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ORIGINAL RESEARCH

Impact of ChatGPT on Teleconsultants in Healthcare: Perceptions of Healthcare Experts in Saudi Arabia

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Purpose: This study aims to investigate the impact of ChatGPT on teleconsultants in managing their operations and services.

Methods: A qualitative approach with focus groups is adopted in this study. A total of 54 participants with varying degrees of experience using AI such as ChatGPT in healthcare, including 11 physicians, 24 nurses, eight dieticians, six pharmacists, and five physiotherapists providing teleconsultations participated in this study.

Results: Twelve themes including informational support, diagnostic assistance, communication, enhancing efficiency, cost and time saving, personalizing care, multilingual support, assisting in medical research, decision-making, documentation, continuing education, and enhanced team collaboration reflecting positive impact were identified from the data analysis of seven focus groups. In addition, six themes including misdiagnosis and errors, issues in personalized care, ethical and legal issues, limited medical context/knowledge, communication challenges, and increased dependency reflecting negative impact were identified.

Conclusion: Although ChatGPT has several advantages for teleconsultants in the healthcare sector, it is associated with ethical issues.

Keywords: ChatGPT, teleconsultants, healthcare, artificial intelligence, AI, decision-making, information

Introduction

Applications for telemedicine, such as teleconsultations, may be able to address problems in the health system with regard to coverage of services, increasing costs, and patient access to care. The term "telemedicine", which combines the words "tele" and "medicine", is not particularly novel. Long distance connections have been used in medicine for a very long time.[1,2] Teleconsultations are outpatient sessions that use videoconferencing technology to allow for real-time conversation between people who are geographically apart. It is a part of the broader definition of telemedicine, which also encompasses store-and-forward telemedicine and remote patient monitoring.[3] Teleconsultants can include wide range of professionals such as physicians, nurses, nutritionists, pharmacists, physiotherapists, and any other healthcare professional, who can provide services remotely either for patients or physicians.[4] Teleconsultations can be categorized into three types,[5] which include: between a patient and healthcare provider; between healthcare providers; and between one patient and more than one healthcare providers (For example, a diabetic patient, diabetic doctor, and a pharmacist or neurologist). Previous research has suggested that teleconsultations are as effective or slightly inferior as face-to-face consultations, especially in terms of patients' satisfaction,[6–9] resource management,[10–13] clinical outcomes,[14–19] and feasibility.[20–22]

However, teleconsultants face several challenges when providing teleconsultations, including technical proficiency, limited physical examination, communication skills, privacy and security, reimbursement, and legal and regulatory challenges. In relation to technical proficiency, teleconsultants need to be comfortable with the technology and equipment required for teleconsultations. They should have access to a reliable internet connection and appropriate equipment, and they should be familiar with the software or platform being used for the teleconsultation.[23–25] As there is no face-to-face interaction with patients, teleconsultants need to be able to provide appropriate advice and guidance based on the limited

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physical examination that can be conducted remotely.[26,27] Moreover, teleconsultants need to be skilled at communicating effectively with patients remotely. This includes being able to establish rapport and trust with patients, and being able to convey complex medical information in a way that patients can understand.[28,29] In relation to privacy and security, teleconsultants need to ensure that patient information is kept secure and that privacy is maintained during the teleconsultation. They should be familiar with the applicable laws and regulations governing the transmission of medical information, and they should take steps to ensure that patient information is protected.[30] Furthermore, teleconsultants need to be familiar with the legal and regulatory requirements governing teleconsultations in their jurisdiction. This may include licensure and credentialing requirements, as well as requirements related to the use of technology and the transmission of medical information.[31]

By examining patient symptoms, medical history, lab test results, and imaging studies, AI algorithms could help teleconsultants diagnose medical disorders. This could aid teleconsultants in developing more precise diagnoses and successful treatment strategies.[30,32,33] By giving real-time recommendations based on patient data, AI systems could help teleconsultants in making treatment choices. For instance, an AI algorithm may suggest a certain drug based on a patient's symptoms, medical history, and other details.[34] By gathering and analysing data from wearables and other sensors, AI may assist teleconsultants in remotely monitoring patients. This could help teleconsultants spot potential health issues before they worsen and take preventive action.[30] Data entry, appointment scheduling, and prescription refills may be automated by AI, freeing up teleconsultants to concentrate on patient care.[35]

