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ChatGPT for Healthcare Sector: SWOT Analysis

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Abstract

This research paper presents a comprehensive SWOT analysis of ChatGPT in healthcare, examining its strengths, weaknesses, opportunities, and threats. The paper highlights the potential benefits of ChatGPT, such as improved patient engagement and support for medical education, as well as its limitations, including the risk of inaccurate data and inability to summarize non-text reports. The paper also identifies opportunities for ChatGPT, such as enabling personalized healthcare delivery and supporting remote patient monitoring. However, the paper also highlights potential threats, such as self-treatment among patients and the risk of an AI-driven infodemic. The significance of this research paper lies in its valuable insights into the ethical and safe use of ChatGPT in healthcare, providing healthcare professionals and policymakers with important considerations for its use. The SWOT analysis also serves as a framework for future research and development of ChatGPT and other large language models in healthcare. This research paper is a significant contribution to the ongoing discussion on the use of ChatGPT in healthcare and its potential impact on patient care and public health.

Keywords: ChatGPT usability, Healthcare systems, SWOT analysis, OpenAI trial version.

1 | Introduction

The chatbot ChatGPT (Open AI, San Francisco, CA, USA) has become incredibly popular. ChatGPT, which will be made available to the general public in November 2022, is an Artificial Intelligence (AI) system that was trained using data taken from the internet that was created by people, including chats [1]. Deep learning models, known as transformers, are used in ChatGPT. Through the use of a large dataset of text, the model learns patterns and generates human-like responses. Using a conversational model, ChatGPT produces relevant and coherent responses based on context and input from users. An AI-powered chatbot is capable of Natural Language Processing (NLP), personalization, customer service, sales and marketing, task automation, 24/7 availability, etc. [2]. ChatGPT has taken internet searching to the next level; the program provides quick and thorough comprehension of complicated subjects and creates personalized conversational solutions to the precise topic posed while remembering its own past responses. ChatGPT has demonstrated outstanding performance across several use scenarios while still only being a research preview.

Healthcare professionals and researchers have also been very interested in and divided about ChatGPT. An AI-powered chatbot also can handle tasks like patient triage, the virtual consultations, medication administration, mental health support, chronic illness management, and more in the healthcare industry [3], [4]. Through NLP and personalization, ChatGPT can help improve healthcare efficiency and accessibility. While AI-powered chatbots can have many advantages for the healthcare, industry, there are also a number of drawbacks to taking into account, such as dependency, misdiagnosis, bad advice, lack of human touch, legal and ethical issues, and worries about privacy [5].

1.1 | Working Principle of ChatGPT

The ChatGPT system uses GPT-3.5 architecture for deep learning. A transformer neural network is trained on large amounts of text data to learn patterns and predict next words based on context. By using a combination of self-attention and feed-forward neural networks, ChatGPT can identify relationships between words. Encoding entails dividing the input text into tokens, assigning a numerical representation for each token [6]. Tokens are then passed through transformer layers, creating contextualized representations. Input text words are weighed by self-attention mechanisms, and each token has a probability of being the next word, depending on its context and training. It is possible to determine output response randomness and diversity using sampling techniques, such as temperature-based sampling. The ChatGPT system can be customised for specific datasets or domains, enhancing performance in specific tasks. The ChatGPT system combines these steps to comprehend user queries and provide relevant and coherent responses, resulting in an interactive conversation experience.
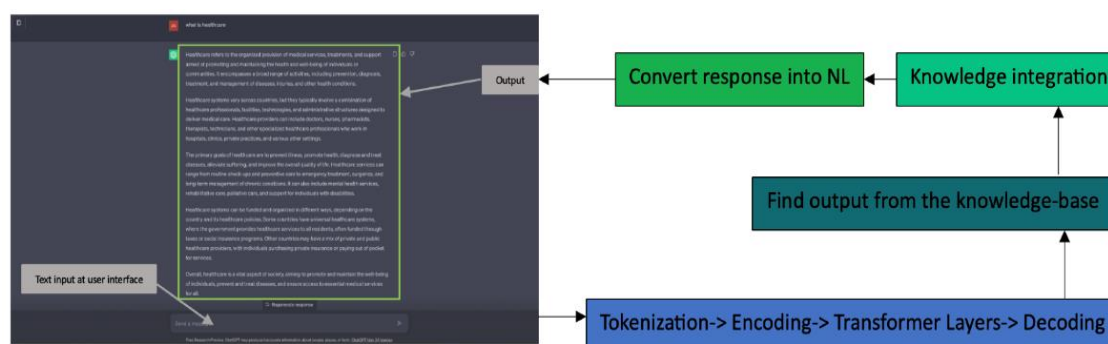

Fig. 1. ChatGPT's working principle.

