

ORIGINAL

## Exploring the Horizon: The Impact of AI Tools on Scientific Research

### Explorando el horizonte: El impacto de las herramientas de IA en la investigación científica

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#### ABSTRACT

The rise of artificial intelligence (AI) and natural language processing (NLP) has revolutionized many aspects of daily life, particularly in the field of development of medical research articles. the use of AI in scientific writing has both advantages and disadvantages. As AI tools gain in popularity and their application becomes more ubiquitous, it's essential to consider how they may affect the future of medical literature. This work aims to describe a number of IT-based tools that contribute to scientific research and writing as ChatGPT, Gemini, Elicit, SCISPACE... Each tool has its own advantages and applications, not to mention shortcomings that can affect the quality of medical research. To conclude artificial intelligence tools have emerged as catalysts for innovation in healthcare research, providing motivation and driving progress even amidst challenges. Therefore, it's crucial to confront the obstacles related to AI and to tackle ethical and regulatory issues to enhance research quality and scientific output.

**Keywords:** Artificial Intelligence; Medical Research; Scientific Writing; ChatGPT.

#### RESUMEN

El auge de la inteligencia artificial (IA) y el procesamiento del lenguaje natural (PLN) ha revolucionado muchos aspectos de la vida cotidiana, sobre todo en el campo de la elaboración de artículos de investigación médica. el uso de la IA en la redacción científica tiene tanto ventajas como inconvenientes. A medida que las herramientas de IA ganan popularidad y su aplicación se hace más omnipresente, es esencial considerar cómo pueden afectar al futuro de la literatura médica. Este trabajo pretende describir una serie de herramientas basadas en la IA que contribuyen a la investigación y la escritura científicas como ChatGPT, Gemini, Elicit, SCISPACE... Cada herramienta tiene sus propias ventajas y aplicaciones, por no hablar de los defectos que pueden afectar a la calidad de la investigación médica. En conclusión, las herramientas de inteligencia artificial han surgido como catalizadores de la innovación en la investigación sanitaria, proporcionando motivación e impulsando el progreso incluso en medio de desafíos. Por lo tanto, es crucial afrontar los obstáculos relacionados con la IA y abordar las cuestiones éticas y normativas para mejorar la calidad de la investigación y los resultados científicos.

**Palabras clave:** Inteligencia Artificial; Investigación Médica; Redacción Científica; ChatGPT.

#### INTRODUCTION

Scientific writing is essential to research work, especially in the healthcare field, as it requires attention to detail, clarity of expression and adherence to established standards, which require attention to detail, clarity

of expression and adherence to established standards. While the importance of good scientific writing cannot be overstated, it is often a difficult and time-consuming process.<sup>(1)</sup> The advent of artificial intelligence (AI) and natural language processing (NLP) has fundamentally transformed numerous facets of everyday life, notably including the sphere of writing medical research articles.<sup>(2)</sup>

At present, researchers are utilizing Large Language Models to refine their manuscripts, craft abstracts for discussions or the discussions themselves, encapsulate literature on specific subjects, and pinpoint unexplored areas within certain fields of study.<sup>(3)</sup>

However, as with all new technologies, the use of AI in scientific writing has both advantages and disadvantages. As AI tools gain in popularity and their application becomes more ubiquitous, it's essential to consider how they may affect the future of medical literature. After all, medical literature serves as the basis for decision-making in patient care.<sup>(4)</sup>

The aim of this study is to describe a number of IT-based tools that contribute to scientific research and writing.

Different areas of use for ai-based tools

Generating new health research questions

In order to use the two AI tools ChatGPT and Gemini to formulate new research questions to improve new areas of research not yet covered in the scientific articles published online, we used the question "Act like a psychiatrist, propose innovative and creative ideas concerning research on mood disorders in children or adults" on the two large language models. and we obtained the following results in table 1.