By offering individualised health suggestions, educational materials, and remote coaching, AI may assist teleconsultants in engaging patients more successfully. This may encourage patients to remain motivated and involved in their own care, improving results.[36] By offering real-time insights into patient health data including blood glucose levels, blood pressure readings, and medication adherence, AI may assist doctors in managing chronic diseases. This may help doctors spot potential health issues before they worsen and take preventative action.[37] By offering a central platform for sharing patient data and insights, AI may promote greater communication and collaboration amongst doctors. This may make it possible for all doctors involved in a patient's treatment to have access to the same data and make better decisions.[38] OpenAI's ChatGPT is a state-of-the-art language model that draws on the history and development of artificial intelligence to create a predictive generative model. It was designed in 2020 using the "Generative Pre-trained Transformer 3.5" (GPT-3.5) architecture. With its groundbreaking ability to generate and comprehend text with human-like fluency, ChatGPT is a major step forward in the field of natural language processing. ChatGPT is an artificial intelligence that can simulate human conversation when given typed text inputs from users. ChatGPT can react with clear and appropriate language to a user's question, advise request, creative writing request, or other assignment. For instance, a teleconsultant may seek some information about a disease or medicine or condition, simply by typing a question in ChatGPT, or may present it with a condition, and ask for best possible treatment or medicine suggestions. In addition, they can also use the application in research, and monitoring by integrating with other applications and devices. Its contextual understanding, contextual response generation, and human language mimicry demonstrate its sophistication as a generative predictive model, expanding the capabilities of AI for a wide range of uses, from customer service to content creation to healthcare and educational services.

Large language models like ChatGPT have been created thanks to recent developments in AI-based natural language processing and deep learning. These models have been extensively employed for many different applications, including question-answering, text production, and language translation.[39] Research[40–42] have demonstrated that ChatGPT could answer a variety of queries with reasonable accuracy and relevance, beating earlier models in both accuracy and efficiency. Moreover, ChatGPT has proven to be capable of producing text that is cohesive and well-organized, making it suitable for tasks like content production and summary.[43] The newer version ChatGPT-4 has more powerful image processing capabilities like image processing, text processing, which can be very useful in managing health records and analysis, and also in diagnosis of radiology images.[44]

Although ChatGPT has showed promise in several applications, issues with its possible biases and restrictions also exist. Studies have shown that language models like ChatGPT could reinforce pre-existing biases in the data they are trained on, producing biased results in their outputs. More study is required to solve ChatGPT's shortcoming, which include those caused by the quality and provenance of the data used for training. However, the actual data used in

ChatGPT for now remains a trade secret; and therefore, the majority of the research focused on its applications in various fields from the users-end.[45–47] Consequently, more investigation is required to properly comprehend ChatGPT's impact and correct its flaws and biases. ChatGPT has demonstrated promise as a tool for teleconsultations and patient care in the healthcare industry.[45,46] ChatGPT's capability to deliver timely and precise information could help teleconsultants make educated judgements and deliver better patient care.[47] To completely comprehend ChatGPT's effects on teleconsultants and patient outcomes, more study is necessary. In this context, this study aims to investigate the impact of ChatGPT on teleconsultants in managing their operations and services.

This study contributes to the research literature and academia in better understanding the impact of AI technologies in healthcare. The study can evaluate the effectiveness of using ChatGPT as a support tool for teleconsultants. It can assess whether AI language models enhance the quality of teleconsultations, improve patient outcomes, and contribute positively to healthcare delivery. Furthermore, this research can identify the challenges faced by teleconsultants when integrating AI language models like ChatGPT into their practice. It can highlight technical limitations, communication issues, and ethical concerns that may arise in the context of telemedicine.

