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Research Excellence on ChatGPT Literature in Medicine: A Scientometric Sketch

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ABSTRACT

ChatGPT, also known as Chat Generative Pre-trained Transformer, was developed by OpenAI and is a versatile chatbot recognized for generating human-like text responses. Since its launch in November 2022, ChatGPT has sparked interest and debate. This chapter aims to examine the scientific publications of AI-based ChatGPT in medicine by analyzing research output, yearly frequency, citations, leading journals, authors, subjects, and keywords using bibliometric tools. We collected data from the Scopus Elsevier database regarding publications containing the keyword "ChatGPT in Medicine" at a global level between 2022 and 2025, identifying a total of 720 research publications. Ultimately, we selected only 2,045 published articles, with an average citation rate of 16.86 per article, excluding articles in press. Additionally, for data analysis, we applied bibliographic coupling and co-citation analysis using VOSviewer software version 1.6.20. The results reveal that the United States led in publications (45.82%), followed by China (8.51%) and Germany (7.14%). The leading institutions producing publications, such as Harvard Medical School, followed by the Mayo Clinic and the University of Toronto, were the most prolific.

KEYWORDS

• Bibliometrics • Scientometrics • ChatGPT • Artificial intelligence • AI • Natural language processing • Medicine • Healthcare

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INTRODUCTION

Since its release in November 2022, ChatGPT, a big language model developed by OpenAI, has been used in a variety of fields. It is a component of the OpenAI-developed generative pre-training transformer (GPT) models (Radford *et al*., 2018). In the field of education, ChatGPT can produce patient education materials, explanations, and practice questions. It does not, however, perform as well as it should when responding to domain-specific queries. Though accuracy, bias, and ethical concerns must be carefully considered, ChatGPT can help with literature reviews, data analysis, paper writing, and peer review in research (Dossantos, An, and Javan, 2023).

ChatGPT plays a pivotal role in medical education. Since ChatGPT is a large language model of OpenAI that has been adopted in various domains. It is a part of the generative pre-training transformer (GPT) models developed by OpenAI (Radford *et al*., 2018). ChatGPT plays an effective role that can generate practical questions, explanations, and patient education materials in the field of Education. However, its performance in answering domain-specific questions is suboptimal. In research, ChatGPT can facilitate literature reviews, data analysis, manuscript development, and peer review, but issues of accuracy, bias, and ethics need careful consideration. In Medical and health science education, ChatGPT plays a significant role and it helps for medical practitioners and health science professionals. In addition to serving as a tool for clinical skill assessment, it helps medical students, physicians, nurses, and the entire medical and healthcare community stay informed about the latest advancements in their professions (Han *et al*., 2022). Particularly for students and young brains, chatbots such as ChatGPT can be effective instruments for enhancing health information literacy (Mokmin and Ibrahim, 2021).You and Gui (2020) claim that ChatGPT may have diagnostic applications. Artificial intelligence (AI)-enabled chatbot-based symptom checker (CSC) applications have recently attracted a lot of attention. These applications leverage human-like interactions to provide possible diagnoses and assist users with self-triaging. Additionally, ChatGPT can be utilized for patient monitoring and clinical decision assistance, recommending consultation. Bibliometrics is a statistical analysis of written publications, such as books or articles. Bibliometric methods are frequently used in the field of library and information science, including Scientometrics. For instance, bibliometrics are used to provide quantitative analysis of academic literature or for evaluating budgetary spending. Citation analysis is a commonly used bibliometric method that is based on constructing the citation graph, a network or graph representation of the citations between documents. This present study aimed to evaluate the literature of ChatGPT in medicine for a period of past two years, from 2023 to 2024.

