

## COMMENTARY

# Use of ChatGPT in medical research and scientific writing

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Lee PY, Hani S, Abdullah A, Teo CH. Use of ChatGPT in medical research and scientific writing. *Malays Fam Physician*. 2023;18:58.<https://doi.org/10.51866/cm0006>**Keywords:**Artificial intelligence (AI),  
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Medicine, Universiti Malaya,  
Kuala Lumpur, Malaysia.**Abstract**

ChatGPT, an artificial intelligence (AI) language model based on the GPT-3.5 architecture, is revolutionising scientific writing and medical research. Researchers employ ChatGPT for diverse tasks, including automated literature reviews, structured-outline generation and drafting/editing assistance. The tool adapts language for varied audiences, aids in citation management, supports collaborative writing and peer review and facilitates table/figure creation. While it enhances efficiency, concerns arise regarding ethics, bias, accuracy and originality. Transparent data sourcing and validation are crucial, as ChatGPT complements human efforts but does not replace critical thinking. Accordingly, researchers must uphold integrity, ensuring that AI-assisted content aligns with research principles. Acknowledgement of AI use in manuscripts, as recommended by the International Committee of Medical Journal Editors, ensures accountability. ChatGPT's transformative potential lies in harmonising its capabilities with researchers' expertise, fostering a symbiotic relationship that advances scientific progress and ethical standards.

**What is ChatGPT?**

Artificial intelligence (AI) broadly refers to any system or machine that can perform tasks that typically require human intelligence, such as learning, problem-solving, perception and decision-making. Natural language processing is a subfield of AI that focuses on enabling machines to generate human language. ChatGPT is a form of AI with a large language model that uses a deep neural network to generate human-like responses to user inputs. It is based on the GPT-3.5 architecture (previously known as GPT-3). The GPT-3.5 architecture is a type of transformer neural network, and the transformer consists of multiple layers of processing units, which are trained to generate the next word or phrase in a sequence given the previous words. ChatGPT is pre-trained on a massive corpus of text data, such as books, articles and websites. This pre-training allows it to learn patterns and relationships in natural language, which it can then use to generate coherent and contextually appropriate responses to user inputs.

When a user inputs a question or statement, ChatGPT processes the text and generates a response based on its pre-trained knowledge. It can also use machine learning techniques to personalise responses based on previous interactions with the user.

Overall, ChatGPT is a remarkable example of how AI can be used to improve human-machine interactions. It enables more natural and intuitive interactions between humans and machines and has the potential to yield significant changes in healthcare education, research and clinical practice with its numerous beneficial applications. In this article, we describe ChatGPT's role in medical research and scientific writing.

**Use of ChatGPT in medical research and scientific writing**

Currently, researchers are already using ChatGPT and other equivalent large language models to improve their manuscripts, write abstracts for talks or the talk itself, summarise literature on a topic and identify gaps in certain areas of research.<sup>1</sup> In the near future, with the right training and ways of posing questions, AI may start to design experiments, write proposals, conduct peer reviews or even support editorial decisions. As AI tools such as ChatGPT have substantial access to information and the speed to perform tasks, it will become the go-to mechanism or tool for time-strapped researchers or editors who are evaluated based on their ability to produce.

The advent of ChatGPT has opened up new possibilities for streamlining and enhancing the process of medical scientific writing.

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ChatGPT has been reported to be able to assist researchers, scientists and medical professionals in their medical scientific writing.<sup>2-5</sup> While not an exhaustive list, **Table 1** illustrates the diverse ways in which ChatGPT can aid in medical writing.

