GUEST EDITORIAL

CHATGPT IN MEDICINE: A REVIEW OF APPLICATIONS, BENEFITS, LIMITATIONS, AND ETHICAL CONSIDERATIONS

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ABSTRACT

ChatGPT represents a major advance in AI capabilities, demonstrating potential across diverse medical applications. However, ethical concerns and limitations necessitate responsible oversight. This review provides a balanced overview of ChatGPT in healthcare, examining promising benefits as well as risks requiring consideration. It covers key themes:

1 Healthcare applications of ChatGPT

2 Limitations and concerns

3 Ethical considerations and recommendations for responsible AI use.

While highlighting ChatGPT's promise, this discussion emphasizes the importance of governance policies and interdisciplinary collaboration to uphold ethics as AI advances.

Keywords: Artificial Intelligence, Machine Learning, Clinical Decision Support Systems, Professional-Patient Relations, Ethics

This article may be cited as: Hoo FK, Ching SM, Rashid AMA, Khan AHKY, Baharin J. Chatgpt In Medicine: A Review Of Applications, Benefits, Limitations, And Ethical Considerations. J Med Sci 2024 january;32(1):1-5

INTRODUCTION

The release of ChatGPT by OpenAI in late 2022 has generated great interest regarding implications in medicine.[1-3] Built using transformer-based deep learning, ChatGPT displays advanced natural language processing capabilities enabling remarkably human-like conversational responses.[4,5]

Early applications span areas like medical education, clinical decision support, patient communication, and documentation.[6-9] However, experts have also highlighted major risks like misinformation, lack of transparency, privacy threats, liability issues, and dehumanizing effects requiring careful oversight.[10-13] Therefore, nuanced analysis of ChatGPT examining both beneficial potential and risks in medical contexts is urgently needed.

This discussion provides such balanced perspective focused specifically on emerging healthcare applications and ethical issues. It synthesizes early evidence and expert insights highlighting promising uses while also emphasizing hazards warranting thoughtful response.

The objectives are: 1) Assess ChatGPT's promise and limitations in medical contexts based on current findings; 2) Surface ethical issues needing policies for responsible development and use; and 3) Recommend priorities for maximizing benefits while minimizing risks. By critically examining ChatGPT, this document seeks to spur informed discourse on responsibly harnessing its capabilities in vital healthcare domains.

CHATGPT'S POTENTIAL APPLICATIONS IN HEALTHCARE

In healthcare, early evidence indicates ChatGPT could aid medical education, clinical decision-making, patient communication, and productivity. Its conversational nature and medical knowledge make ChatGPT well-suited for applications needing natural language processing and text generation.[14-17]

For education, ChatGPT has exhibited aptitude answering exam-style medical questions and rapidly producing custom clinical cases.[16,18,19] By automating personalized tutoring and feedback at scale, ChatGPT may enhance knowledge acquisition and retention.[19-22] For instance, it can provide tailored explanations of concepts, quiz students' understanding, and suggest areas needing further study.

This could increase engagement and address gaps in competencies. ChatGPT also shows promise for

efficiently generating realistic patient scenarios to train clinical skills and judgment. By expanding customizable educational resources, it could make learning more adaptive, accessible, and experiential.

For clinical support, ChatGPT has shown promising ability to summarize patient data and suggest appropriate lab tests or imaging studies.[23-26] It can rapidly synthesize complex records into coherent narratives to inform diagnoses.

ChatGPT also exhibits potential to explain conditions, care recommendations, and rationale to patients in understandable language. By generating such layperson-friendly interpretations of medical information, it may boost patient literacy, engagement, and shared decision-making.[27-30]

Additionally, automating notetaking and documentation with ChatGPT could alleviate clinician burnout.[31-34] It can capture patient encounter details for charting, freeing up time and mental focus.

ChatGPT also shows aptitude generating post-visit summaries, referral letters, and other documentation requiring synthesis of findings, interpretation, and communication. By automating routine documentation tasks, it may enhance clinical workflow efficiency.

However, given risks of misinformation and liability, experts advise ChatGPT only be selectively implemented in healthcare with extensive validation and oversight.[24-26,35] It should not independently perform sensitive tasks like diagnosing, prescribing, or charting without clinician supervision. But as an assistive tool for education, communication, and documentation, ChatGPT shows substantive potential to aid medicine if responsibly directed.

LIMITATIONS AND RISKS OF CHATGPT USE IN HEALTHCARE

Despite promising capabilities, experts emphasize ChatGPT has substantial limitations and risks requiring extensive safeguards in healthcare.[18,35,36] Most critically, as a data-driven AI, ChatGPT lacks human clinicians' nuanced judgment and expertise for sound decisions [18,35]. Its responses often omit key considerations or make unjustified extrapolations that could endanger patients without oversight.[37-39]

Critically, unlike human clinicians, ChatGPT lacks understanding when its responses are incorrect or unsafe, blithely generating plausible sounding yet inconsistent, unethical, or harmful recommendations.[35,40] Such AI "hallucinations" increase risks as users may overestimate its competence.[41-43] For instance, while ChatGPT can intelligently discuss medical concepts and cases, it does not truly comprehend the implications of its advice. This could lead users to mistakenly trust dangerous or unjustified suggestions without independent clinical verification.