Table 1. Answers obtained by ChatGPT and Gemini	
Gemini	ChatGPT
The role of the gut microbiome in mood regulation.	The impact of genetics on mood disorders
The use of psychedelics in the treatment of mood disorders.	The influence of nutrition on mood disorders
Developing personalized treatments for mood disorders	Technology and mood disorders
Using technology to improve access to care and treatment for mood disorders.	Cultural and ethnic factors in mood disorders
The impact of social media and other digital technologies on mood disorders	Non-pharmacological interventions for mood disorders
The development of new therapies for treatment-resistant mood disorders	Prevention and awareness
	Study of sociocultural factors
	Research into personalized treatments.
	Measuring long-term impact
	Early intervention

After comparing the two language models, it's evident that each has its strengths in processing and generating language-based solutions. Gemini's proposals seem more narrowly focused on the direct treatment and technological aspects of mood disorders. ChatGPT's proposals cover a wide spectrum, from biological underpinnings to societal impacts, and include both treatment and prevention.

Both lists are forward-thinking, but Gemini might appeal more to those interested in direct clinical application, while ChatGPT offers a broad research agenda that includes understanding the disorder from a multifaceted perspective.

Adding to this, the 'Tree of Thoughts' (ToT) framework presents a novel way to enhance decision-making capabilities. Unlike traditional models that process information linearly, ToT introduces a branched reasoning approach. This allows the model to explore different pathways and consider a wider range of outcomes before reaching a conclusion. Such a method is particularly valuable in complex problem-solving where decisions made early on can significantly influence the outcome. Integrating this reasoning into language models could lead to more nuanced and accurate interpretations, akin to a seasoned chess player thinking several moves ahead. The implication for medical literature, or any field relying on decision-critical analysis, could be profound—potentially leading to more robust and reliable tools for practitioners.<sup>(6)</sup>

Search for scientific articles

To accomplish this, we searched for a theme on “Moods disorders therapy for child” in the Elicit tool, which looks for articles relating to the theme and gives a summary of either the 4 or 8 top articles with their references, as well as extracting data from a pdf that the user uploads to the page (figure 1).



Figure 1. Elicit results after doing the research “moods disorders therapy for child

We carried out the same search on PubMed, filtering by age, and took the first 4 results to appear (figure 2).

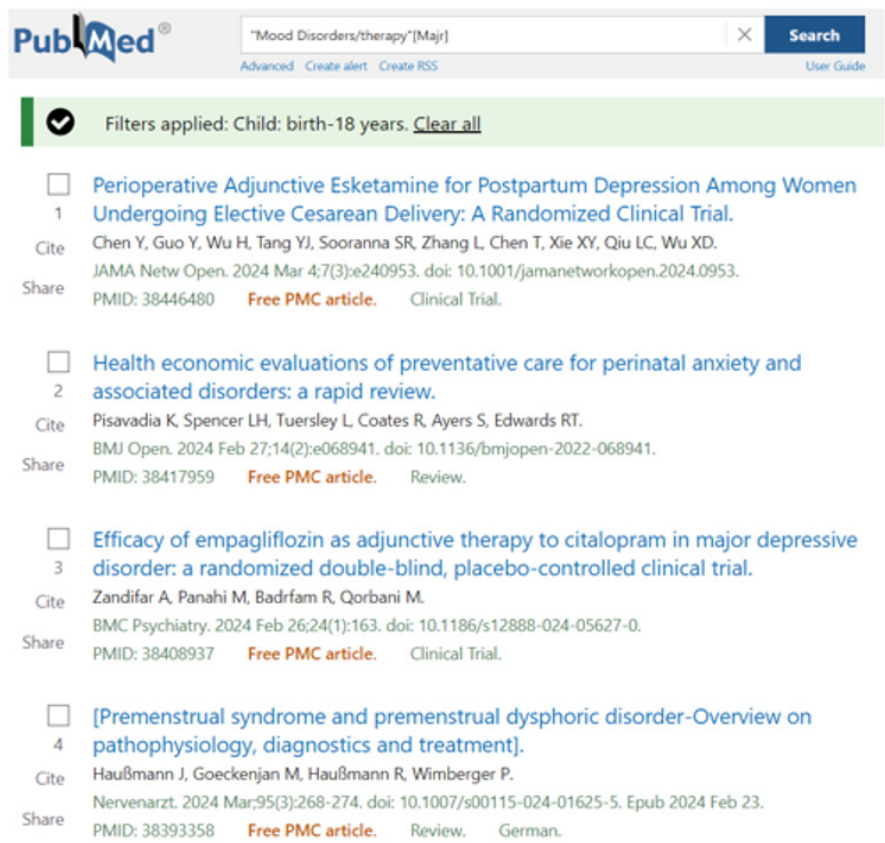


Figure 2. PubMed results of Moods disorders therapy for child

We asked the same question "Mood disorders therapy for child" on another tool called "Scispace" in the literature review section and received the following summary with the top 5 scientific articles (figure 3).

