

Role of ChatGPT in Healthcare Industry

Raghav Garg¹

Jayshree Periwai International School, Jaipur

Abstract

The present review article aimed at finding the impact of AI generated Natural Language Processing tools (chatbot name ChatGPT) in the field of healthcare and medical research. It was found that ChatGPT is very useful in article writing, administrative medical services as well as in tele-consultancy in remote areas, still it was documented in many researches that it may cause harm to human originality, skill comprehension, communication, decision making. It cannot replace a human health professional. There is a need to develop a regulatory framework to minimize the misuse of this new AI tool and facilitate its use in a more precise manner to save time and cost with enhanced efficiency in writing skills as well.

Keywords

Artificial intelligence, AI, Healthcare, Diseases, Treatment, Medical education, ChatGPT

Introduction

There is a global revolution in the healthcare industry due to advancement in newer technologies including artificial intelligence (AI). Conversational chatbots are in much usage involving picture, voice, gesture, keyboard etc. New contribution in this area is speech recognition technology in the form of 'Natural language processing' (NLP). Before this in 1966, ELIZA was introduced as a chatbot that followed the pattern of identifying the question and matching answers displayed. It was the first of its kind of app that was much appreciated but it had its own disadvantages as it lacked knowledge and communication skills. Chat Generative Pre-trained Transformer (ChatGPT) is the newer version of chatbot technology launched in November 2022. It is better than ELIZA as it can transmute a wider range of industrial sectors including healthcare. The aim of this AI-powered chatbot is to provide immediate access to exact information about medical topics. Its improvement was based on supervised and reinforcement learning processes. It provides responses to text based inputs. It is a program that processes natural language input and provides appropriate replies on the basis of huge amounts of data.

The transformer model is the foundation for ChatGPT in which input data is processed through self-attention technology [12]. It is user friendly and gives rapid responses. In the present review article, different types of usages of ChatGPT have been studied through various research studies in relation to the healthcare sector.

Methodology

Data from different researches was searched from Scopus, PubMed and Google scholar databases published in 2023, using the keywords: 'ChatGPT' and 'Healthcare industry'. From this database, 17 researches were found that were quite relevant to the topic. After collecting and going through an extensive amount of review of literature, role of ChatGPT was identified in different segments of medical care, teleconsultation, medical research, medical education and scientific writing.

Review of literature

Generative Pretrained Transformer (GPT) is a kind of Artificial Intelligence (AI) that generates written articles as if written by a human being. ChatGPT has great potential in many applications in healthcare. This AI generated chatbot has features of text generation, text translation, categorisation, making abstract of articles and creating conversation systems.

Moreover, it can also be used for various Natural Language Processing (NLP) tasks like speech tone analysis, tagging of speech and entity identification.

As GPT needs access to enormous medical information that is precise and updated, therefore it's very important to retrieve data from authentic sources. Although it is very useful as a chatbot, digital assistant, and in other healthcare related applications, it is also very important to maintain confidentiality of data as it has access to many sensitive medical information. Therefore it depicts some medical ethics related limitations, data interpretation, accountability of the results and other privacy related issues ^[1].

Another study done by Vaishya et al. (2023) observed that although chatGPT generate rapid responses, data is generated from existing content that is available on the internet. Also they found wrong answers to many medical queries. Still it has learning ability from previous answers. Still there is a need to check all data generated from medical point of view ^[2].

Zaman (2023) analyzed strengths, weaknesses and opportunities in the healthcare sector of chatGPT in their research paper through a comprehensive SWOT analysis. An improved engagement from the patients side as well as its role in medical education was documented in this paper but simultaneously, it showed its own weaknesses such as risk of validity of data and it was not able to interpret non-text reports. Although it was seen with a promising role for personalized as well as better health care facilities for the patients in remote areas. It is a facility but it can increase the risk of self treatment among patients. Therefore making guidelines for safe usage of ChatGPT is essential ^[3].

Sharma and Sharma (2023) highlighted the potential role of ChatGPT for mariners as they have the risk of not getting proper health care during long sea voyages. Prompt health care facilities can be provided to sea voyagers by enhancing expertise and conversational capabilities of ChatGPT. ChatGPT can be helpful in virtual medical consultations for mariners by expert healthcare professionals, thus it can prove a revolutionary way to provide health care for mariners ^[4].

Impact of ChatGPT, an AI language model, was seen by Awal and Awal (2023) in scientific medical writing. With no doubt it was accepted that it increased the efficiency of writing in a cost effective and standardized manner. With this, it was found to be time saving as it provided a base draft that could be polished by an expert. Consistent formatting, better terminology and style are some important features that made ChatGPT a useful AI tool. It was suggested to use this tool with caution as it lacked expertise compared to human scientific writers, reliability of the data and ethical concerns. It cannot replace human professionals in interpretation of comprehensive medical reports. Responsible usage can only be possible after making guidelines for ethics and legal issues ^[5].

Role of ChatGPT was studied to increase the efficiency of pediatric surgery. It was documented that there is still need of more research in this field ^[6].

AI tools like ChatGPT have brought transformative changes in many industries including healthcare. This has remarkably enhanced communication and problem-solving features. Efficiency and productivity of the workplace has been drastically shoot up in the field of healthcare as well as in medical education. With these positive aspects, Rane (2023) raised some concerns for data privacy, validity of the data generated and lesser opportunities for human employment as it has automated many things in a cost and time saving manner. It

has made data analysis easier.