To enhance its responses, ChatGPT can also rely on a knowledge base. Knowledge bases are structured collections of information available during a conversation [7]. The model is capable of retrieving relevant answers, facts, or references from a knowledge base in order to respond appropriately. This enables ChatGPT to provide accurate and reliable responses based on verified facts and data when a user query requires factual information or specifics. Human experts can create a knowledge base based on high-quality sources such as encyclopedias, databases, or industry-specific knowledge. In order to integrate the retrieved information into the generated response, ChatGPT can utilize the knowledge base. Using this integration, the model can provide contextually relevant answers, thereby improving its conversational capability.

1.2 | Example of ChatGPT's Application in Healthcare

Several medical fields have utilized Generative Pre-trained Transformer (GPT) models for treatment purposes. As part of mental health treatment, GPT models were developed to develop virtual conversational agents. Personalized and accessible treatment options are provided, offering support, guidance, and resources to treat mental health concerns. In GPT models, guidelines are used to build interactive systems that provide personalized recommendations, reminders, and feedback to encourage positive lifestyle changes. To support individuals managing chronic diseases, GPT models can provide

personalized treatment plans and medication reminders, symptom tracking, and educational resources for self-care. The field of precision medicine explores GPT models to tailor treatment to an individual's unique characteristics. Data from genomics, clinical records, and treatment outcomes can be analyzed by these models to make personalized recommendations. Rehabilitation and physical therapy use GPT modeling to develop interactive tools that can guide individuals through personalized exercise routines, provide feedback on form and technique as well as track progress. Models like GPT have been used in palliative care settings to enhance communication, assist with end-of-life decision-making, and provide information about treatments and prognoses. A chatbot, such as ChatGPT developed by OpenAI, can speed up the creation of evidence-based clinical practice guidelines by searching and selecting relevant evidence from a variety of databases in an efficient manner. However, ChatGPT should be understood to complement and enhance healthcare professionals, not to replace their expertise [8]. Chen et al. [9] evaluated the performance of ChatGPT in providing cancer treatment recommendations aligned with NCCN guidelines, finding that while it provided NCCN-concordant recommendations for most prompts, a significant portion also included non-concordant recommendations, indicating limitations in its reliability and robustness for providing accurate cancer treatment information. Arslan [10] suggests ChatGPT may be useful for obesity treatment, since it can provide personalized nutritional, exercise, and psychological support, making the treatment more effective; however, ethical and security concerns must be addressed to ensure its responsible application.

Sinha et al. [11] evaluated the capability of ChatGPT, a NLP model, in solving higher-order reasoning questions in pathology. The results showed that ChatGPT demonstrated a relational level of accuracy in providing meaningful responses, scoring approximately 80%. This suggests that the program can be utilized by academicians and students as a helpful tool for reasoning-type questions. Further research is needed to assess its accuracy in future versions of the program [7]. An exploratory case study on the use of ChatGPT for simplifying radiology reports showed promising potential in improving patient-centered care, although concerns regarding the accuracy and potential harm were identified and further research is needed [12]. According to Bhattacharya et al. [13], ChatGPT, an advanced large language model developed by OpenAI, offers impressive capabilities in generating human-like text and stimulating conversations. However, it is crucial to consider both the benefits and drawbacks of such models, as they have the potential to impact evidence-based medicine.

ChatGPT and similar GPT tools have contributed to mental and physical health treatment [14]. These models provide personalized guidance, resources, and recommendations, which improve therapy outcomes. Precision medicine analyzes genomics and clinical data to make tailored recommendations. Chronic disease management includes tailored treatment plans, medication reminders, symptom tracking, and educational resources. During rehabilitation and physical therapy, they guide individuals through personalized workout routines, track progress, and provide feedback. Furthermore, ChatGPT offers the potential to improve patient-centered care in physical and mental health treatments. While more research is needed, ChatGPT shows promise. ChatGPT is a new platform that is still developing and we can expect to see more empirical relevant research in this field in the near future.

1.3 | SWOT Analysis

The identification and analysis of internal and external elements that may have an impact on an organization's or project's success are made using the strategic planning tool known as the SWOT analysis [15]. Strengths, Weaknesses, Opportunities, and Threats are referred to by the abbreviation SWOT. The usage of ChatGPT in healthcare can benefit from SWOT analysis in a variety of ways. A SWOT analysis can provide light on ChatGPT's advantages, disadvantages, opportunities, and threats in the context of the healthcare industry. This may be used to create plans for maximizing the usage of ChatGPT in the healthcare industry, such as enhancing context awareness to deliver more accurate medical guidance. A SWOT analysis can show areas where changes can be made to better help patients and healthcare workers by highlighting ChatGPT's shortcomings related to healthcare, such as a lack of empathy.