**Table 1.** Various ways ChatGPT aids in medical research and scientific writing.

Ways	Explanation
1. Automated literature review	ChatGPT has been reported to be able to expedite the process of literature reviews by automating the extraction and summarisation of relevant information from a vast array of scientific articles and publications. <sup>2,3</sup>
2. Structured-outline generation	ChatGPT has been shown to be able to serve as a helpful tool for generating structured outlines that guide the flow of scientific writing. <sup>2</sup>
3. Drafting and editing assistance	Reports show that ChatGPT can act as an intelligent assistant during the drafting and editing stages of medical scientific writing. The tool can offer suggestions for improving sentence structures, enhancing clarity and ensuring adherence to scientific writing conventions. <sup>2</sup>
4. Language enhancement and adaptation	ChatGPT can aid in adapting the language and tone of the written work to suit the intended audience. <sup>3</sup> In an article published in <i>Nature</i> , ChatGPT was reported to be used to generate scientific papers in a variety of languages, including English, Spanish and Chinese. <sup>4</sup>
5. Citation and reference management	Some literature demonstrates the ability of ChatGPT to assist researchers in generating proper citations and references based on widely accepted citation styles (e.g. APA or MLA). <sup>3</sup>
6. Collaborative writing and peer review	ChatGPT has been reported to be able to facilitate collaboration by serving as an intermediary tool for brainstorming, sharing ideas and reviewing drafts. <sup>3</sup>
7. Table and figure creation	ChatGPT has been shown to be able to aid researchers in developing tables and figures by offering suggestions on formatting, data visualisation techniques and labelling. <sup>3</sup>

### Potential risks of the use of ChatGPT in medical research and scientific writing

The use of AI tools such as ChatGPT will accelerate all aspects of the research process and the generation of new knowledge. However, whether delegating these tasks to AI is ethical is unclear. The fact is that progress cannot be stopped. It is unlikely that AI tools will be withdrawn from society and that regulations will be implemented to limit their use. Therefore, both researchers and ethicists must debate the trade-off between productivity and preservation of human creativity and originality. Continuing to champion the inclusivity of all data into the AI model is essential. Currently, much of the information accessed by ChatGPT could be biased towards developed countries, where there are more users on the Internet, more research digitally published in journals and more citizens expressing themselves and their preferences and culture online.<sup>6</sup> For a research tool to be equitable, all perspectives and research findings need to be considered regardless of their presence.

Currently, there are still many inaccuracies in the information generated by ChatGPT, but with more training and release of newer versions of the model, these inaccuracies can be reduced.<sup>7</sup> Researchers must know how this model is perfected and how the data are

generated. This crucial aspect should take precedence before the information queried is presented. Promoting transparency in this manner will enable researchers to be confident when they incorporate ChatGPT into their research, as they are ultimately responsible and will be held accountable for their work. Understanding the source of the original information is equally important. This enables researchers to provide appropriate acknowledgement to the previous work upon which their research is based, while avoiding unintentional plagiarism or replication of previous ideas. Hence, while ChatGPT can provide valuable assistance in scientific writing, researchers should exercise critical judgement and validate the accuracy and interpretation of the data and visual representations of tables and figures themselves. The AI model should be viewed as a tool to facilitate the creation process, but the final responsibility for ensuring the scientific integrity of the scientific writing lies with the researchers. Researchers should also be aware of the potential risks of using AI models to assist in scientific writing. These risks include plagiarism, inaccuracy, bias and misrepresentation.<sup>2,3,5</sup>

**Recommendation on the use of ChatGPT**  
The International Committee of Medical Journal Editors (ICMJE) recommends that authors disclose and describe any use of AI-

assisted technologies including ChatGPT in assisting research and manuscript preparation.<sup>8</sup> Such use can be disclosed in the Methods or Acknowledgement section of a manuscript. ChatGPT should not be listed as part of the authors, as it will not be responsible and accountable for the work conducted, failing to meet the ICMJE authorship criteria.<sup>8</sup> Researchers must carefully assess and edit the outputs from ChatGPT to ensure that the manuscript content is accurate and unbiased.

### Conclusion

Innovations are designed to reduce workload and enhance the quality of life of humans. Hence, the existence of ChatGPT and similar innovations must be embraced. As described above, ChatGPT has limitations, including the fact that it is not able to completely replace human work in research and scientific writing. Researchers must fully utilise the tool to complement and make their work more efficient and productive. While doing so, they must maintain critical thinking,

exercise control and oversight over the entire project and strive to acquire new knowledge. Finally, researchers must uphold the principles of research conduct, ensuring ethics and integrity in generating new knowledge while preventing plagiarism.

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ChatGPT was used to generate the preliminary abstract of this article, which was then revised by the authors.

### Author contributions

All authors conceptualised the study, reviewed the literature and wrote the article. All authors approved the final version of this article.

### Conflicts of interest

All authors declare no conflicts of interest.

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