Previous Works

Numerous distinguished academics and scientists have published studies on ChatGPT that were carried out using bibliometric and scientometric technologies. Khosravi et al. (2024), for instance, found 2531 and 5839 papers about research on chatbots in the Web of Science and Scopus databases, respectively. They measured keyword co-occurrence analysis on 211 publications using a bibliometric approach. A bibliometric analysis of 328 research publications on ChatGPT that were taken from the Scopus database was conducted by Baber et al. (2024), who also looked at the authors and citations. A significant number of papers were published in March 2023, according to Ahmed and Sab's (2023) analysis of 333 ChatGPT research outputs that were indexed in the Web of Science until June 2023. Liu et al. (2024) analysed ChatGPT's worldwide trends and hotspots based on 1239 papers indexed by the Web of Science between January 2023 and January 2024. Using the keyword "ChatGPT," Gande et al. (2024) examined 786 articles from January to September 2023 that were published in medical-related journals. Additionally, some studies have investigated ChatGPT in certain fields, including educational research, the social sciences, nursing education, anesthesia, obstetrics and gynecology, and plastic surgery, using bibliometric techniques.

Objectives

The main objective of this study was to evaluate the literature output of ChatGPT in Medicine. The other objectives are to analyze the yearly publications and citations, document types of publications, affiliations of publications, country, productive authors, source-wise publications, and funding agencies over the past two years from 2023 to 2024.

MATERIALS AND METHODS

On May 15, 2025, the Scopus Elsevier database was utilized to retrieve data on "ChatGPT in Medicine" globally from 2022 to 2025, initially identifying a total of 19720 research publications. We excluded the year 2025 since it was not yet complete, focusing instead on the years 2022 through 2024, which yielded 15,648 records encompassing 13 different documents. We further narrowed our selection to include only articles, resulting in 6,823 records. Next, we limited the subject to Medicine, which identiÞed 2,222 documents. We then excluded publications in languages other than English, leading to 2,133 records. Ultimately, we selected 2,045 published articles, excluding those in press. Various indicators have been employed in the literature for bibliometric analysis, such as total article count, average citations per article, total citation count, total link strength, and h-index. All of these indicators were applied in this research. The interpretation was conducted using VOSviewer 1.6.19, software designed for analyzing articles and producing visual and analytical Þndings for speculation.

RESULT AND DISCUSSION

The details of ChatGPT in Medicine have been retrieved through the Publish and Perish database for two years, between 2023 and 2024.

Table 1: Productivity Profile of ChatGPT in Medicine

Details	Data
Publication Years	2023-2024
Citation Years	2023-2024
Papers	2045
Citations	34484
Cites per year	17242.0
Cites per paper	16.86
Cites per author	8286.85
Papers per author	538.28
Authors per paper	5.58
h-index	74
g-index	134
hI, norm	34
hi, annual	17
hA-index	56

Publication Analysis

Table 2 indicates the publication productivity based on the year from 2023-2024, and found a huge number of papers (75.89%) were produced in the year 2024 and the remaining 24.11% of the research articles were published in 2023. The results show that the growth of research has been gradually increasing.

Table 2: Year-wise publications

Year	Documents	Percentage
2024	1552	75.89
2023	493	24.11
Total	2045	100

Types of documents

Analyzing the types of documents examined, most of the studies (48.2%) were articles. The data of documents on ChatGPT in Medicine has different types of publications with 17 languages and the documents were Articles (2,045), Letters (1,046), Editorials (366), Reviews (352), Notes (241), Conference papers (210), Short surveys (28), Book chapter (24), Erratum (23), Conference reviews (6), Books (4), and retracted (3). But the original research articles (2045) have only been chosen for data analysis.

Top 10 Documents with Different Subjects

Figure 1 represents the subject-wise distribution of publications on ChatGPT in Medicine and found that the majority of papers (72.3%) were in medicine out of 15 disciplines. The next leading subject was health care with 6.1% and followed by computer science was 4.8%, and the remaining subjects were below 4%.

table cont....