Methods

Study Design, Setting, and Sample

To investigate the effects of ChatGPT on teleconsultants in managing their operations in the Saudi Arabian healthcare system, a descriptive qualitative approach using focus group discussions (FGs) held at government hospitals was taken into consideration. This method aids in examining issues and occurrences involving people's perceptions and experiences.[48] Being a registered healthcare professional (physicians, nurses, nutritionists/dieticians, pharmacists, and physiotherapists, who had varying levels of experience in using ChatGPT-3) with more than a year of experience was required for participation. The analysis excluded unregistered healthcare workers who were not linked to the hospitals under consideration. An email invitation to participate in the study was sent to a convenient sample of medical professionals as part of the recruiting phase for the FGs, with a clear inclusion criterion (The initial email invitation asked medical professionals whether they were familiar with ChatGPT'). Those who agreed to participate in the FGs were invited to meetings in hospitals at times that suited for them. 54 medical professionals from various specialisations participated in seven focus group discussions (FGs) in two Saudi Arabian government hospitals. To ensure homogeneity and to benefit from their shared experiences, the groups varied in size from seven to nine participants from different professions per session depending on their practice backgrounds.[49] Focus group members were purposefully chosen in order to ensure that an adequate number of healthcare professionals from different departments or professions took part in the study. Via saturation, the total number of participants was established. When the researchers arrived at the consensus that data categories had been formed and that fresh data had been sorted into those categories, the FGs were stopped.

Data Collection

The FGs were set up to gather data about the various ways in which ChatGPT may affect teleconsultants in the healthcare industry. The researchers created a thorough set of twenty questions (appended as Appendix A) to discuss the various effects or influences that ChatGPT may have on Saudi Arabia's healthcare professionals. Follow-up inquiries like "What do you mean?" and "Can you clarify, please?" were used to elicit further details and promote more dialogue. Because English is the main language in healthcare settings in Saudi Arabia, one of the researchers (TA) led the focus group discussions (through semi-structured questioning) in English language. Regardless of where they were from or what their mother tongue was, every participant spoke English very well. Opportunistic sampling method was adopted during the focus groups discussion, taking advantage of the events as they unfolded. By inquiring about their opinions of the study's goals, the interviewer who served as the FGs' moderator made sure that all participants were involved. This was done to make sure that every opinion was heard and to prevent the dominance of FGs by a few people, which is seen to be a prevalent problem with focus group procedures. Nonetheless, the individuals in this study had a lot in common. They were all healthcare professionals (teleconsultants), and the interviewer was able to successfully manage the FGs as the ChatGPT influence was consistent in several aspects. All participants were assured of anonymity and privacy, and participation was entirely voluntary. To get complete information

from the FGs, voice recordings of the sessions were made. Every session lasted for almost an hour. Before each FG session, participants gave their informed consent. The use of pseudonyms and codes ensures that the information is reported anonymously. Imam Abdulrahman Bin Faisal University's institutional review board in Saudi Arabia granted ethical approval (IRB-2023-03-130). An informed consent was obtained from the participants for the publication of anonymized responses.

Data Analysis

To enable computerised storage and management, the audio-recorded data were converted into text using NVIVO qualitative data analysis software. The transcribed text was reviewed and updated by the authors to ensure that the meaning of the sentences remained same. The framework developed by Braun and Clarke was used for thematic analysis.[49] The evaluation was driven by an approach, which calls for observing and searching for meaningful patterns and relevant review topics in the data. This phase was followed by developing early codes, looking for themes, reviewing themes, and defining and naming themes.[49] Each category of topics was given a name, and the coded data were organised and classified according to their similarity using the MAXQDA 2022 software.

Results

Characteristics of Participants

Out of the 54 participants, 33 were females; and 21 were males. The participants included 11 physicians, 24 nurses, six pharmacists, eight nutritionists/dieticians, and five physiotherapists. Majority of the participants had more than six years of experience in their respective fields. The demographic information of the participants is presented in Table 1.

Table 1 Participants Demographics

Demographic Data	Frequency
Gender	
Male	21
Female	33
Age	
18–30 years	8
31–40 years	23
41–50 years	14
More than 50 years	9
Profession	
Physicians	11
Nurses	24
Pharmacists	6
Nutritionists/Dietician	8
Physiotherapists	5
Experience	
Less than 3 years	6
3–6 years	15
6–9 years	23
More than 9 years	10

Positive Impact/Influence of ChatGPT on Healthcare Teleconsultants

The impact of ChatGPT on teleconsultants in healthcare is represented by twelve themes developed from the focus groups. These themes represented different activities and operations related to the healthcare professionals, which are presented in the following sections.