Moreover, a SWOT analysis may assist in analyzing and minimizing these risks by identifying possible threats to ChatGPT's usage in healthcare, such as privacy issues, to guarantee patient safety and data protection. A SWOT analysis can assist in exploiting ChatGPT's strengths that are particular to the healthcare industry, such as its extensive medical expertise, to improve healthcare services for patients. A SWOT analysis can assist in investigating and extending the possible uses of ChatGPT in healthcare by finding possibilities particular to that industry, such as offering remote medical consultations.

1.4 | Significance

This article's goal is to present all sides of ChatGPT's application in healthcare, from positive to negative. A SWOT analysis of ChatGPT for the healthcare industry can reveal information about its advantages, disadvantages, opportunities, and threats. Most of the past studies discussed the opportunities and challenges of this technology. Very few papers mentioned the strength and relevant threats. However, this paper is explaining all those factors in a systematic format. This can assist in formulating plans to maximize its utilization and enhance patient outcomes for healthcare. This study advances the field of conversational AI in healthcare. Using ChatGPT in healthcare settings helps guide the design and implementation of AI systems in healthcare by identifying its strengths and weaknesses. In addition to improving patient care and engagement, the study's findings could assist healthcare professionals in making better decisions. Also, it addresses challenges and ethical concerns relating to AI, ensures patient privacy, addresses biases, and fosters trust in AI-powered healthcare solutions.

2 | SWOT Analysis

2.1 | Strength of ChatGPT in Healthcare

The extensive knowledge base of ChatGPT is one of its key advantages. With the help of extensive training data, ChatGPT has developed a profound grasp of various subjects and can respond to user inquiries with precision. Also, because of its linguistic skills, consumers will find it more approachable and natural. Moreover, ChatGPT is versatile and can be adjusted to meet varied user demands since it can be adapted and integrated with various platforms.
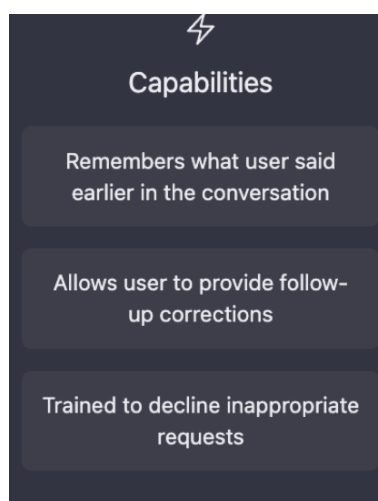

Fig. 2. ChatGPT's strength.

One of the main strengths of ChatGPT for healthcare is its NLP capabilities [7]. The vast amount of data available within a short amount of time is one of the biggest strengths of ChatGPT. Moreover, ChatGPT can provide consistent information and recommendations across different healthcare providers, reducing variability in care and improving patient outcomes.

ChatGPT has automated a storage system to remember what the user said earlier in the conversation. It allows the user to provide follow-up corrections and is trained to decline inappropriate requests.

2.2 | Weakness of ChatGPT in Healthcare

Although ChatGPT's NLP skills are one of its assets in the healthcare industry, they may occasionally be a liability. One possible drawback is that patients with inadequate reading or language abilities might not always be able to understand ChatGPT's replies. In such circumstances, a human healthcare expert may be more suited to explain medical facts to the patient in a manner that they may comprehend [16]. Another drawback of ChatGPT is that it cannot always be able to distinguish fine distinctions in language or communication, which is crucial in healthcare situations. For instance, ChatGPT might not be able to decipher crucial information about a patient's medical status from their tone of voice or other nonverbal indicators [17]. The significance of interpersonal communication and empathy in healthcare settings cannot be overstated, even though NLP is a potent tool for enhancing healthcare communication. Patients might choose to communicate with a live healthcare provider who can offer them both medical guidance and emotional support. ChatGPT's responses may be accurate but lack the emotional intelligence and empathy that a human healthcare professional can provide.

ChatGPT may not always be able to understand the context of a patient's situation or medical history, which can lead to inaccurate or inappropriate responses. Moreover, like any AI system, ChatGPT is susceptible to bias and errors that can impact the accuracy of its responses.