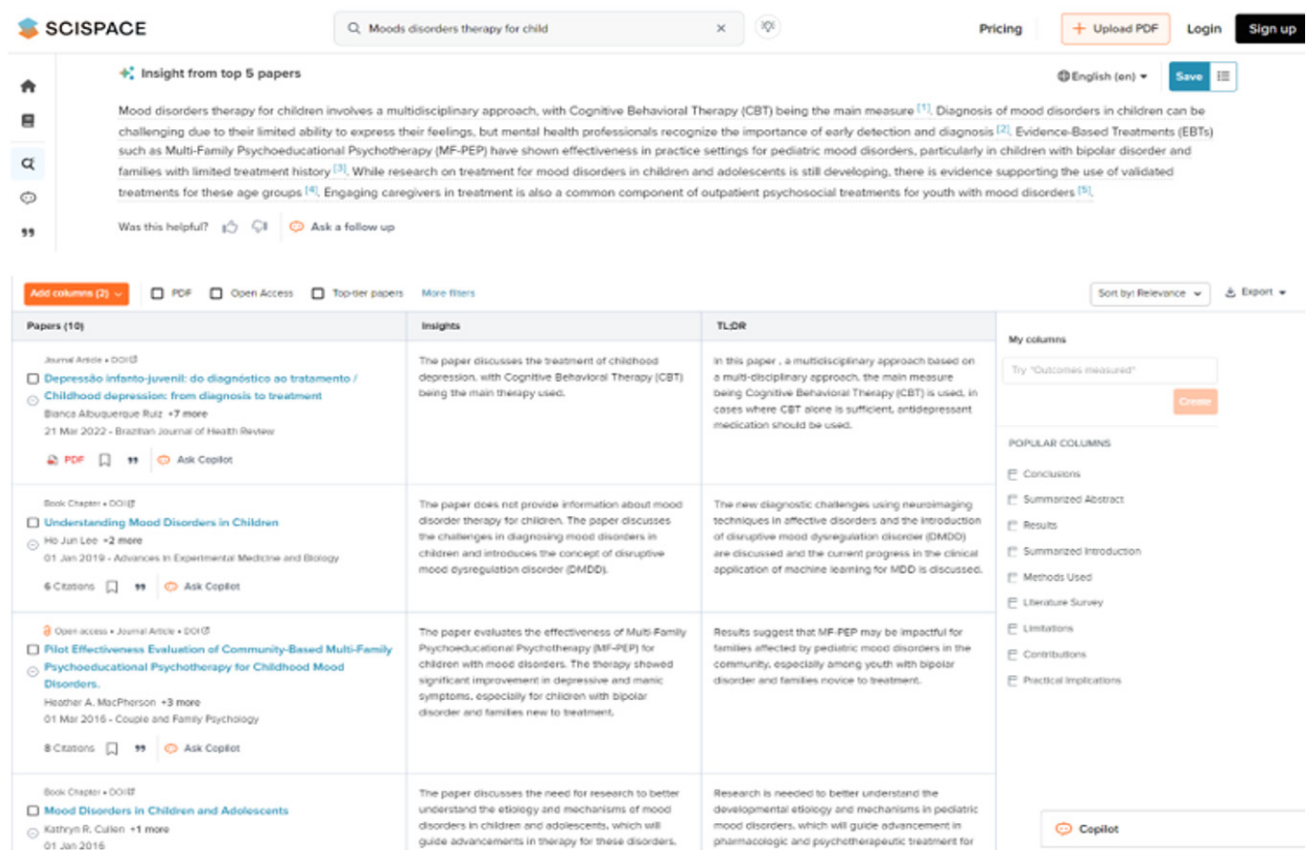


Figure 3. Research in Scispace about “Moods disorders therapy for child”

The **Elicit** tool is beneficial for quick, summarizing insights from a small set of papers. PubMed is ideal for accessing a comprehensive library of medical papers and is widely recognized for its reliability and **SCISPACE** provides a balance between detailed information and summarizing insights, which could help in understanding complex topics more comprehensively.