Informational Support

One of the key impacts of ChatGPT on healthcare teleconsultants is the support provided in accessing information. It was identified that ChatGPT could provide accurate and up-to-date information on medical conditions, symptoms, treatments, and medications to healthcare teleconsultants. In addition, it could also support healthcare professionals by creating awareness about the key developments in their respective fields, enabling them to better deliver the healthcare services. This could help them make informed decisions and provide better care to their patients. These inferences were derived from the five interviewees in different fields.

> I can ask ChatGPT for latest medical research and guidelines and summaries of new developments in Cardiology research. It provides a summary of all the information I require. This saves a lot of time, as I do not need to read different journals, articles and other publications, or browse online for many sources of information (Cardiologist physician, Hospital A).

> ChatGPT can help me in learning new developments in the telenursing process, especially in relation to the standards of practices, treatment or monitoring procedures. This helps me to improve my skills and capabilities and be up-to-date with the developments in the telenursing sectors, and provide high quality care to the patients remotely (Nurse, Hospital B).

> Being a pharmacist, I need to keep myself updated with new drugs, and relevant information on indications, dosages, side effects, interactions, and contraindications. Also, some complex queries such as potential drug interactions between multiple medications and the effects of different drug combinations on different patients can be understood using ChatGPT. Being aware not only helps me from a career perspective, but also in delivering quality care (Pharmacist, Hospital B).

> I can rely on ChatGPT for nutritional information of various foods, developing personalized meal plans for patients with different conditions, identifying food allergies and sensitivities and many more areas where the information keeps updating according to the changing lifestyles of the people and developments in the nutritional research (Dietician, Hospital A).

> I used ChatGPT for guidance on exercise therapy, including recommendations for the best exercises for a particular patient or condition; and also, for identifying potential contraindications for exercise therapy, such as medical conditions or medications that may impact a patient's ability to exercise safely (Physiotherapist, Hospital A).

Diagnostic Assistance

ChatGPT could assist healthcare teleconsultants in diagnosing medical conditions by asking relevant questions and analyzing the symptoms reported by the patient. Two physicians illustrated these points by discussing the relevance of ChatGPT in diagnostic assistance.

> I may sometimes refer to ChatGPT for information on abnormalities in scans or signs of infections. This would help me in better analyzing the scans, and improve accuracy and save time (Radiologist physician, Hospital A).

> With new infections spreading rapidly from time to time, it may be challenging for physicians to identify particular new diseases such as Covid-19 or other novel virus infections. ChatGPT can be used to identify symptoms of such new infections by the doctors, which can help in diagnosis procedures of novel infections (Pulmonologist, Hospital B).

Communication

ChatGPT could improve communication between healthcare teleconsultants and their patients by providing natural language processing capabilities that could help them understand the patient's concerns, needs, and expectations. Two participants including a nurse and a dietician discussed these points by explaining how they use ChatGPT for improving communication with patients and understanding their needs.

Although, I have enough experience of communicating with patients personally at hospitals, interacting with them online is something very new to me. I used ChatGPT to learn few aspects of online communication with patients such as using empathy in communication, using more plain language which patients are comfortable with, and also reconfirming if they have understood my feedback (Nurse, Hospital A).

I often deal with patients from different cultures other than Saudi, few from western countries and few from Asian communities. Their needs and preferences for foods are different, and it may sometimes become complex for me to understand their food preferences. I use ChatGPT for understanding few foods that are specific to certain cultures, and also take its assistance in preparing diet routines (Dietician, Hospital B).

Enhancing Efficiency

ChatGPT could enhance the efficiency of healthcare teleconsultants by automating routine tasks, such as scheduling appointments and sending reminders, allowing them to focus on providing quality care to their patients. Teleconsultation nurses are usually burdened with activities such as monitoring and tracing various conditions and vitals of the patients, booking appointments, providing suggestions and feedback, and also act as bridge between physicians and patients. Similarly other professionals such as nutritionists, physiotherapists, and pharmacists. All the participants. These findings could be inferred from the following statements.

The application can assist in collecting and analyzing patient information, such as symptoms and medical history, to help triage patients and determine the level of care needed (Physician Hospital B).

