

# Original Article: CHAT-GPT and artificial intelligence in Medical Endocrine System and interventions

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## ABSTRACT

**Introduction:** Since its release, ChatGPT has taken the world by storm with its utilization in various fields of life. This review's main goal CHATGPT is a CHATGPT developed by Open AI. This robot is trained with the help of artificial intelligence on a large amount of data to learn language patterns. In the medical application of CHATGPT, the main topic is the conversation between doctors and patients. **Method:** In this study we searched in Scopus, Google scholar, PubMed databases and by searching with keywords such as "Nursing Services", "Importance of CHATGPT" and "Medical Education" during 2018-2024 to obtain articles related to the selected keywords. This innovation has the potential to automate daily tasks such as generating patient records or writing reports. By studying more than 45 articles about CHATGPT and the role of artificial intelligence in medicine, the results of this study showed that CHATGPT, with its very high potential, can play an important role in the field of interactions between humans and artificial intelligence and intelligent systems in the future. **Results:** The move towards the use of artificial intelligence in medicine, which is informed by patient information, can provide more personalized and clinically accurate answers to patients. Also, according to the findings of this research, it can be said: Automating administrative functions, scheduling visits, simplifying notes, checking insurance approvals for drugs, and other repetitive daily tasks can reduce the focus on administrative tasks and more time for providing medical care in to authorize the personnel. **Conclusion:** In this research, the researchers noticed the mistakes of CHATGPT chat bot in creating cancer treatment programs. According to these researchers, this chat bot had provided one-third of its answers in the field of designing treatment programs with incorrect information. Indeed, CHATGPT AI can support automation and improved clinical care delivery. Also, the results of this study showed that scientists in their new study on CHATGPT realized that its solutions for cancer treatment contain false information.

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## Introduction

Using the powers of artificial intelligence and machine

learning, this artificial intelligence robot may act as a digital assistant for doctors in summarizing patient records and information. This technology extracts essential information by grouping data into family medical records [1-3],

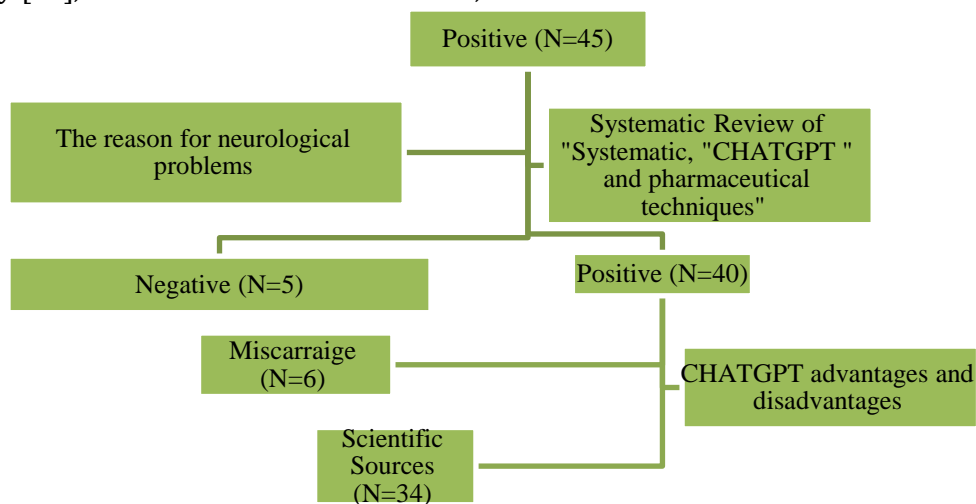
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symptoms, current medications, possible allergies, and lab results through patient records [4-6]. By ensuring AI has easy access to this information, doctors can assess patient needs faster than ever before. This functionality allows for a clearer focus on core areas of patient care [7-9]. Be careful that CHATGPT is not supposed to replace the doctor and make decisions for him, but it can be a great help in diagnosis and treatment for doctors [10]. Strengthening decision-making systems using artificial intelligence and machine learning tools can improve treatment decisions and outcomes [11]. In fact, CHATGPT in medicine can provide medical services first through chat, virtual care, and finally [12], with the decision of the doctor,

through face-to-face care. Pay attention to how much easier the process of diagnosis and treatment can be in this way.

### Search strategy and selection of articles

Search in Scopus, Google scholar, PubMed databases and by searching with keywords such as "Nursing Services", "Importance of CHATGPT" and "Medical Education" during 2018-2024 to obtain articles related to the selected keywords [13]. Case report articles, editorials, and articles that were not published or only an introduction of them were available, as well as summaries of congresses and meetings that were in languages other than English, were ignored (figure 1) [14].