Each tool has its unique benefits depending on the user’s needs, such as the depth of research required, the need for academic rigor, or the preference for summarized insights.

Reading scientific articles

To help users read scientific articles, and sometimes summarize them, we tested a number of AI-based pdf-reading tools, including “**Doclime**” and “**ChatDOC**”. We put an article online,<sup>(5)</sup> and asked the same question: “The target audience for the paper”, and collected the answer (table 2).

Table 2. Answers obtained by Doclime and ChatDOC	
Doclime	ChatDOC
The target audience for the paper on the implementation of Digital Health Ethics through the adoption of 16 European Ethical Principles for Digital Health would likely include policymakers, healthcare professionals, researchers in the field of digital health, ethicists, technology developers, and individuals involved in the regulation and governance of digital health technologies.	The target audience for the paper on implementing digital health ethics, European ethical principles, and the importance of ethical considerations in advancing technology in healthcare includes various stakeholders involved in the digital health sector, policymakers, healthcare professionals, researchers, and individuals benefiting from digital health services.

As we can see, both tools have made it possible to read and extract the same information in response to the question posed, which are the healthcare professionals or the beneficiaries of digital Health services.

Writing scientific articles

We found an AI-based tool called “**Huxli.ai**” that redraws on the theme you’re looking for using either fast search or advanced search. We asked it the question “Artificial intelligence for medical doctor research” on



advanced search (figure 4).