I believe, the existing applications that we use for managing appointments is not integrated with ChatGPT. Integrating appointment scheduling platforms with ChatGPT, effective and efficient platforms can be designed to provide a user-friendly interface for patients and healthcare providers to interact with ChatGPT and manage appointments (Physiotherapist, Hospital B).

Cost and Time Saving

ChatGPT could improve the efficiency of healthcare teleconsultants by automating routine tasks, such as appointment scheduling and prescription refills, and providing real-time alerts and notifications. Furthermore, by assisting teleconsultants in various tasks such as diagnosis, continued learning, reporting and prescriptions, it could result in utilization of less resources, save time, and also healthcare costs for healthcare providers and patients. This could free up more time for teleconsultants to focus on patient care and improve overall productivity. These findings could be inferred from the following statements.

ChatGPT can also be used by the patients for self-care and management of chronic illnesses, which may require frequent consultations. If the patients are educated and made aware about self-management of conditions such as diabetes, it can reduce consultations, improve communication with physicians, as they need not explain everything in detail to the patients (General physician, Hospital A).

Usually, the healthcare costs for personal consultations are very high compared to online consultations. Patients' healthcare expenses can be minimized by limiting personal physiotherapy consultations to the initial days of treatment, and later shifting to online consultations or therapies. This can significantly reduce healthcare expenses for patients, and also for benefit physiotherapists, as they can utilize their saved time for other patient consultations (Physiotherapist, Hospital A).

Personalizing Care

ChatGPT could help healthcare teleconsultants personalize care for their patients by providing tailored recommendations and treatment plans based on the patient's medical history, preferences, and lifestyle factors. These services could be applicable for teleconsultants in different fields. These findings are evident from the following statements.

ChatGPT can assist in monitoring patient data by analyzing patient-generated health data, such as fitness tracker data or self-reported symptoms, to track patient progress towards health goals and provide personalized recommendations (Physician, Hospital A).

We already have AI-based devices for real-time monitoring. For example, continuous glucose monitoring (CGM) patches for real-time blood glucose monitoring. By integrating ChatGPT with such technologies, more patient-centred care and recommendations can be automated, limiting the burden on the dieticians and nurses (Nurse, Hospital B).

ChatGPT may also be used for creating daily reports a summary of patients' data, who are using smart-devices to track their health, and may be used for recommendations such as changes in physical routines like providing alerts for a small walk, if the patient is idle for a long time (Dietician, Hospital A).

Multilingual Support

ChatGPT could provide multilingual support, allowing healthcare teleconsultants to communicate with patients who speak different languages. This could improve accessibility and quality of care for patients who may face language barriers. All participants including physicians, nurses, pharmacists, dieticians, and physiotherapists agreed with this feature, as evident from the following statements.

I usually refer to ChatGPT for understanding few words or statements expressed by patients who mix different language while communicating their problems online (Gynaecologist, Hospital B).

I use ChatGPT to modify my instructions in a different language, relating to particular movements during the therapy, so that the patients may find it easy to understand (Physiotherapist, Hospital A).

Assisting in Medical Research

ChatGPT could assist healthcare teleconsultants in conducting medical research by analyzing large volumes of medical data and providing insights into medical conditions, treatments, and outcomes. One of its important applications in medical research could be data analysis.

I frequently publish journals in the areas of eHealth technologies by collaborating with other pharmacists, doctors and academicians. Although, I am unaware of few complex data analysis methods that use statistical data and complex mathematical formulas, I recently came to know that ChatGPT is very efficient in handling such complex mathematical functions to analyse data. This could help researchers like me who are unaware of complex statistical analysis techniques (Pharmacist, Hospital A).

Decision-Making

ChatGPT could provide decision support to healthcare teleconsultants by analyzing patient data and providing recommendations for diagnoses, treatment plans, and medications. This could help teleconsultants make more informed decisions and improve patient outcomes.

With the informational support, that I receive from ChatGPT, I can decide on the medication according to different patients, especially in combining different drugs for effective results among the patients in improving their conditions (Pharmacist, Hospital A).

By becoming aware of developments in new treatment plans and technology interventions in managing chronic illnesses such as diabetes using ChatGPT, I can improve my decision-making process by providing the best treatment plan for my patients (General Physician, Hospital B).