As human intuitions are combined with upcoming technologies in Industry 5.0, it provides more collaborative, adaptive, and empathetic interactions between mankind and AI tools. There is a paradigm shift in overall productivity. Societal issues can also be addressed using these AI tools such as accessibility and affordability to healthcare, educational disparities as well as it was found to be helpful in providing tailor made solutions to a variety of communities as per their problems. Possibilities of a harmonious co-existence of humans with automated machines and softwares were explored in the present research article [7].

The third innovation of OpenAI's language model was ChatGPT-3 (Generative Pretrained Transformer 3), which was released in the year 2020. It has been programmed to extract huge amounts of text data available on the Internet and generate text after Natural Language Processing (NLP) with many functions like text completion, making abstracts, translation etc. Present study investigated the potential role of ChatGPT in Orthopedic aspects and analyzed it through related studies available on the internet. ChatGPT-3 was perceived as Virtual Doctor (DocGPT) [8].

Alanzi (2023) investigated the future of ChatGPT on teleconsultation facilities. It can perform various functions such as providing information, help in diagnostics, communication, skill enhancement, cost effectiveness, time saving, tailormade healthcare, language translational support, helpful in research, report writing, updating existing education etc. This paper also made it evident that there were concerns regarding errors, misdiagnosis, some faults in personalized care, ethical and legal issues and limited knowledge [9].

Beneficial role of Artificial Intelligence, particularly ChatGPT, was studied in writing 'Review of Literature' as it was a very time consuming task. Digital Twin applications were chosen. This study showed the efficiency of ChatGPT in compilation and expression of data. It showed that in future, there will be less human efforts in report writing and publication [10].

Zhang et al. (2023) identified that ChatGPT can be helpful in performing administrative tasks like appointment schedules, billing process etc. that can provide time to spare towards patient care. It will not only enhance departmental efficiency but also reduce healthcare costs. It was recommended that although ChatGPT can perform some administrative duties of a physician, it still cannot replace human doctors. Therefore it's very critical

to implement its usage into the healthcare sector after going through its challenges ^[11].

ChatGPT can also be useful in the field of public health. It is helpful in generating informed decisions reports for the communities about their health. Therefore, Biswas (2023) also examined the potential use of ChatGPT in public health with its benefits and challenges ^[12].

ChatGPT can play a promising role if the safety and privacy concerns are addressed appropriately. Sallam (2023) studied the importance of ChatGPT in medical education, research and healthcare. Following benefits of ChatGPT were documented -

- Good quality scientific report writing and improving quality and convenient research
- Utility in data analysis, coding, collection and formatting review of literature, spare time to focus on experimental design and helpful in new drug experiments
- Useful in management of the administrative tasks often done in health care facility like maintaining the workflow, budget saving, record maintenance, individualized medicines and spreading health awareness and
- Helpful in medical education by increasing focus on critical thinking and problem-based learning.

Besides documenting benefits, Sallam (2023) also reported some concerns related to use of ChatGPT that included issues related to medical ethics, copyright, transparency, and legal aspects, biased results, tendency of plagiarism, lack of original reports or data, inaccurate data output, limited and incorrect knowledge, improper citations, issues pertaining to the cybersecurity etc. It was recommended that in its present state, ChatGPT can not substitute any human author unless the guidelines are amended by ICMJE/COPE. An initiative is needed by all stakeholders to make a responsible usage of ChatGPT ^[13].

Hosseini et al. (2023) also recommended a thoughtful and measured process in adoption of ChatGPT in the field of medical education ^[14].

ChatGPT enables the public to converse with an automated mechanized tool on a wide range of data. It has reached 100 million users in no time just after its release in November 2022 that made it the fastest-growing consumer application till date. ChatGPT was also found to be a useful tool in generating a patient simulation tool as well as in forming quizzes for the students. It mimicked communication between a doctor and a patient, attempting to summarize a scientific article that raised questions on academic integrity. It led to the de-

velopment of a curriculum on artificial intelligence that should be learned by various health professionals. To gather more authentic data in order to make certain guidelines, *JMIR Medical Education* has called for research papers related to the theme of usage of AI. ChatGPT will be used to make an initial draft of the papers and human guest editors will finally edit the initial draft ^[15].

Shahsavar and Choudhary (2023) aimed to study the perception for decision-making and willingness to use ChatGPT for self-diagnosis by a population group and to find out whether it was effective and safe. The data was retrieved from 607 candidates in a cross sectional survey. The results supported a higher performance expectancy of ChatGPT and were positively associated with improved decision-making outcomes among its end users. Different factors were identified that affected willingness to use ChatGPT. A strong inclination was observed in people to use this AI generated tool. It was highlighted that there should be a collaboration among AI developing companies, healthcare industry and policy-makers to ensure responsible use of ChatGPT. It has not only enhanced access to healthcare but also improved awareness and education in terms of increased medical tourism. Increasing usage of this chatbot for self-diagnosis has affected digital health treatment plans. It has in turn affected patient disease or treatment outcome ^[16].

Potential of the ChatGPT in article writing and decision making has brought a revolution in the field of medical research. This AI generated language processing trained chatbot is popular for its human-like interactions. In this research, the role of ChatGPT was studied as a potential tool in the treatment of Non-Communicable Diseases ^[17].

Conclusion

In the present review article, the positive and negative aspects of ChatGPT were studied in the field of healthcare and medical research. This tool has the great potential to transform the entire system of healthcare. At present, intensive research work is required to enhance safe and effective usage with guidelines for ethical usage of the AI tool. It should be ensured to minimize its risk to society, especially the public who may misuse it for self diagnosis or self treatment or lack of originality in report writing. There is a need to formulate a regulatory framework who can monitor the use or misuse of this new and developing AI technology.

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