Because many medical reports, including radiology or imaging data, cannot be in text format, ChatGPT's inability to summarize a non-text report is a drawback for the healthcare usage of the model. ChatGPT may not be able to offer a thorough knowledge of a patient's health state or make precise treatment suggestions if it cannot summarize these findings. This could result in misdiagnoses or ineffective therapies, which might damage the patient.

For instance, ChatGPT might not be able to summarize the radiology report and determine the urgency of the problem if it shows worrisome growth. The patient can experience a worse prognosis as a result of a delayed or missing diagnosis. As a result, ChatGPT's inability to summarize non-text findings represents a substantial barrier to its adoption in the healthcare industry. Despite improvements being made, it is still difficult for AI to analyze non-text input, such as using picture recognition algorithms. To ensure that their patients receive the best care possible, healthcare practitioners must be aware of ChatGPT's limitations and utilize it in conjunction with other tools and examinations.

⚠️
Limitations

May occasionally generate incorrect information

May occasionally produce harmful instructions or biased content

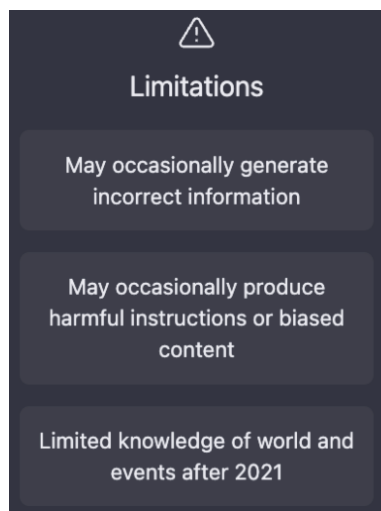Limited knowledge of world and events after 2021

Fig. 3. ChatGPT's wakeless in healthcare assistance – in the development stage.

Because healthcare is a profession that is continually growing and where new research and discoveries are frequently released, ChatGPT's inability to provide the most recent data is a limitation. ChatGPT may deliver obsolete or erroneous information if it does not have access to the most recent data, which might result in wrong treatment recommendations or missed diagnoses. For instance, ChatGPT may not be able to offer accurate information on the efficacy or potential adverse effects of a new treatment if it does not have access to the most recent clinical trial data. Patients may end up receiving unsuitable or inadequate therapies as a result, which might be harmful.

Moreover, the absence of the latest data may cause ChatGPT to overlook revised clinical standards, practices, or guidelines that are made in response to fresh scientific findings. This may affect its capacity to make suggestions that are accurate and up-to-date. Hence, ChatGPT's usage in healthcare is severely constrained by the lack of the most recent data. To provide the greatest service for patients, it is crucial to make sure ChatGPT gets access to the most recent and current information. To give ChatGPT the most recent information, healthcare practitioners must often update their knowledge base.

2.3 | Opportunities of ChatGPT in Healthcare

In this section, we aim to investigate the role of ChatGPT from the perspective of different participants of the healthcare system chain. The healthcare system generally comprises four major components: a healthcare provider (doctors and nurses), the health organization management, the patients, and the future ace of the system- the medical education taker and learner.

2.3.1 | Benefits for healthcare professionals

ChatGPT can act as an auxiliary for patients' diagnosis report summarization. ChatGPT is trained with NLP, which is a subfield of AI and computer science train machine to interpret human (natural) languages. NLP algorithms, Named Entity Recognition (NER), and sentiment analysis techniques extract key points from the report and can customize the summary of the report. The report provided by ChatGPT not only in a very short time but also delivers a succinct and lucid summary.

Additionally, ChatGPT has the ability to recommend diagnoses and treatments based on the data archive analysis. Not only can ChatGPT recommend diagnosis and treatment based on comparing the patient's reports and history with medical literature, but also it can predict the possible outcomes of the treatments. Thus, the system can aid doctors in providing customized treatment to patients and help to select the best option for fast recovery treatment.

Moreover, ChatGPT is a language model comprised of a vast corpus of text related to medical literature, including medical research studies, articles, and other publications. Indeed, among various methods and tools for medical literature analysis NLP and text analysis is the most efficient. Critical information on patients' demographics, treatment history, and outcome data can be extracted from the medical text by utilizing NLP techniques of ChatGPT, and the systems also assist the researchers in pinpointing the patterns and trends in the data, up-to-date and most beneficial treatment options or areas for further study. On the other hand, text analysis algorithms of ChatGPT can incorporate to identify the most important concepts and themes in the medical literature. One of the techniques is topic modeling, which the system utilizes for identifying the most common topics and themes in a set of documents. Overall, ChatGPT makes medical research a lot easier and more time efficient.