**Figure 1.** Flow chart of included subjects [13]

### Patient education with CHATGPT

Another innumerable benefit of CHATGPT in the medical field is improving patient education. Doctors may be able to use it to keep patients informed during treatment [15-17]. How to use pills and drugs, tracking symptoms and side effects and checking the performance of drugs, clinical notes of medical history [18-20], treatment plans and follow-up methods are issues that can be done with the help of artificial intelligence in the not-too-distant future [21-

23]. Usually, the writings and manuals of drugs are in professional language and it is difficult for patients to understand them [24-26]. That's exactly where CHATGPT comes in, simplifying medical notes, prescriptions, and even lifestyle recommendations for the patient [27-29]. Also, one of the other uses of CHATGPT for educating patients is to provide answers to frequently asked questions of patients. Cited [30-32]. Because it is very difficult for patients to have a direct contact with the doctor and ask him a

question [33-35]. This artificial intelligence robot can help patients by filling the information gaps [36-38]. The purpose of the predicted features of the algorithm is to answer patients' questions about the diagnosis or management of their conditions [39-41].

### **CHATGPT challenges in healthcare**

While CHATGPT technology is promising, it still faces challenges to be accepted and applied in medical care. For example, the information used in the training of the algorithm is only up to 2021, and its information range is currently limited to the end of 2021 [42-45]. Users also need help to ensure the answers provided by the algorithm [46-48]. This AI bot may currently provide incorrect information, and of course, this is not too strange [4-51], since it is an AI and has not yet been trained to provide an accurate prescription for medical care [52-55]. Its widespread use in medical care requires a revolution and a complex system that requires time. CHATGPT is an uninhabited building and how it will be decorated and set up for medical use will definitely take time, but its potential should not be underestimated [56-58].

### **Monitor and manage the patient's condition**

Artificial intelligence technologies can enable continuous monitoring of patients both inside and outside healthcare facilities [59-61]. Wearable devices equipped with sensors and artificial intelligence algorithms can track vital signs, activity levels, sleep patterns and other health-related data in real time. This feature enables the early detection of abnormalities or changes in the patient's condition and informs the relevant people [62-64]. As a result, doctors and specialists can act quickly to prevent the occurrence of greater risks. In addition, remote monitoring systems equipped with artificial intelligence can facilitate telemedicine. As a result, patients can receive care and consultations from their homes [65-67]. This

feature can be very efficient for people who are far from their doctor or cannot afford to leave the house [68-70].

### **Administrative duties and health care systems**

Artificial intelligence can simplify administrative tasks and improve the efficiency of healthcare systems. Natural Language Processing (NLP) algorithms can analyze and extract relevant information from medical records, reducing the time and effort required for documentation and coding [71-73]. Chat bots and AI-powered virtual assistants can also answer common questions, schedule appointments, and provide basic medical advice, freeing up healthcare professionals' time for more complex tasks [74-76]. In addition, artificial intelligence can be used in resource allocation, such as hospital bed management, staff activity scheduling, and inventory management. In this way, you can save money and optimize many tasks [77-79].

### **CHATGPT becomes a gynecologist and obstetrician**

According to Shafqna, in a new experiment, Singaporean researchers used CHATGPT for specialized examinations in the field of gynecology and obstetrics and found that this chat bot can perform better than humans in some cases [80-82]. According to ISNA and quoted by Neuroscience News, CHATGPT was able to perform better than humans in a specialized test examination in the field of obstetrics and gynecology and showed itself to be excellent in areas such as empathic communication, information gathering and clinical reasoning [83-85]. The chat bot achieved an average score of 77.2%, beating humans who scored an average of 73.7%.

This experiment showed that CHATGPT can quickly provide accurate and relevant answers to complex clinical questions [86-88]. However,

CHATGPT struggled in cases that required open explanation or multiple changes. The test showed that CHATGPT takes an average of two minutes and 54 seconds to complete each section [89-91], which is significantly less than the predetermined 10 minutes. In this study, the researchers selected seven sections that were implemented in mock examinations during the last two years with the evaluation method called "Objective structured clinical examinations" (OSCEs) [92-95].

All experiments were similar in scope and difficulty and did not include visual interpretations to address current limitations of CHATGPT at test time [96-98]. Each section has multiple layers of evolving questions based on the initial data provided and subsequent responses from the candidate [99-101]. The OSCE assessment is a criteria-based assessment in which each candidate is assessed on their clinical competencies by completing a series of tests in a simulated environment [102].