Documentation

ChatGPT could assist healthcare teleconsultants in documenting patient consultations by summarizing key points, generating reports, and updating patient records. This could save time and improve accuracy in documentation. As explained earlier, this could improve work efficiency.

> Sometimes, I may need to summarize key points for communicating the patients condition with the doctors; and in this process, ChatGPT was very beneficial in helping me to identify key words and statements for the documentation process (Nurse, Hospital A).

> I feel, ChatGPT can be exceptionally well, if integrated into healthcare systems, where it can automate documentation process after listening to the physician and patient interaction, and then doctors may save time as they only need to review the analysis of ChatGPT rather than writing full case report (Physician, Hospital A).

Continuing Education

ChatGPT could offer continuing education to healthcare teleconsultants by providing access to up-to-date medical research, guidelines, and training modules. This could help teleconsultants stay current with the latest medical practices and improve the quality of care they provide. All the participants agreed with the ChatGPT's support for continued or life-long learning process.

Enhancing Team Collaboration

ChatGPT could enhance collaboration among healthcare teams by facilitating communication, sharing knowledge and insights, and coordinating care across multiple providers. This could improve patient outcomes and reduce the risk of medical errors. These findings are inferred from the following statement.

> Sometimes, I may need to participate in online consultations along with the doctor and patients to decide on the physical therapies required for the patients. I often face problems in understanding the needs and requirements during online collaborated consultations. I feel integrating ChatGPT with these collaborative platforms can help to streamline communication and ensure that everyone is on the same page (Pharmacist, Hospital B).

Challenges of Using ChatGPT in Healthcare Teleconsultations

A total of six major themes including Misdiagnosis and errors, issues in personalized care, limited medical context, communication challenges, ethical and legal issues, and increased dependency on technology were identified from the focus group discussions. Two sub-themes including liability and accountability, and security and privacy were grouped under ethical and legal issues. These are discussed below:

Misdiagnosis and Errors

Several issues were observed during the discussions, especially in relation to the accuracy, clinical judgement, and considering unique patient medical history. Although, ChatGPT is effective in providing assistance to teleconsultants, it was observed that relying completely on the application could lead to misdiagnoses and errors in clinical care. These findings are inferred from following statement.

> The most important observation that I can say is that these applications lack real world medical experience. Each patient may have different symptoms, different diagnostic results, based on which the treatment plans may be decided. As far as I think, even a small chance of error or misjudgement could lead to severe threat or risk that may affect the patients significantly. (Physician, Hospital A)

Issues in Personalized Care

Although there are advantages of ChatGPT in personalized care as discussed in above section, there are also issues associated with personal care, where ChatGPT have limitations. These may relate to establishing relationship, comfort for communication, and emotions. These findings can be inferred from the following statement.

> Few patients may take time to establish some comfort zone in communicating easily with doctors, while few may be open from the first instance. Patients may feel more comfortable in discussing sensitive issues to a human who can understand emotions rather than to a machine or application, which in turn helps in establishing a personalized relationship. (physician, Hospital A)

Limited Medical Context

In relation to the scope of ChatGPT's application, many issues were raised, especially in relation to its knowledge and abilities, real-time patient data, and day-to-day advancements in the medical research. In this context, one of the participants stated that

> I am not sure, if the application is aware of the ongoing research and the developments in the field of medicine. Because, when I ask any question related to the recent times, it apologizes and states it do not have access to real-time data. It is important for teleconsultants to regularly update themselves with the latest developments in their fields to be competitive and also to provide efficient and effective care. However, ChatGPT, in this context is of limited use (Physician, Hospital A)

Communication Challenges

It was observed that ChatGPT struggled to handle ambiguity or complex medical questions. Most of the participants stated that they had to modify their phrases or rephrase their questions to get the correct answer they were looking for. Few participants were not satisfied in this case, as it wastes their time and may lead to frustration or misunderstandings.

Increased Dependency on Technology

Most of the participants opined that over-reliance on ChatGPT could lead to a reduction in human teleconsultants' skills and clinical judgment over time, as they may become too dependent on the technology. Many issues related to over use such as weakened communication skills, erosion of clinical experience, reduced critical thinking, and becoming complacent and not updating themselves with latest medical knowledge.