ChatGPT has vast medical information, so it can assist healthcare providers by delivering summaries of the latest research on a particular disease, treatment, or medication. To keep healthcare providers up to date, it can also give insights on recent trends and issues in healthcare, such as new treatment techniques, inventions of medicines, new therapies, diagnostic techniques, and technology, and prepare the healthcare providers by delivering background knowledge and training about disease outbreaks [10].

ChatGPT can perform a vital role by assisting healthcare professionals with telemedicine services. It acerates the process by acting conducting patient triage, appointment scheduling, medication management, and follow-up care. By conducting the initial assessment of patients using NLP, it can refer patients to appropriate specialists. Moreover, the initial medication suggestion and information can be extracted from AI's database, including dosage level and side effects, which can be handy during medicine prescriptions. ChatGPT is an AI system that can be available 24/7 and is the best option for post-appointment updates and monitoring. Hence, ChatGPT makes after-appointment feedback tracking easy and available [5].

ChatGPT can remind patients of their upcoming appointments and medications, which is very useful in the case of chronic conditions. Moreover, by tracking patients' symptoms, this system can assist nurses and guide increasing patient involvement by spending less time maintaining a better patient outcome.

2.3.2 | Opportunities for healthcare management

AI can automate administrative processes of healthcare systems by performing tasks on behalf of administrative staff [4]. ChatGPT can facilitate patients in scheduling appointments with healthcare providers and remind them of upcoming appointments. ChatGPT can send automated messages to patients regarding appointment reminders, test results, and other important information. Adjoining AI, thus, not only can help reduce the workload of administrative staff but also can ensure that patients receive timely care. Therefore, chances of missed notification and human error can be reduced if not eliminated from the system.

Additionally, ChatGPT can help healthcare providers with billing and coding tasks by providing information on coding requirements. As an AI system, naturally, ChatGPT has the capability to identify potential billing errors and thus ensure that claims and transactions are accomplished correctly. Besides, ChatGPT can assist with health insurance management by providing information on insurance requirements, verifying patient eligibility, and submitting claims. This can help reduce errors and ensure that healthcare providers are reimbursed appropriately for their services.

ChatGPT can generate healthcare websites by performing tasks such as content creation, website design, and website maintenance if the necessary information is given. The AI system can guide to generate the website for a healthcare organization and incorporate it in answering patients' frequently asked questions, diverting patients to appropriate specialists in telemedicine management and system automation, enabling 24/7 service without human error and saving time for administrative staff to perform other priority tasks.

2.3.3 | Opportunities for patients

ChatGPT can assist patients in understanding medical terminology and jargon. It has a database from which it extracts information related to particular terminology and provides the querier with a description and meaning of the jargon. Thus, helps the patients to understand complex medical terms in a more straightforward language than that of as mentioned in their medical reports from either diagnoses or prescriptions from doctors, which helps to carry out the treatment plans better. As patients realize the terminologies, patients can explore all treatment options before making decisions. Also, ChatGPT provides the patients with information about the different treatment options available if only some particular key points are mentioned about the symptoms. However, more detailed queries can help ChatGPT provide a better and more accurate response. Moreover, by exploring the potential health risk of different drugs, health conditions, and treatments, ChatGPT guides patients in making more informed decisions.

According to the figure, ChatGPT provided treatment suggestions for fever, medicine, lifestyle, and home remedy. Moreover, it's suggested to make a doctor's appointment in case of a high fever and mention the temperature, which should be considered a high fever.

The database of ChatGPT can track related information about mediums, i.e., counseling services, emergency contact details, etc. For first aid and initial or emergency, thus, ChatGPT can be of great help. Lastly, ChatGPT helps to minimize the management procedural time and the lead time of waiting for treatment reduce, and patients are the ultimate benefited party from this time efficiency.

