able to combine their thinking with AI to complete tasks during adaptation stage, which is different from blind reliance on generative AI tools (**Hosseini et al., 2023**).

In this series of dynamic changes, the most important thing is that teachers should demonstrate to students the operation methods and usage responsibilities of AI through practical applications, which can enable students to grasp the technology and help dispel the fear of the unknown (**Hosseini et al., 2023**).

Additionally, the integration of AI, including tools like ChatGPT, in nursing education is a subject of debate, with stakeholders acknowledging both the benefits and challenges associated with its implementation (**Yalcinkaya & Yucel, 2024**).

The challenges and controversies of using this technology include reduced students' thinking abilities, and those who rely too much on technology may tend to abuse the technology (**Athilingam & He, 2023**). Nurse educators have certainly taken notice of ChatGPT and expressed concerns about the potential misuse by students to outsource assessments and generate a passable response to a given prompt (**Castonguay et al., 2023**).

Furthermore, If nursing students rely heavily on ChatGPT for answering questions during their learning process rather than actively engaging with the course materials and other valuable sources of information, such as textbooks and academic journal articles, they may not develop the necessary skills to identify, appraise, analyze and synthesize information on their own (**Choi et al., 2023**).

Evidence-based nursing practice is a cornerstone of modern nursing care, and nurses must be able to critically evaluate research findings and other empirical evidence to improve nursing practice, which ultimately leads to better care for their clients (**Choi et al., 2023**).

Some interesting questions include whether researchers who know better about AI technologies and have more access to AI tools will be able to do better research in terms of, for example, productivity and quality (**Miao & Ahn, 2023**). Utilization of ChatGPT comes with risks, attention should be paid to cultivating students' creativity, collaboration, communication, and critical thinking, cultivating their AI literacy, exploring effective ways to cultivate their digital literacy and AI literacy, and fundamentally solving the potential risks and negative impacts in the application process of AI technology (**Kong et al, 2024**).

Furthermore, using AI simultaneously increases the risk of unforeseen outcomes, discrimination, and ethical issues caused by malfunctions and incomplete technology related to AI medical devices; the alteration and bias of information due to a lack of accumulated data or learning errors in AI; and the invasion of privacy, which is also growing (**Hashish et al., 2024**) and might be dangerous to the nursing profession (**Hassan Mekawy, et al., 2020**).

In addition, there are fears that ChatGPT's compulsion to provide prepared content can inhibit the growth of critical thinking, problem-solving, and interpersonal skills in healthcare students and researchers (**Shorey et al., 2024**). Meanwhile, worries around ChatGPT generating automated content that is simply not genuine but needs to be looked carefully to establish that its authenticity matters create issues for researchers (**Shorey et al., 2024**). The impact of ChatGPT on job security, creativity, critical thinking and problems with plagiarism and inaccuracy are discussed (**Zheltukhina et al., 2024**). Though those are a few of the concerns, additional research is showing advantages ChatGPT can bring to education and research (**Zheltukhina et al., 2024**).

Additionally, though ChatGPT is capable of accurately describing cases in content terms, it has been also highlighted that the nursing diagnoses it produces do not correspond to standard classifications. Such difference can ultimately create errors on patient care (**Yalcinkaya & Yucel, 2024**).

Similarly, using ChatGPT in scientific papers raises ethical concerns, both medicolegal and copyright, plus the risk of incorrect content. It could help writing papers with evidence from online search engines; however, it cannot go through an exhaustive literature search let alone do critical analysis and discussion (**Alkhaqani, 2023**). Too much reliance on ChatGPT as a main source of information and decision-making tool, with little monitoring of it from healthcare experts or validation, may lead to poor outcomes and potentially harmful advice (**Sharma & Sharma, 2023**). Although ChatGPT is able to provide information on several nursing issues, it is essential to verify that the information is accurate and reliable (**Alkhaqani, 2023**). So we should concern ourselves about this situation. Students who depend excessively on ChatGPT may misinterpret a concept. That misunderstanding would undercut their ability to deliver safe and effective care. This may eventually affect the development and growth of the nursing profession (**Choi et al., 2023**).