Ethical and Legal Issues

There are many aspects of ethical issues observed by the participants. Usually during consultations, patients are aware that they are communicating with doctor who values their privacy and security. But, if the ChatGPT is used, who are patients interacting with? Is it the teleconsultant or a machine or a hybrid model? Also, the patients have right to know if they are interacting with an AI or a human teleconsultant. In addition, other complications include:

Liability and Accountability

Participants observed that there is some sort of accountability and liability they hold for the decisions they take in relation to the patients' condition. However, if something goes wrong, it may be challenging to determine whether the responsibility lies with the AI system or the teleconsultant using it. This can be inferred from the following statement.

> I am not sure, who holds the responsibility if I take decisions based on the ChatGPT suggestions and then it goes wrong. It is basically, me taking the decision, but the motivating factor to take such decision is the application. But, I am not sure if its liable or not, as it clearly acknowledges that its knowledge is limited. So, there are many such ethical and legal complications surrounding the use of ChatGPT in healthcare.

Security and Privacy

Most of the participants opined that protecting patients' data privacy and security becomes even more complex when AI-based applications like ChatGPT are used. They may enter patients details like their condition, age, sex, and other factors and may seek suggestions, which may breach the privacy and data security.

Discussion

The findings have suggested that ChatGPT could impact healthcare teleconsultations in different ways, especially in managing their activities and operations, reducing work burden, increasing awareness, and personal development. Studies[30,31] observed that the physicians need to be aware of various information in healthcare, especially in treatments, medications, standards, legal and regulatory policies. It can be observed from the findings that many participants identified the positive aspect of ChatGPT in providing informational support. Decision-making can be challenging for

healthcare teleconsultants, as they must provide diagnosis and treatment recommendations based on limited information and without the benefit of a physical exam. They may also have to navigate the limitations of technology, such as poor video or audio quality, that can impact their ability to communicate with patients effectively. However, it is important to note that while ChatGPT could provide informational support for healthcare teleconsultants, it is not a substitute for medical advice from a qualified physician or healthcare provider, as its weakness is reflected in medical examinations.[50] Physicians should always exercise their professional judgment and consult with their patients and other healthcare professionals when making medical decisions. However, recent studies[51,52] have indicated that ChatGPT is effective in medical examinations, suggesting the ambiguity in research studies in relation to the role clinical decision-making in future. But the findings in this study also suggested that overuse of such technologies may affect teleconsultants' skills and clinical judgment. AI based technologies were already identified to be effective in assisting physicians in diagnosis and developing treatment strategies,[30,32,33] and ChatGPT has demonstrated its effectiveness in terms of both accuracy and relevance by answering different queries.[40–42] The findings in this study are consistent with the previous studies[30,32,33,40–42] which indicated the positive impact of ChatGPT type of applications in providing diagnostic assistance, life-long learning, and most importantly decision-making among the healthcare teleconsultants.

To enable better healthcare services using AI technologies such as ChatGPT, effective communication is essential for providing high-quality healthcare teleconsultations. As observed from the findings in this study, by using plain language, visual aids, active listening, empathy, and clear communication channels, teleconsultants could help patients better understand their health issues and treatment options, leading to improved health outcomes. However, lack of human touch in communication is one of the issues found in this study, which may affect the communication between patients' and teleconsultants. Furthermore, challenges associated with teleconsultants such as lack of physical examination, poor communication and technical skills, inability to convey complex medical information, lack of rapport with patients, and trust issues[23–25,28,29] can be effectively addressed by integrating ChatGPT with online consultation platforms, which would enhance communication process as identified in this study. For instance, the participants learned through ChatGPT about improving communication by showing empathy and understanding cultures and using multi-language support[39] for improving their communication. In addition, it is also observed that ChatGPT could provide personalized care and recommendations, which could motivate patients in effectively engaging in their treatment and self-care procedures.[36] ChatGPT could monitor patient data by leveraging advanced analytics and NLP techniques, allowing healthcare providers to gain insights into patient health status and track patient progress towards health goals in real-time. By doing so, ChatGPT could help healthcare providers deliver more personalized and proactive care, resulting in better patient outcomes and improved quality of care. Furthermore, with multilingual support offered by ChatGPT, teleconsultants could improve patient care by improving communication, increasing accessibility, promoting patient engagement, enhancing cultural competence, and expanding their reach to more diverse patient populations.