Each volunteer was given 10 minutes to complete each section, which was accompanied by an unfamiliar clinical scenario and information necessary for informed clinical decision-making [103-105]. Each candidate was expected to articulate a plan of care and demonstrate skills such as communication, information gathering, application of clinical knowledge, and patient safety within a specified time frame [106-108].

All parts of the experiment were presented in the same format to two human volunteers called candidates A and B and CHATGPT as candidate C [109-111]. This research was conducted in "Yung Lu Lin School of Medicine" (NUS Medicine) Singapore under the supervision of ("Mahesh Kolani Choolani") [112], head of the obstetrics and gynecology department of this faculty. The researchers in this project analyzed the responses and found that CHATGPT scored very well in the area of empathic communication [113-115]. This chat bot was able to skillfully

and quickly give real and accurate disease-related answers to clinical questions and generate answers based on unfamiliar data in the shortest possible time [116-118].

This is a feat that a person of average intelligence would need more than 10 years of clinical training to achieve. It is commendable that generative artificial intelligence, which is currently only in its infancy, can make significant contributions [119]. Quickly interpret general content and present it by organizing it into coherent and concise conversational responses [46]. This is a goal that is not easily achieved by non-English speaking candidates or candidates facing exam stress [47]. To minimize bias, responses were sent to the test panel while the real identity of CHATGPT was concealed [48]. Despite best efforts to blind the examining panel, examiners were generally able to identify CHATGPT responses, but not in all cases [49].

#### **Evaluation of CHATGPT by radiologists**

Researchers intend to evaluate these technologies to determine whether the information provided by artificial intelligence is reliable and accurate [50]. A new study conducted by a team at the University of Maryland School of Medicine (UMSOM) shows that the answers generated are often correct. However, there is a possibility that it is sometimes false or even fake. The findings of this study have been published in the journal *Radiology*. The study was conducted by creating a set of 25 questions related to counseling for breast cancer screening, and then the team gave each question three times to ChatGPT to analyze the generated responses. The answers were evaluated by three radiologists specializing in mammography, and they found that the answers were appropriate for 22 of the 25 questions. Outdated information caused the chatbot to provide an incorrect answer to a question.

The remaining two questions had conflicting answers and each time these questions were

asked the answers were significantly different. Researchers are optimistic about the possibility of using such a product in the health tool sector. "We found that ChatGPT answered questions correctly about 88 percent of the time, which is pretty amazing," Paul Yee, MD, assistant professor of diagnostic radiology and nuclear medicine at UMSOM and author of the study, said in a press release.

The team added that chat bots can be helpful in summarizing information and making sense of it for applicants. On the negative side, researchers have emphasized that the information provided is not comprehensive. In other words, it is not based on all the sources that are available on the Internet.

ChatGPT provided only one set of recommendations for breast cancer screening issued by the American Cancer Society, but different recommendations from the Centers for Disease Control and Prevention, said Hannah Hauer, a radiologist at the University of Maryland Medical Center who led the study. It did not mention diseases or the US Preventive Services Task Force. Even more surprising is that ChatGPT can often create fake journal articles or health consortiums to support its claims. Users should be aware that these are new and unproven technologies and should still rely on their doctor for advice rather than ChatGPT, Dr Yee said.

The team is analyzing the ChatGPT lung cancer screening recommendations. In addition, the team seeks to find ways to make ChatGPT responses comprehensive, accurate, and understandable to those without a high level of education [120].

According to a recent study published in the journal JAMA Internal Medicine, ChatGPT AI provides better answers to patients' questions in 79% of cases than human doctors. During this study, 195 questions and answers raised from a page on the Reddit social network where reputable doctors have answered users' medical

questions were reviewed and evaluated. A group of experts evaluated the data and found that the answers provided by ChatGPT's artificial intelligence were more than three times more accurate and correct than those submitted by doctors, and were mostly rated as "good" or "very good".

The chatbot was also rated nearly 10 times more "empathetic" or "very empathetic" than doctors. The findings could have important implications for the future of medicine and health care, said John Ayers, lead author of the study and vice president of innovation at San Diego School of Medicine in California. Medical consultation is now one of the growing areas of public health that Chat JPT seems to be doing very well. However, the authors caution that more research is needed to assess the potential benefits and risks of using chatbots in healthcare.

While AI-based models such as ChatGPT have great potential to help doctors message patients, they may provide inaccurate information if not accurate enough.