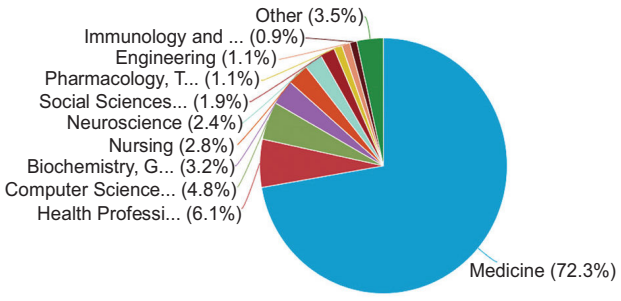


Figure 1: Subject-wise distribution[25]

Top 10 Documents with Authors

Figure 2 indicates the top ranked authors in ChatGPT in Medicine during the period of two years from 2023 to 2024. Among the two years, the huge number of papers published by Seth,I with 20 articles, followed by Cheungpasitporn, W, Miao, J and Thongprayoon, C with 19 research articles each and the third productive author was Lechien, J.R with 17 articles. It found that the most of the publications were joint authors.

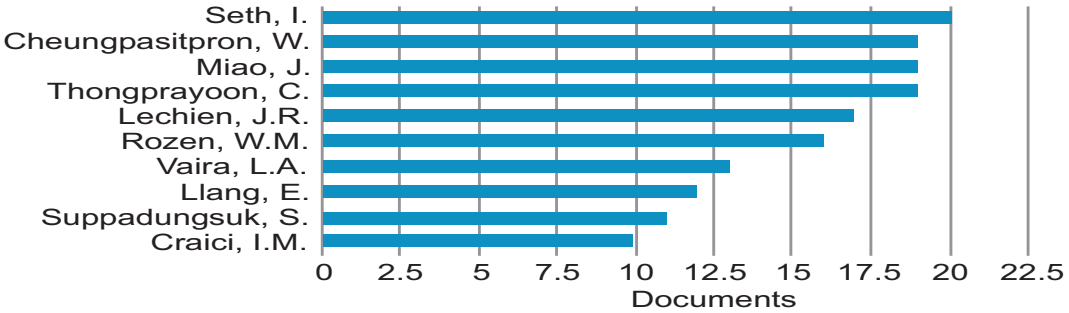


Figure 2: Productive authors on ChatGPT in Medicine

Top 10 Documents with Affiliations

Figure 3 investigates the affiliation-wise contribution in ChatGPT in Medicine and found huge amount of the publications are produced by Harvard Medical School (= 62), and ranked first and followed Mayo Clinic with (=49) and placed second and third rank by University of Toronto (=40). The least amount of papers published among top ten institutions was "University of California, San Francisco" with 28 research papers. The results showed that the researchers from "Harvard Medical School" were eagerly involved in publishing papers in ChatGPT in Medicine.

