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The Pros and Cons of Using ChatGPT in Medical Education: A Scoping Review

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Abstract. This scoping review explores the advantages and disadvantages of using ChatGPT in medical education. We searched PubMed, Google Scholar, Medline, Scopus, and Science Direct to identify relevant studies. Two reviewers independently conducted study selection and data extraction, followed by a narrative synthesis. Out of 197 references, 25 studies met the eligibility criteria. The primary applications of ChatGPT in medical education include automated scoring, teaching assistance, personalized learning, research assistance, quick access to information, generating case scenarios and exam questions, content creation for learning facilitation, and language translation. We also discuss the challenges and limitations of using ChatGPT in medical education, such as its inability to reason beyond existing knowledge, generation of incorrect information, bias, potential undermining of students' critical thinking skills, and ethical concerns. These concerns include using ChatGPT for exam and assignment cheating by students and researchers, as well as issues related to patients' privacy.

Keywords. Open AI, ChatGPT, Medical Education, Chatbot

1. Introduction

Artificial Intelligence (AI) has transcended fiction and now permeates medical education and clinical management, as well as various aspects of daily life [1]. Chatbots, especially ChatGPT, have been developed using vast amounts of textual data from the internet [1]. Since its public release in November 2022, ChatGPT has impressed users with its capabilities. In medical education, large language models like ChatGPT provide students convenient access to information and skill practice opportunities [2]. Furthermore, ChatGPT can simulate patient interactions, enabling students to hone their diagnostic and communication skills in a controlled environment [2]. However, ChatGPT has limitations, such as generating incorrect information and relying on data only up to 2021[3]. These limitations can be addressed through advancing large language models, with major companies like Google, Apple, Facebook, Amazon, and Microsoft working on similar projects [3]. ChatGPT represents a promising tool for the future of medical education, warranting an open-minded approach to effectively harness its potential for enhancing education and clinical management [1,4].

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2. Methodology

Following the Joanna Briggs Institute (JBI) guidelines, we conducted a scoping review using five databases: PubMed, Medline, Scopus, Science Direct, and Google Scholar. Our selection process involved three steps: 1) removing duplicates from 246 retrieved articles, 2) screening titles and abstracts, and 3) assessing full texts to identify studies meeting our inclusion criteria (Appendix A[2]). Two reviewers (BM and TS) extracted data and recorded it on an Excel sheet (Appendix B[2]). A narrative synthesis was employed to summarize key findings and themes, presenting them as text and tables.

3. Results

3.1. The benefits of using ChatGPT in medical education

A total of 25 studies were included from the initial 246 identified. These studies reported both positive and negative aspects of using ChatGPT in medical education. As depicted in Table 1, seven studies (n=7, 28%) found ChatGPT particularly helpful for writing assignments and research papers, as it can generate coherent and grammatically correct sentences. Another seven studies (n=7, 28%) indicated that ChatGPT provides quick access to information and improves personalized learning. In three studies (n=3, 12%), educators used ChatGPT for writing exam questions with satisfactory results. Two studies (n=2, 8%) employed ChatGPT for language translation in clinical radiology, another two (n=2, 8%) used it for automatic scoring/grading, and two more (n=2, 8%) applied ChatGPT to expedite information processing and data analysis.

Table 1. Summary of ChatGPT applications in medical education, as reported in the included studies.

Benefits /applications of ChatGPT in medication education	**Reference Number**	**sum**	**Percentage**
Academic /Scientific writing/ Research assistance:	**{1,3,4,5,13,15,16}**	**7**	28%
Practice / language translating (Radiology/imaging):	**{1,17}**	**2**	8%
speeding up information process and data analysis	**{7 &15}**	**2**	8%
creating new educational content by educators /MCQs:	**{13, 14 and 22}**	**3**	12%
personal learning / Quick access to information	**{1, 3, 5, 12, 13, 14, and 21}**	**7**	28%
Automatic scoring/grading	**{5 &13}**	**2**	8%

3.2. The risk of using ChatGPT in medical education

On the other hand, Table 2 illustrates that ten studies (n=10, 40%) reported ChatGPT as an unreliable source of information for students and educators, as it provides incorrect information. Additionally, three studies (n=3, 12%) indicated that ChatGPT generated false and misleading references, despite appearing genuine. Five studies (n=5, 20%)

[2] https://doi.org/10.5281/zenodo.7854755

addressed concerns regarding the negative aspects of using ChatGPT, such as ethical issues like exam cheating and biased responses to certain queries. Transparency and copyright concerns were highlighted in three studies (n=3, 12%), while one study (n=1, 4%) emphasized the risk of declining critical thinking abilities among students. Another study (n=1, 4%) mentioned that ChatGPT's information is not up-to-date, only extending up to September 2021. All included studies' references are available in Appendix C[3].

Table 2. Summary of studies discussing challenges and limitations of using ChatGPT in medical education.

Risks / Concerns of ChatGPT in Medical Education	Reference Number	sum	Percentage
Risk of incorrect / inaccurate information	{7, 9, 10, 11, 12, 17, 20, 22 & 23}	10	40%
Restricted knowledge / outdated	{24}	1	4%
Transparency Issues	{7, 11 & 15}	3	12%
Ethical Issues	{2, 7, 18, 19 & 21}	5	20%
Fabricated references	{6, 9 and 15}	3	12%
declining critical thinking abilities of the students	{21}	1	4%

4. Discussion

This scoping review synthesizes studies on the current state and use of ChatGPT in medical education. One study highlights ChatGPT's potential to enhance learning outcomes, facilitate communication between learners and educators, provide immediate feedback, answer questions, aid knowledge retention, simulate real-life scenarios, assess knowledge, and improve clinical decision-making skills [1]. However, another study raises concerns about ChatGPT's reliability as an information source, with four doctors unable to correctly identify any ChatGPT-generated abstracts, and only two correctly identifying two or three abstracts [2]. Likewise, another study argues that ChatGPT may not be suitable as a reliable resource for educators and medical students, particularly for complex questions requiring advanced skills and knowledge; although ChatGPT can assist educators, caution is advised [5]. Our findings align with previous studies discussing the dependability and accuracy of ChatGPT in medical education, particularly for complex scenarios and questions requiring advanced knowledge and skills. They suggest that AI-powered multiple-choice questions on medical subjects with tailored feedback could revolutionize medical education and enhance care quality [3]. Another study also indicates that ChatGPT can be utilized for scientific writing, reviewing, and editing, as well as for authoring essays, solving problems, and creating new content [6]. This scoping review offers a comprehensive overview of existing literature on ChatGPT in medical education, identifying knowledge gaps, research trends, and areas needing further investigation. The use of ChatGPT in medical education is an emerging technology, and many studies were excluded from this review because they were in the preprint stage or not yet peer-reviewed, limiting the number of included studies.

[3] https://doi.org/10.5281/zenodo.7854755

5. Conclusion

In conclusion, ChatGPT and other conversational agents hold the potential to transform medical education and training by offering personalized, interactive, and readily available learning experiences. By equipping medical professionals with essential skills and knowledge, ChatGPT can contribute to improved patient outcomes and advance the medical field. However, while ChatGPT is a powerful language generation tool that can serve as an assistant for students and educators, it cannot replace human intelligence or replicate the complexity of human thinking. As ChatGPT has limitations and challenges that need addressing as the technology evolves, it should be employed with caution. Future studies should examine ChatGPT's use in medical education and focus on developing standardized evaluation tools to assess the benefits and risks of this emerging technology in the field.

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