Atrial fibrillation can also be detected by an ECG when the rhythm is clearly regular and P waves are detected before each QRS complex. This device also has inferior wall myocardial infarction. Cardiologists routinely refer patients based on false ECG reports, the most common being misdiagnosis of heart rhythms or overdiagnosis of a previous heart attack. The referring physician may not have attempted to interpret the ECG or may not have been concerned about the medical or forensic consequences of not agreeing with the device.

### **Review of heart examination report by artificial intelligence and experts**

The researchers examined the extent to which cardiologists made changes to the initial reports. The first finding was that the frequency of initial changes in the examination of the heart examination report by artificial intelligence and

experts was more than 5% compared to the final report of the cardiologist. The first objective of the studies was to test non-inferiority and the second objective was to test superiority. During the experiments, 3,495 electrocardiograms from adults were used. The amount of reports that required a significant change was 16.8% in the artificial intelligence group and 27.2% in the sonographer group (difference -10.4%, with a confidence level of 95%, -13.2 to 7.7) - percentage,  $p < 0.001$  in non-inferiority test and  $p < 0.001$  for superiority test). The final findings showed that the average difference between the final report of the cardiologist and the preliminary reports of the heart examination by artificial intelligence and sonographers was 6.29 and 7.7%, respectively (difference -0.96% with a confidence level of 95%, 34 -1.0 to -0.54 percent with  $p < 0.001$ , for superiority test).

### **Incorrect CHATGPT solutions for cancer treatment**

As AI-based chat bots are becoming popular sources of cancer information, a study looked into them. Researchers in this project found that these sources provide accurate information about the myths and misconceptions surrounding cancer [12]. Dr. "Skyler Johnson", physician-scientist at "Huntsman Cancer Institute" and associate professor of radiation cancer department at "University of Utah" (UofU), in research that is considered the first example of its kind, the ability Evaluated the reliability and accuracy of the cancer information of the "CHATGPT" bot. Using the National Cancer Institute's (NCI) common myths and misconceptions about cancer [19], Johnson and his team found that 97 percent of the answers were correct. However, these findings come with some important caveats; including concerns that some CHATGPT responses may be misinterpreted; This can lead to bad decisions for cancer patients [23]. The research group advised patients to be cautious about using chat

bots to get information about cancer. This research showed that it was not clear whether the answers came from the chat bot or the National Cancer Institute. Although the responses were accurate, the researchers found CHATGPT's language to be indirect, vague, and in some cases unclear [31].

"I understand how difficult it is for cancer patients and their caregivers to access accurate information," Johnson said. These resources should be explored in order to help cancer patients navigate the online information environment and seek the right answers about their disease. Misinformation can harm cancer patients [39]. In their previous study, published in the Journal of the National Cancer Institute, Johnson and his team found that misinformation is common on social media and can harm cancer patients. The next steps for Johnson and his team are to evaluate how often patients use the chat bots to search for information about cancer, what questions they ask, and whether the AI chat bots provide accurate answers to uncommon cancer questions [16].

### **Discuss**

For this study the meta-analysis showed indicating that the accuracy of ChatGPT in providing correct responses was significantly higher compared to the total responses for queries. However, significant heterogeneity was present among the studies, suggesting considerable variability in the effect sizes across the included studies.

Artificial intelligence can also help ophthalmologists plan and guide surgery. By analyzing preoperative imaging data, artificial intelligence algorithms can help determine the optimal surgical approach and predict surgical outcomes. For example, in cataract surgery, AI systems can analyze biometric measurements to recommend the appropriate IOL power and calculate the incision size needed for optimal vision outcomes.

Additionally, during surgery, robotic systems equipped with artificial intelligence can provide real-time feedback to surgeons, increasing accuracy and reducing the risk of complications. Another area where artificial intelligence is being used in ophthalmology is the development of telemedicine platforms. These platforms allow patients to remotely take retinal images or perform visual function tests using smartphones or other devices. AI algorithms can then analyze these images or test results and provide preliminary assessments, allowing ophthalmologists to diagnose and monitor patients remotely. This is particularly useful for patients in remote areas or those with limited access to specialist eye care.

One of the primary applications of artificial intelligence in cardiac treatment is in the field of medical imaging.

Artificial intelligence algorithms can analyze medical images such as echocardiograms, angiograms, and MRI scans of the heart to detect abnormalities and help diagnose various heart diseases. These algorithms can learn from massive amounts of data and identify patterns that may not be easily discerned by expert












clinicians. By automating the image analysis process, AI can reduce diagnostic errors and help improve the efficiency of radiologists and cardiologists. Another area where artificial intelligence is used in cardiac treatment is risk assessment and prediction.