The results suggested that by automating routine tasks, ChatGPT could help healthcare teleconsultants optimize their workflow, improve efficiency, and focus their attention on more complex patient care tasks. This could ultimately lead to better patient outcomes and satisfaction. However, documentation is an important and critical task, as the patients' condition and treatment procedures are completely dependent on the documents and reports. This could help teleconsultants in enhancing their work efficiency.[35] ChatGPT could also help in managing healthcare resources by automating routine tasks, optimizing resource allocation, and improving resource utilization. By doing so, ChatGPT could help healthcare providers improve the quality of care, reduce costs, and enhance patient outcomes.[35,43] Recent studies have suggested the applicability of ChatGPT in documentation process such as developing discharge summaries,[53] assisting nurses work flows,[54] and collaborative team of ChatGPT and healthcare professionals for delivering high-quality patient care.[55] This could significantly reduce the problem of healthcare resources availability,[56] lack of healthcare access,[57] and rising demand for healthcare services[58] in the past few years. However, the findings also suggested that misdiagnosis, errors, and lack of 100% accuracy in ChatGPT may lead to serious issues in the areas it is being utilized. Furthermore, its limited knowledge in the medical context, makes it more susceptible to errors, especially in diagnosis, monitoring, and developing treatment plans for patients.

One of the key challenges associated with ChatGPT is that it could only provide the underlying logic and natural language processing (NLP) capabilities required for automated appointment scheduling. However, to fully implement an automated appointment scheduling system, a supporting application or platform would be required to handle the user

interface and integrate with other systems, such as electronic health records (EHRs) and communication channels. In addition, it also raises ethical issues in its application in various sectors, especially the healthcare.[59–61]

As observed from the findings, ChatGPT could be used in medical research, as it is capable of processing and analyzing large volumes of medical data, including electronic health records, medical imaging data, clinical trial data, and other healthcare-related data.[61] However, the recent studies[45–47] suggested the limitations in ChatGPT as it is trained on a unknown datasets, and its accuracy and reliability may not be constant, indicating a major concern on its application in healthcare teleconsultations and other areas of applications. Therefore, it could be observed that while ChatGPT has many advantages for healthcare teleconsultants, parallelly, there are issues surrounding its applicability due to its novel nature, as its impact is not fully understood. In addition, ethical and legal complications is one of the serious challenges posed by ChatGPT in its application in healthcare, especially in relation to accountability and liability, and data privacy and security. Teleconsultants could avoid these issues by employing AI language models like ChatGPT as supplementary resources rather than replacement specialists. The use of AI in the consultation process should not replace the need for human teleconsultants to use their clinical judgment, check AI-generated recommendations, and inform patients about the use of AI.

These findings from the study contribute to the lack of literature concerning ChatGPT's application in healthcare sector. Furthermore, the results from this study could guide academic researchers and policy makers in understanding the impact of ChatGPT on teleconsultants, which may reflect some common factors in other areas of healthcare. There are few limitations in this study. This study has considered only five types of healthcare professionals including physicians, nurses, pharmacists, dieticians, and physiotherapists. However, there are different healthcare professionals from different fields; as a result of which the generalization of findings from this study must be done with care. Furthermore, it is possible that the participants may be influenced by the statements of seniors in the group, as a result of which there may be an existence of slight bias in the results.

Conclusion

The purpose of this study is to analyse the impact of ChatGPT on teleconsultants. In achieving this purpose, the findings suggested that ChatGPT could assist healthcare teleconsultants in their work by providing informational and decision support, facilitating communication, increasing work efficiency, and enhancing patient engagement. By leveraging chat platforms that utilize natural language processing and machine learning algorithms, healthcare teleconsultants could provide high-quality care to patients through telemedicine by improving collaboration between healthcare providers. However, due to its novel nature, there is a need to further explore its impact in various areas of healthcare for better understanding its impact. Especially, the ethical challenges involved in relation to accountability and liability, data privacy and security, which are the key issues that may limit the use of ChatGPT in teleconsultations.

Disclosure

The authors report no conflicts of interest in this work.

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