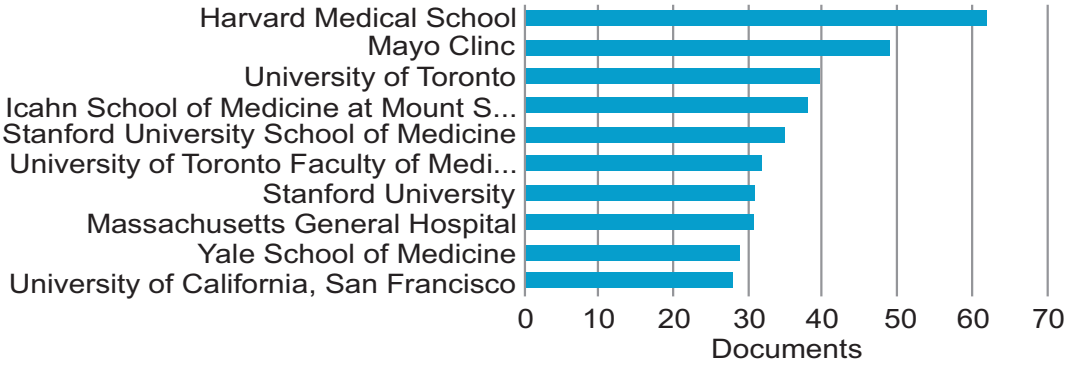


Figure 3: Distribution by Affiliations

Top 10 Productive Funding Sponsors

Hundred and two (102) funding sponsors were identified during the study, as shown in Figure 4, which shows the funding agencies' examination of ChatGPT in Medicine. The U.S. Department of Health and Human Services and the National Institute of Health supported 129 publications apiece, ranking them first out of 102. The National Natural Science Foundation of China came in second with 47 publications financed. With 8043 research papers, the Ministry of Science and Technology holds the third position. The National Institute of Health and the U.S. Department of Health and Human Services were the two organizations that supported research in a nation with the most qualified and productive publications, according to the results.

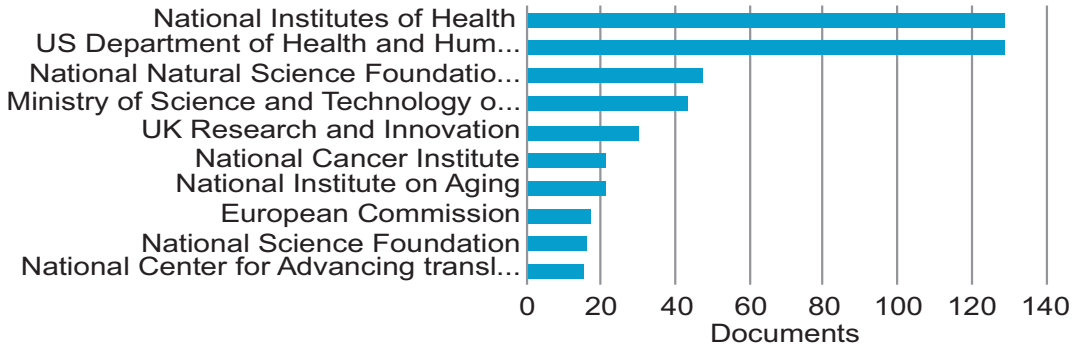
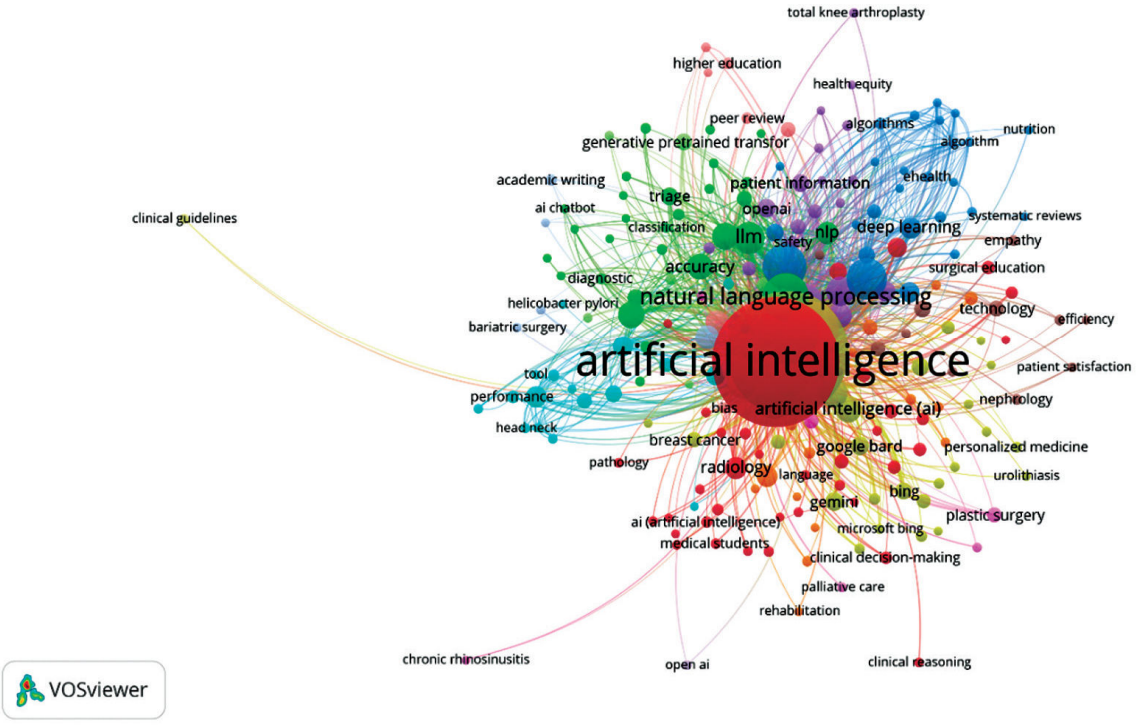