By analyzing large datasets containing patient information, including medical history, genetic data, lifestyle factors, and clinical measurements, AI algorithms can identify patterns and risk factors associated with various cardiovascular diseases. This allows healthcare professionals to predict a person's likelihood of developing certain heart conditions or experiencing side effects such as heart attacks or strokes. With this information, personalized preventive strategies can be implemented to reduce the risk of cardiovascular events.

By analyzing large data sets from clinical trials, electronic health records, and scientific literature, AI algorithms can identify new insights, patterns, and correlations that may lead to the discovery of new treatments or diagnostic techniques. This has the potential to accelerate medical advances in heart treatment.

**Table 1.** Forest Plot Investigating the Relationship between Neurological and Cardiovascular Diseases in Young People and Children with Infection and Blood Pressure

Raw	Study	Year		Proportion	Wight 98%	Weight %
1	Naghdipour et al.,	2021		0.92	[0.39 - 1.06]	5.02
2	Krittanawong et al.,	2020		0.87	[0.54 - 1.02]	6.1
3	Bouloukaki et al.,	2020		0.88	[0.63 - 1.01]	5.4
4	Carey et al.,	2021		0.60	[0.25 - 1.08]	6.1
<b>Heterogeneity <math>t^2=0.12</math>, <math>I^2= 0.00</math>, <math>H^2=1.00</math></b>				0.95	[0.22 - 1.07]	
<b>Test of <math>\Theta= \Theta</math>, <math>Q (4) = 1.15</math>, <math>P= 0.7</math></b>						
1	Guo et al.,	2020		0.84	[0.27 - 1.08]	6.1
2	Zhou et al.,	2022		0.76	[0.52 - 0.22]	5.8
3	Wang et al.,	2020		0.11	[0.54 - 0.89]	5.8
4	Malhotra et al.,	2020		0.39	[0.12 - 0.99]	6.00

<b>Heterogeneity <math>t^2=0.1</math>, <math>I^2= 0.1</math>, <math>H^2=0.4</math></b>				0.77	[0.19 – 1.00]	
<b>Test of <math>\theta= \theta</math>, <math>Q (4) =3.5</math>, <math>P= 0.3</math></b>						
<b>1</b>	Pourhanifeh et al.,	2020		0.92	[0.39 – 1.06]	1.03
<b>2</b>	Wan et al.,	2021		0.87	[0.54 – 1.02]	1.33
<b>3</b>	Bouloukaki et al.,	2020		0.99	[0.63 – 1.01]	1.050
<b>4</b>	Zhang et al.,	2021		0.68	[0.25 – 1.08]	5.03
<b>Heterogeneity <math>t^2=0.1</math>, <math>I^2= 0.00</math>, <math>H^2=1.09</math></b>				0.87	[0.22 – 1.07]	
<b>Test of <math>\theta= \theta</math>, <math>Q (4) =3.55</math>, <math>P= 0.1</math></b>						
<b>1</b>	Visseren et al.,	2021		0.84	[0.27 – 1.08]	4.08
<b>2</b>	Liu et al.,	2020		0.76	[0.52 – 0.22]	4.81
<b>3</b>	Ansari et al.,	2022		0.11	[0.54 – 0.89]	4.8
<b>4</b>	Al-Makki et al.,	2022		0.39	[0.12 – 0.99]	4.00
<b>Heterogeneity <math>t^2=0.19</math>, <math>I^2= 0.09</math>, <math>H^2=0.1</math></b>				0.77	[0.19 – 1.00]	
<b>Test of <math>\theta= \theta</math>, <math>Q (4) =3.11</math>, <math>P= 0.04</math></b>						

## Conclusion

CHATGPT is a new AI chat bot powered by Open AI that has surprised the whole world and is sure to change the game thanks to its incredible mastery and creativity. This artificial intelligence chat bot can do things like answering various questions, making unique stories and sonnets with a unique style, recreating history with the voice of a famous person, and solving computer programming problems. CHATGPT also has great potential for medical care, but it is still not fully suited for interacting with medical data, because it still does not recognize whether the data is true or false, and there are also limitations to predict, and the answers of this AI bot cover a wide range. which can be concluded that maybe he is not ready for medical care yet. Of course, if you have read this article carefully, you have realized what great potential CHATGPT has, which must be used properly in the medical field. In the future, CHATGPT will be widely used in all editing programs.

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