2.3.4 | Opportunities for medical education

Technology breakthroughs are advancing medical education, and AI like Chat GPT can serve many beneficial functions. ChatGPT has the potential to play a significant role in the field of medical education. It can be used to automate the grading process, generate exercises and scenarios, create personalized learning plans, provide research assistance, offer quick access to information, and even translate languages. With its ability to analyze sentence structure, vocabulary, grammar, and clarity of papers and essays, ChatGPT can be a valuable tool for educators who have to grade a large number of assignments. It can also generate exercises and quizzes, summaries, and translations, making complex learning materials easier for students to understand. Additionally, ChatGPT can create virtual tutors that can answer students' questions and provide feedback on their work. It can also assist in research by answering questions, generating bibliographies and outlines, and summarizing relevant articles [18].
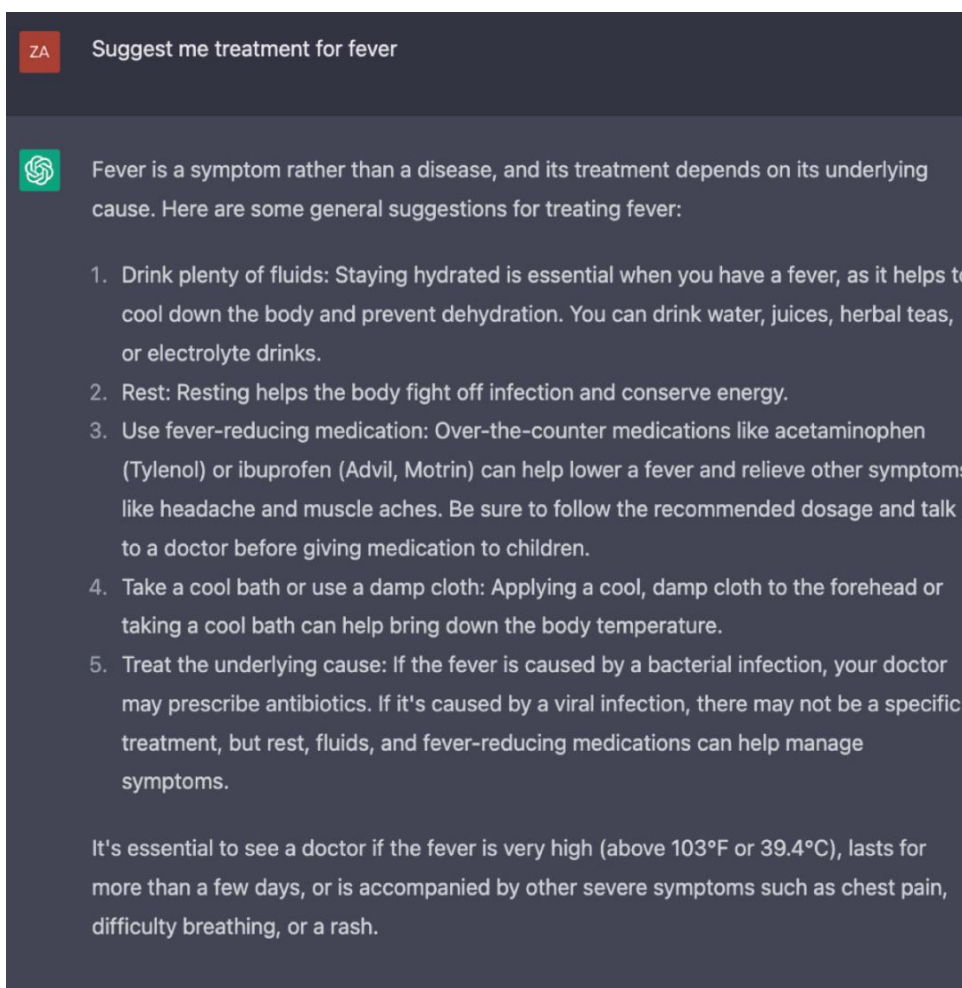

ZA Suggest me treatment for fever

Fever is a symptom rather than a disease, and its treatment depends on its underlying cause. Here are some general suggestions for treating fever:

1. Drink plenty of fluids: Staying hydrated is essential when you have a fever, as it helps to cool down the body and prevent dehydration. You can drink water, juices, herbal teas, or electrolyte drinks.
2. Rest: Resting helps the body fight off infection and conserve energy.
3. Use fever-reducing medication: Over-the-counter medications like acetaminophen (Tylenol) or ibuprofen (Advil, Motrin) can help lower a fever and relieve other symptoms like headache and muscle aches. Be sure to follow the recommended dosage and talk to a doctor before giving medication to children.
4. Take a cool bath or use a damp cloth: Applying a cool, damp cloth to the forehead or taking a cool bath can help bring down the body temperature.
5. Treat the underlying cause: If the fever is caused by a bacterial infection, your doctor may prescribe antibiotics. If it's caused by a viral infection, there may not be a specific treatment, but rest, fluids, and fever-reducing medications can help manage symptoms.

It's essential to see a doctor if the fever is very high (above 103°F or 39.4°C), lasts for more than a few days, or is accompanied by other severe symptoms such as chest pain, difficulty breathing, or a rash.

Fig. 4. ChatGPT's treatment suggestion for fever.