Figure 4: Productive Funding Sponsors

Co-occurrence-author keywords

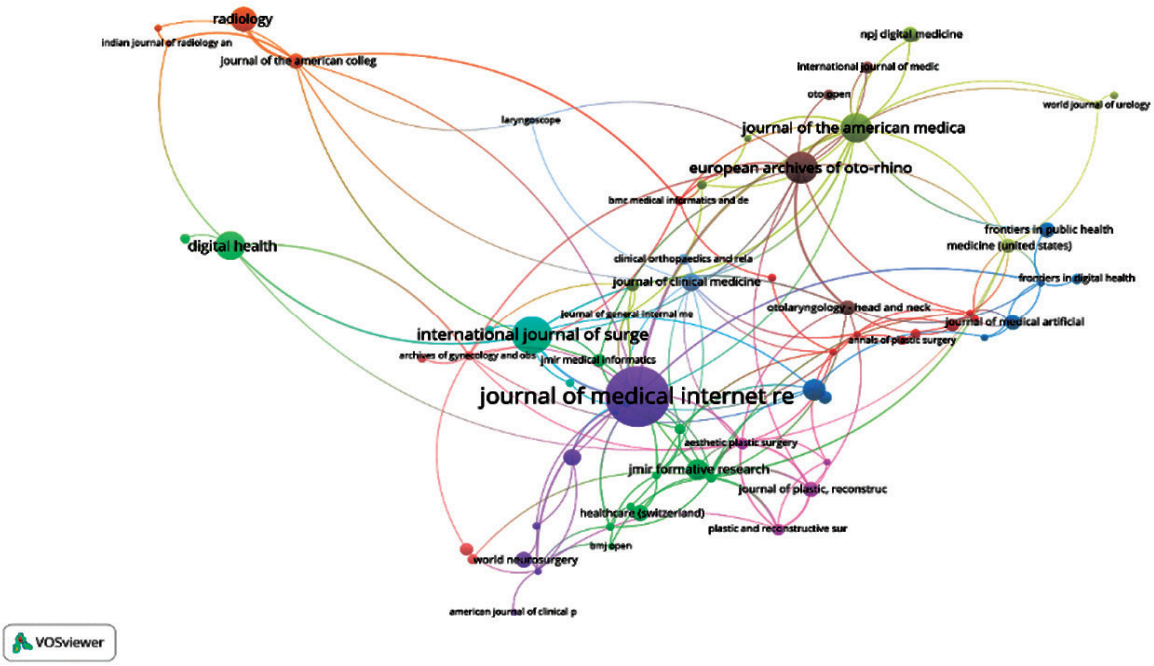
Keyword co-occurrence of authors was measured, and the top five keywords were "artificial intelligence", with 1024 occurrences, and the total link strength is 2913. The next leading keyword is "chatgpt" with 947 occurrences, and the total link strength is 2830. The third productive keyword is "large language models" with 240 occurrences, and the total link strength is 895. The keyword "natural language processing" has 138 occurrences, and the total link strength is 694. The fifth top keyword is "large language model" with 185 occurrences, and the total link strength is 680.