In addition, depending too much on ChatGPT in learning activities might result in students disconnecting from their courses, educators, and peers. For nursing students, interaction with staff and classmates is important for developing interpersonal skills. In the context of communication and relationships, these are integral components for working effectively with clients, caregivers, and colleagues (**Choi et al., 2023**). And there are also fears that heavy dependence on ChatGPT could potentially limit students' critical thinking and problem-solving abilities or their ability to innovate. It may also encourage an erosion of independent thinking (**Tam et al., 2023**).

In contrast, ChatGPT's training data spans a diverse set of general knowledge. However, it has difficulty distinguishing between evidence-based and non-evidence-based sources. So, it cannot give comprehensive results, especially with specialized health knowledge (**Shorey et al., 2024**). Likewise, the model reflects the history of data it trained on and reveals bias at some moments. This can restrict its ability to have a wider audience and reach (**Baidoo-Anu & Ansah, 2023**). The knowledge level itself is based on information that lasts up to 2021 (**Tam et al., 2023**), thus the answers are not based on up-to-date information.

Moreover, although ChatGPT aims to provide good, accurate, and informative answers based on existing data, its output will be limited to what it has learned (**Pavlik, 2023**). Students who rely excessively on ChatGPT may not understand a concept or topic. This mis assessment might affect their provision of safe, adequate care (**Choi et al., 2023**). Likewise, comprehensive training of AI systems as well as clear algorithm making work together to promote the quality content that ChatGPT produces over time (**Shorey et al., 2024**). The language generation tool ChatGPT can support students and educators, but it cannot substitute for intelligent humans or match the complexity of human thought (**Mohammad et al., 2023**). At the same time, the model is non-deterministic; it produces

different responses each time it uses a new input. Once again and then again when users enter the same information from the last session, ChatGPT may perform the same task in different writing styles or in completely different contexts leading to inaccurate or incomplete results (**Tam et al., 2023**).

Moving forward, the weakness identified for ChatGPT during our trials lies in its incapacity for solving fundamental math and logic problems. ChatGPT could sometimes give wrong information or even a mistake (**Tam et al., 2023**) and it is not a new issue. Another significant shortcoming we identified with ChatGPT when we encountered it, is its inability to locate sources of information in the text it generates. When we questioned or asked ChatGPT specifically to include references in the generated text in some of our trial sessions, some references were found to be incorrect or even nonexistent (**Tam et al., 2023**).

Another potential limitation of ChatGPT is its inability to consider present-day data or events that have taken place since the beginning of September 2021 (**Castonguay et al., 2023**). ChatGPT cannot replace human thought in its entirety as used for application through knowledge, skill performance and assessment as a demonstration of nursing students' work that they need to demonstrate through theory and clinical courses (**Castonguay et al., 2023**). For instance it does not produce novel concepts, including new theoretical frameworks. ChatGPT is a language model that learns from the thousands of different sentences and texts it's trained on. So, it has no capability of generating additional ideas or knowledge, other than from that information itself (**Castonguay et al., 2023**).

Additionally, there is increasing concern about the accuracy and reliability of information generated by ChatGPT. This is largely attributed to its inaccessibility to up-to-date medical studies and clinical information (**Yalcinkaya & Yucel, 2024**). Overall ChatGPT offers several benefits for nursing education through individualized learning and ease of use, but these limitations of using ChatGPT to provide accurate and up-most current information gives cause for concern about its use in high value health care facilities. Guidance and policy on using such AI tools as ChatGPT are critical to ensure safe and effective integration in nursing education (**Yalcinkaya & Yucel, 2024**).

Innovative Teaching Strategies:

The use of ChatGPT as a simulated patient in healthcare training is beneficial for nursing students. As a result, high user engagement with simulation models of virtual patients has been experienced in clinical training sessions. Students can relay this significant information to virtual patients, highlighting how important good patient education and management is. This approach makes its way into healthcare interactions (**Benfatah et al., 2024**). And, in addition to that, ChatGPT could help nurses pursue their education and careers by setting learning paths that meet their needs and interests. This allows nurses to keep a high level of care for their patients by learning about the evolution of remote patient monitoring, and other smart healthcare technologies (**Sharma & Sharma, 2023**). ChatGPT is an example of a large language model developed to facilitate patient involvement, support decision-making and develop trustworthy and reliable information regarding medical conditions and treatments (**Hobensack et al., 2024).** This is great for students to test their knowledge and understand the course materials. Students can also use ChatGPT to prepare for presentations by generating relevant sample questions for their work. ChatGPT is a useful tool that helps students take charge of their learning experience and academic goals (**Tam et al., 2023**). In nursing studies, the AI chatbot can simulate patient encounters and give students chances to practice their communication, assessment, and intervention skills (**Tam et al., 2023**).