Furthermore, ChatGPT can generate case scenarios to help medical students practice and improve their diagnostic and treatment-planning abilities. It can also create relevant, engaging, and interactive materials such as summaries, quizzes, and flashcards to facilitate learning for students. Its language translation abilities can be used to communicate with patients from different linguistic backgrounds, providing the best medical care. ChatGPT's potential to revolutionize medical education is immense, and it can play a significant role in shaping the future of healthcare by creating a more skilled and knowledgeable workforce.

2.4 | Threats of ChatGPT in Healthcare

Because of its NLP capabilities, ChatGPT poses various possible risks to the healthcare industry. One possible risk is that ChatGPT's replies might be inaccurate or mistaken. Although while ChatGPT has been trained on a sizable quantity of data and has shown good accuracy in many situations, it is not perfect. Inaccurate or incorrect medical advice from ChatGPT might hurt patients or have unfavorable effects. The potential for bias in ChatGPT's replies represents a further danger. In healthcare situations, prejudice or discrimination may result if the data utilized to train ChatGPT is in any way skewed. Patients from marginalized populations who may already suffer discrepancies in healthcare may find this to be especially troubling.

Also, there may be security and privacy issues with the usage of ChatGPT in the medical field. If ChatGPT is not properly deployed or protected, it might result in data breaches or other security problems that endanger patient confidentiality and privacy. Lastly, the application of ChatGPT in healthcare may raise moral questaions about the use of AI in clinical judgment. Some may contend that the application of AI language models in the medical field might diminish the value of human empathy and emotional support in patient care. Concerns about AI's capacity to completely replace human healthcare workers may also exist.

ChatGPT can potentially be a threat for healthcare due to a number of reasons. The use of ChatGPT in healthcare raises legal and ethical concerns around liability, accountability, and responsibility for medical advice given by an AI system [4].

Currently, there is a lack of clear regulation and standards for the use of AI in healthcare, which can make it difficult to ensure patient safety and quality of care [4], [5].

The widespread use of ChatGPT and other AI systems in healthcare may lead to job displacement for healthcare professionals, particularly those in lower-skilled roles [6].

Some patients and healthcare providers may be resistant to the use of AI in healthcare, preferring to rely on human expertise and interaction [19], [20].

Because inaccurate data can result in wrong treatment recommendations, missed diagnoses, and potential patient injury, it poses a serious danger to the implementation of ChatGPT in the healthcare industry [21]. Inaccurate data can seriously impair ChatGPT's capacity to give accurate and knowledgeable replies to healthcare practitioners and patients. For instance, ChatGPT may provide erroneous treatment suggestions or omit crucial information that might have an influence on a patient's care if it gets inaccurate data regarding a patient's medical history or present symptoms.

Moreover, biases in the data that ChatGPT is trained on may contribute to erroneous results [22]. These prejudices may cause ChatGPT to make incorrect or bia, especially in the direction of underprivileged groups. Further discrepancies in healthcare results and patient experiences may result from this. As a result, healthcare practitioners must make sure ChatGPT is trained using reliable, impartial data and constantly evaluate its performance to spot and fix any errors. In order to assure its correctness and relevance to the patient's particular circumstance, it is also crucial to check and confirm any information that ChatGPT delivers. Patients may suffer injury if this is not done, which might lower the standard of treatment.

The inclination of patients to self-treat poses a risk to the use of ChatGPT in healthcare since it may result in improper and perhaps hazardous self-treatment techniques. ChatGPT is a tool designed to help medical staff and give people information, but it shouldn't take the place of advice from a licensed healthcare expert.

Patients could be tempted to diagnose and treat their diseases entirely based on the information supplied by ChatGPT without consulting a doctor [23]. This may result in self-medicating with the wrong drugs, delaying getting the right help, or failing to realize how bad their illness is. For instance, a patient may utilize ChatGPT to self-diagnose their symptoms before buying and taking over-the-counter drugs without consulting a doctor. This could exacerbate their disease, conceal the intensity of their symptoms, or lead to unfavorable drug interactions.

Moreover, patients could lack the medical expertise required to correctly evaluate and implement the data offered by ChatGPT. This increases the risk of injury by increasing the likelihood of misconceptions or incorrect interpretations of the information. As a result, healthcare professionals need to inform individuals on how to utilize ChatGPT properly and stress the value of consulting a doctor before self-treating any ailment. Patients should be made aware that ChatGPT is an adjunct to medical therapy, not a substitute for it. To ensure that patients are informed about ChatGPT's limits and possible hazards, it is crucial to create precise guidelines for its usage. Patients may suffer injury and the standard of treatment may be compromised if this is not done.