Map 1: Co-occurrence-author keywords of network visual

Bibliographic coupling of sources

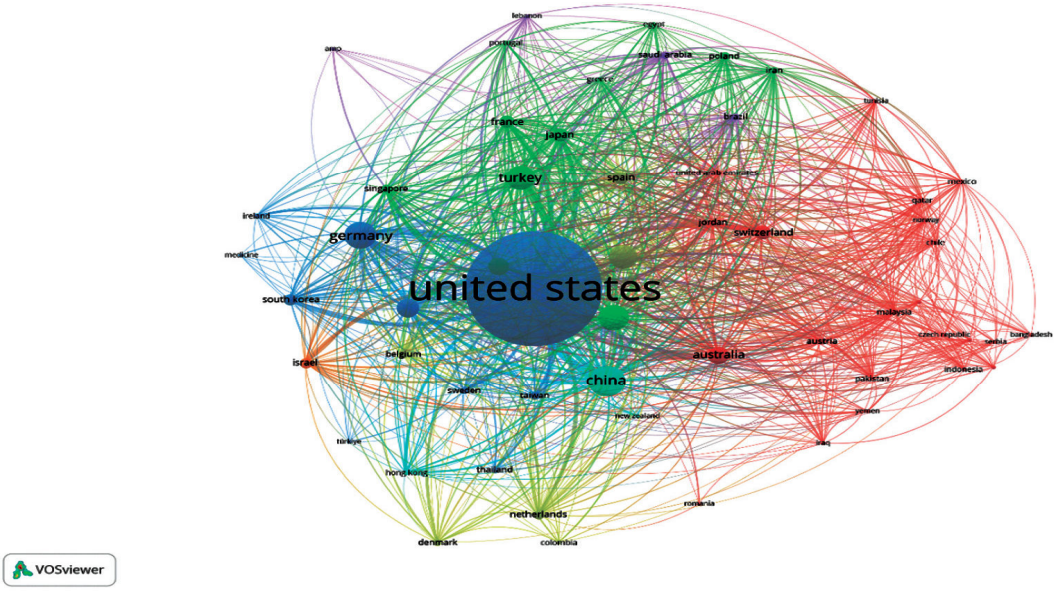
The leading journals were "Journal of Medical Internet Research" with 77 records with 1934 citations, and its total link strength was 6419, and ranked first and followed by "International Journal of Surgery, London, England" with 42 records. The citations were 580, and its total link strength was 3258, and ranked second, and the third rank goes to "European Archives of Oto Rhino Laryngology" with 34 records, and its citations were 658, and the total link strength was 2254.



Map 2: Publications Bibliographic coupling by journals (2023-2024)

Bibliographic coupling by countries

Map 3 shows how the research publications in the discipline were distributed by top 10 countries by several publications. The top-ranked countries with articles were published by the United States (=899) with 17239 citations, and its total link strength was 164919 and ranked first. Following the list were China (=175) ranked second with 1682 citations and its total link strength was 47016, and Germany (=146) ranked third with 2355 citations and its total link strength was 39124, United Kingdom (=136), got fourth with 2970 citations and its total link strength was 37144 and Italy (=126) had the fifth rank with 3017 citations and its total link strength was 36179. The results showed that the United States was the leading and productive country with collaborated with other countries in terms of publishing research articles.



Map 3: Publications Bibliographic coupling by journals (2023-2024)

CONCLUSION

The study has given how fresh the platform is, the scientific output on ChatGPT in medicine is diverse. Through bibliometric analysis, the current study demonstrated the useful insights of ChatGPT on the productivity of medical research. Research involving data from several sources, such as Scopus-based data, may alter the results and warrant additional investigation. "Bibliometric analysis is a useful method for obtaining a comprehensive assessment of a particular research area or journal," state Shukla *et al*. (2020). Stakeholders interested in a specific field of study or journal may find this study to be very important in formulating strategies and pertinent issues (Sahu, 2021).

Furthermore, based on the current direction of a specific research field, these studies could offer a legitimate research goal or guidelines to be investigated in this study. In conclusion, during the last two years, ChatGPT in medicine has recognized the most esteemed institutions for their substantial global research productivity as well as their academic brilliance.

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