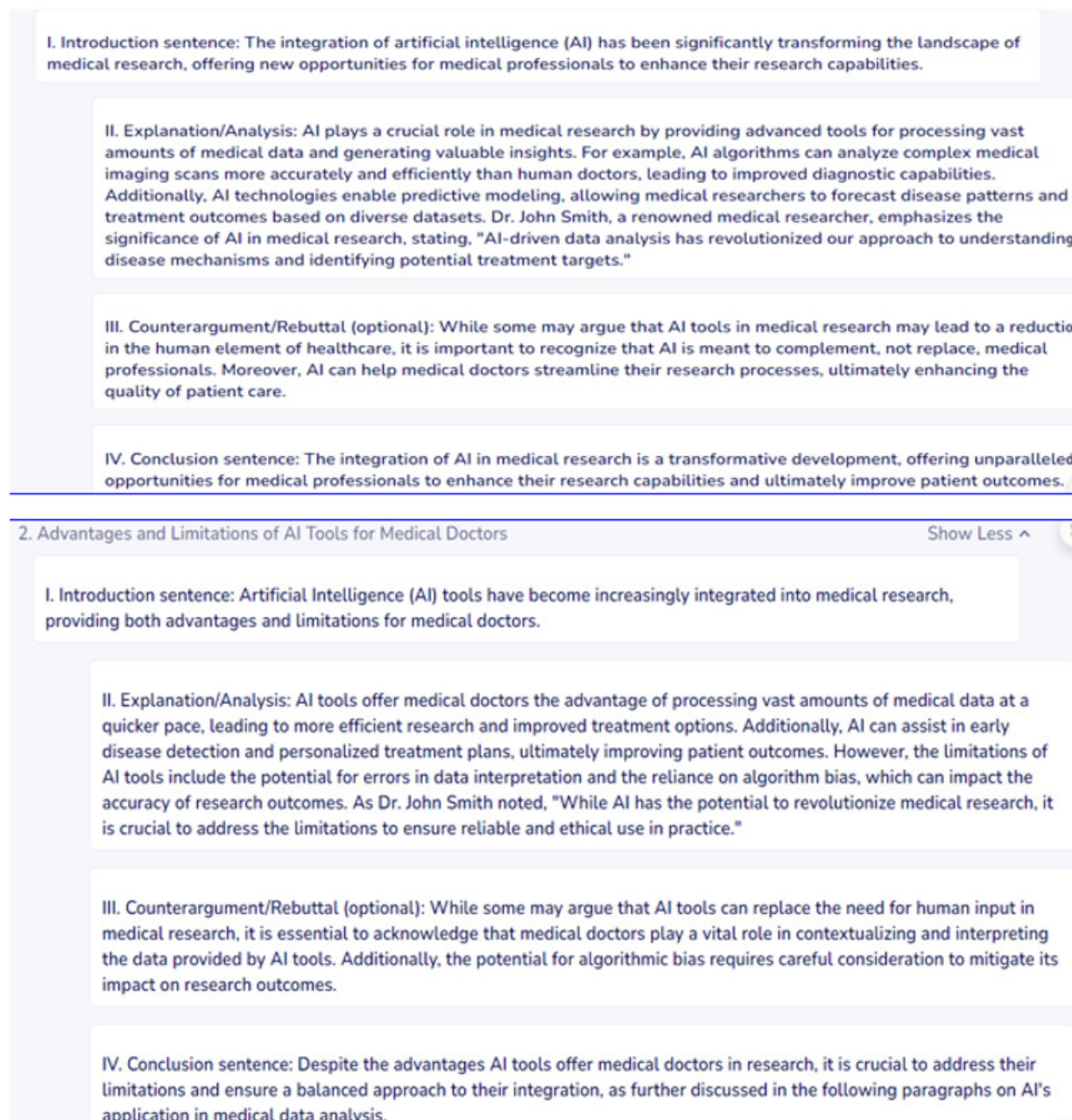


Figure 4. the results in "Huxli.ai" to question "Artificial intelligence for medical doctor research"

This tool allowed us to give a presentation with an introduction and an outline, ending the presentation with a conclusion; this type of tool can be used to get a quick idea of a given subject, but its main flaw is that it doesn't provide any scientific references from which the information was extracted.

Another tool we've tested to improve writing by reformulating an initial text is called "Smodin", which we administer to a text, and which also offers an anti-plagiarism correction (figure 5).

The advent of artificial intelligence (AI) and natural language processing (NLP) has fundamentally transformed numerous facets of everyday life, notably including the sphere of writing medical research articles.<sup>(2)</sup>

Several articles have highlighted the use of intelligent chatbots in scientific writing<sup>(2,6,7,8,9)</sup>, Leveraging chatbots like ChatGPT and Gemini can significantly enhance the efficiency of scientists in writing scientific articles. Here's why incorporating it into your writing process can be beneficial: it not only elevates your efficiency but also accelerates your writing speed, enabling you to conserve valuable time.<sup>(10)</sup>

## Smodin Rewriter

Input

A (En) ▼

AI plays a crucial role in medical research by providing advanced tools for processing vast amounts of medical data and generating valuable insights. For example, AI algorithms can analyze complex medical imaging scans more accurately and efficiently than human doctors, leading to improved diagnostic capabilities. Additionally, AI technologies enable predictive modeling, allowing medical researchers to forecast disease patterns and treatment outcomes based on diverse datasets. Dr. John Smith, a renowned medical researcher, emphasizes the significance of AI in medical research, stating, "AI-driven data analysis has revolutionized our approach to

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Upload

(.doc, .docx, .pdf)

Ouput

AI plays a key role in medical research by providing advanced tools to process large amounts of medical data and generate valuable insights. For example, AI algorithms can analyze complex medical imaging scans more accurately and efficiently than human doctors, thereby improving diagnostic capabilities. In addition, AI technology can enable predictive modeling, allowing medical researchers to predict disease patterns and treatment outcomes based on different data sets. PhD. Renowned medical researcher John Smith emphasized the importance of artificial intelligence in medical research, saying: "AI-driven d

Show Changes

Check For Plagiarism

PDF

Word

Figure 5. The results in "Smodin" after reformulating

AI tools face challenges in grasping the intricacies of scientific language due to their reliance on machine learning and natural language processing. These technologies excel in pattern recognition but struggle with the subtleties of figures of speech and the complex contexts of scientific concepts. To enhance the effectiveness of AI in scientific writing, researchers should supplement their inputs with detailed context and meticulously review the AI-generated suggestions for accuracy and relevance.<sup>(11)</sup>

While ChatGPT offers significant advantages in making the writing process more efficient, it's important to be wary of the potential for misuse, which could compromise the uniqueness and depth of content. Depending solely on ChatGPT for generating article topics might restrict creativity and the exploration of novel ideas.<sup>(12)</sup>

## CONCLUSIONS

AI tools have become Inspiring elements in healthcare research as well as Motivators and force generators even in the face of difficulties, hence the importance of meeting the challenges associated with AI and of addressing ethical and regulatory considerations to enable better research and scientific production.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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