The learning process of medical students may be endangered by the usage of ChatGPT in healthcare teaching [24]. Students may avoid learning from real-world experiences, which are essential for enhancing clinical decision-making abilities, as a result of their reliance on ChatGPT. Moreover, the likelihood of plagiarism when utilizing ChatGPT can be detrimental to the standard of medical education. To hone their clinical abilities, medical students must learn how to assess and analyze medical information in the moment, such as during patient interactions. The development of these abilities may be hampered by relying simply on ChatGPT for information since it does not take into account the subtleties and complexity of real-time medical decision-making.

The quality of medical education may suffer as a result of the inclination toward plagiarism when utilizing ChatGPT. Without a thorough comprehension of the underlying medical ideas, medical students may be tempted to copy and paste material from ChatGPT, which might result in subpar patient care and even cause injury to patients.

It is crucial to use ChatGPT in conjunction with medical education, not as a substitute for it. In order to help their learning process, medical students must obtain sufficient instruction on how to utilize ChatGPT appropriately and successfully. This includes highlighting how critical it is for them to practice making clinical decisions in real-world settings and offering advice on how to utilize ChatGPT responsibly and without plagiarism. Failing to do so might degrade medical education standards and have a severe effect on patient care.

5 | Conclusion

This paper presents a thorough SWOT analysis of ChatGPT in healthcare, providing an overview of its strengths, weaknesses, opportunities, and threats. The analysis revealed several potential benefits of using ChatGPT in healthcare, such as improved patient engagement, instant access to medical information, and support for medical education. However, there are also limitations to its use, such as the risk of inaccurate data and an inability to summarize non-text reports.

Furthermore, the analysis identified potential opportunities for ChatGPT, including supporting remote patient monitoring and enabling personalized healthcare delivery. Nevertheless, its use also poses potential threats, such as the possibility of self-treatment among patients and the risk of an AI-driven infodemic.

Table 1. SWOT analysis of ChatGPT for healthcare highlight.

Strengths	Extensive knowledge base
	Linguistic skills
	Versatility
	NLP capabilities is a main strength for healthcare.
	ChatGPT can provide consistent information, recommendations across healthcare providers.
	Automated storage system to remember user input and decline inappropriate requests
Weaknesses	Limited patient comprehension due to language and reading
	Lack of emotional intelligence and empathy
	Inability to understand context or medical history
	Susceptibility to bias and errors
	Inability to summarize non-text data format
	Lack of access to the most recent data
Opportunities	Benefits for healthcare professionals:
	– Summarise patient reports quickly and accurately.
	– Recommends diagnoses and predicts possible outcomes.
	– Extracts critical information from medical text.
	– Delivers summaries of latest research on diseases, treatments and medications.
	– Assists with telemedicine services, patitent triage, appointments scheduling and medication management.
	– Reminds patients of upcoming appointments and medications.
	Opportunities for healthcare management:
	– Automates administrative processes and reduces workload.
	– Helps with billing and coding tasks and insurance management.
	– Generates healthcare websites and provides 24/7 service.
	Opportunitiesfor patients:
	– Assists patients in understanding medical terminology and jargon.
	– Provides information about different treatment options available.
	– Enables patients to ask more detailed queriesnfor better guidance.
	– Provides reminders of upcoming appointments and medications.
Threats	Inaccurate or mistaken replies from ChatGPT
	Potential bias in ChatGPTs replies
	Security and privacy is sties
	Ethical concerns around the use of AI in clinical judgment
	Lack of cleat regulations and standards for the use of AI in healthcare
	Job displacement for healthcare professionals
	Patient and healthcare provider resistance to AI in healthcare
	Inaccurate data cotild res tilt in wrong treatment recommendations missed diagnoses, and potential patient injury.
	Patients' inclination to self-treatleading to improper and potentially hazardous self-treatment techniques
	Endangerment of the learning process of medical Students who rely too heavily on ChatGPT and may be prone to plagiarism.

It is clear that ChatGPT can dramatically improve patient care and medical education. Yet, because to the inherent hazards, its use in healthcare necessitates a careful evaluation of moral and practical considerations. Hence, while using ChatGPT in healthcare, professionals and policymakers should exercise caution and make sure that it is done so in accordance with ethical standards and safety precautions.

Overall, this study adds to the continuing discussion about ChatGPT's application in healthcare and its possible effects on patient care and general health. This paper's SWOT analysis approach offers useful direction for the study and development of ChatGPT and other big language models in healthcare.

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