Furthermore, ChatGPT's knowledge stems from pre-2022 training data, rapidly growing outdated as medicine advances. Its responses may reflect outdated practices rather than current evidence-based standards.[36,44] ChatGPT also cannot judiciously interpret new research findings' validity and relevance like clinician-scientists. So, reliance on its outdated or questionable recommendations could compromise care quality and patient safety.

Additionally, overreliance on ChatGPT risks eroding essential clinical knowledge and skills gained through formal education and experience.[45-47] If students use ChatGPT as a crutch rather than an aid, they may fail to adequately develop expertise.

And clinicians depending heavily on ChatGPT could experience skill atrophy and deskilling over time. Maintaining human competencies alongside judicious AI augmentation will remain crucial.

While powerful, these risks make clear ChatGPT requires extensive safeguards in healthcare, safely augmenting but not replacing clinicians.[35,47] As an assistive rather than independent tool, ChatGPT shows promise if thoughtfully implemented. But upholding standards of care, accuracy, and safety necessitates extensive oversight and verification of its outputs.

ETHICAL CONSIDERATIONS FOR RESPONSIBLE USE OF CHATGPT IN MEDICINE

ChatGPT also introduces major new ethical challenges requiring thoughtful policies in medicine.[1,13,48] Key issues include lack of transparency, embedded biases, misuse potential, privacy concerns, accountability gaps, dehumanization risks, and fairness issues.[36,49-51]

As it lacks insight into its limitations, ChatGPT's outputs cannot be critically evaluated.[49,52] It provides no transparency into its reasoning, confidence levels, or knowledge gaps. This black-box nature hinders assessing when outputs are unsafe or improper. Biases and misinformation in its training data may also propagate undetected.[48,52] For example, outdated paternalistic attitudes or demographic skews in data could introduce biases needing ongoing monitoring.

ChatGPT's generative capacity also enables misinformation spread and fraud.[10,53] Its ability to fluently discuss medical topics could be misused to generate convincing but false health advice or predatory marketing

claims. ChatGPT's text can also be misappropriated for dishonest purposes like producing plagiarized content or forging clinician notes. Responsible policies for use are necessary to prevent such harms.

Ensuring privacy is also difficult as conversations may reveal confidential patient details.[48,54] If ChatGPT's training data included identifiable records, it further risks exposing private health information. Ongoing audits of its capabilities to detect breaches will be critical.

Additionally, without legal personhood, responsibility for medical errors ChatGPT propagates is unclear.[52,55] Users, programmers, and employing institutions all diffuse its accountability. Updated legal frameworks apportioning appropriate liability are needed to address this vacuum.

Over-reliance on ChatGPT may also erode human skills like empathy that enrich care experiences.[47,56] Excessive faith in its capabilities could reduce clinicians' direct engagement with patients and humanity. Thoughtful integration balancing AI augmentation with human connection will remain vital.

Finally, representational gaps in ChatGPT's training data could introduce marginalizing biases.[54,57] Lack of diverse perspectives risks outputs reflecting dominant groups' preferences disproportionately. Ongoing efforts to enhance inclusivity in AI will be integral to mitigating unfair biases.

Addressing these issues to uphold ethics amid rapid AI progress requires collaboration among technologists, clinicians, ethicists, lawmakers, and the public.[13,58] Their cooperation can steer development toward democratization rather than monopolization of benefits. Comprehensive ethical governance and participatory oversight of ChatGPT will be essential as healthcare applications expand.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, while highlighting promise, this review emphasized the importance of governance and policies to uphold ethics as AI advances in medicine. Realizing benefits while addressing risks requires:

1 Comprehensive oversight for transparent, accountable, and ethical AI use. Mechanisms like external audits, monitoring boards, and public participation can enhance direction of ChatGPT toward societal good.

2 Extensive validation of any clinical recommendations. Safety standards should require ChatGPT outputs be verified by clinician teams before use in care settings to prevent patient harm.

3 Delineating best-practice human roles for responsible AI augmentation. Policies should establish domains where ChatGPT can assist versus replace human expertise to preserve competencies.

4 Promoting public participation in steering AI's development. Democratizing discourse on technological impacts through participatory forums can help align AI with societal needs.

5 Proactive research into safety, biases, and impacts. Ongoing studies on AI risks are imperative to guide wise governance.

6 Updating legal frameworks addressing emerging issues. New liability models and protections for privacy and responsible use are needed for emerging technologies like ChatGPT.

Overall, ChatGPT represents a watershed advancement poised to transform medicine if responsibly directed. But prudent policies and collaboration are essential to encourage innovation while preserving ethics and human values. With comprehensive governance and mindful integration respecting human roles, ChatGPT's remarkable capacities could be harnessed to enhance health and healthcare.

This review aimed to outline a balanced perspective assessing its promise and risks to spur thoughtful discourse toward that goal. The years ahead will be defining in charting AI's course through principled development centred on human welfare.

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