Finally, ChatGPT could also help students improve their reading comprehension skills if English is not their first language. It can simplify difficult or abstract topics if they are having trouble understanding them through automa ted tutoring (**Castonguay et al., 2023**).

Impact on Learning Outcomes:

Many have suggested ways in which ChatGPT can be used, in certain disciplines such as health and nursing education. Studies looked at performance and effects (**Zheltukhina et al., 2024**). Developing supportive learning environments using ChatGPT is an approach that can enhance learning outcomes (**Zheltukhina et al., 2024**). There are concerns and challenges regarding the usage of ChatGPT, but there is positive recognition of the potential for it to enhance educational practice and student learning outcomes (**Zheltukhina et al., 2024**). The specific responses generated by ChatGPT in certain medical contexts demonstrate the versatility of this technology in making learning experiences possible in nursing education while generating the right answer in different medical contexts (**Benfatah et al., 2024**).

Yalcinkaya & Yucel (**2024**), shows that the use of ChatGPT in nursing curriculums can provide tools for students to improve on critical thinking, problem-solving problem-based learning and self-learning skills. These tools can also be developed over time, contributing to future development of the nursing education programs that prepare nurses for the medical profession and improving patient outcomes (**Sharma & Sharma, 2023**). But using ChatGPT in nurse education, in itself, risks worsening equity issues. For example, if some students can tap into ChatGPT and use it to generate high grade written assignments, students who cannot access the chatbot may be at a disadvantage. This might result in uneven learning outcomes and prospects (**Cotton et al., 2023**).

Furthermore, digital literacy has recently become an essential nursing informatics competency. This needs to be a highest priority to meet course and program objectives (**Castonguay et al., 2023**). We recommend nurse educators look at ways they can incorporate ChatGPT into their curriculum, for example, for formative or summative assessments (**Castonguay et al., 2023**).

Finally, it is important that the growing area of AI and an understanding of how to work with, rather than against, this technology is captured in entry-to-practice competencies to guide nurses and nursing educators through curriculum design and assessment, which will prepare students to engage with, and evaluate emerging technologies as they continue to evolve (**Castonguay et al., 2023**).

CONCLUSION

In summary, the integration of ChatGPT into nursing education presents numerous benefits, including enhanced accessibility, personalized learning experiences, and improved clinical decision-making skills. This AI tool supports educators by providing supplementary resources and administrative assistance, fosters interdisciplinary collaboration, and addresses resource constraints by being scalable and cost-effective.

Furthermore, ChatGPT prepares nursing students for future technological integration, fostering a culture of innovation and adaptability. As nursing education evolves, the thoughtful implementation of AI tools like ChatGPT will be essential in advancing the field and eventually improving patient care outcomes. Ongoing research and careful consideration of challenges will be crucial in maximizing the potential benefits of this technological advancement.

However, successful integration requires addressing technical , ethical, and logistical challenges. As noted by Chang et al., (2023), it is essential to educate nursing students on scholarly integrity, patient and public safety, and ethical use of ChatGPT. More empirical research is needed to understand the influences of ChatGPT on nursing education, especially on the student learning outcomes, nurse educators' teaching practices and ethical implications on the use of ChatGPT.

There may also be an ethical research component for research institutions, publishers, and funders to develop clear language about how researchers should disclose the use of AI technologies such as ChatGPT to prepare proposals and publications. Consistency and transparency will ensure a high level of rigor and accountability for research conduct.

With continued innovation and thoughtful implementation, generative AI can play a crucial role in preparing the next generation of nurses for the complexities of modern healthcare.

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