

ORIGINAL ARTICLE

Evaluating ChatGPT's Role in Assessing Turkey's Medical Tourism Trends

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Abstract

Background and aims: The primary objective of this study is to evaluate the performance of the ChatGPT as an expert in the field of medical tourism. Another objective of this study is to assess its evaluations regarding the current state and future prospects of medical tourism in Turkey from an artificial intelligence perspective.

Methods: Within the scope of the study's objectives, questions were created for ChatGPT regarding the current state and future prospects of medical tourism in Turkey. First, the draft questions were prepared by the authors of this article using the literature. All questions were evaluated by experts through online interviews. Totally 8 experts have been evaluated the questionnaires. These experts consisted of two tourism professors who had research on medical tourism, three major medical tourism hospital managers, one reconstructive aesthetician clinic owner, and the Turkish Healthcare Travel Council Founding Chairman. The second step of the research questionnaire was applied to the ChatGPT Model 4, which was trained as a medical tourism expert. Then test the answers of the AI used the tools "Completeness of content, Lack of false information in the content, Evidence supporting the content, Appropriateness of the content, and Relevance," referred as CLEAR. All answers were evaluated by 41 experts who had articles and research on medical tourism in Turkey. To explain the methodology appropriately, reporting was conducted using the METRICS checklist, which was prepared for artificial intelligence studies.

Results: The general answers of ChatGPT 4-o were accurate, informative, and helpful, providing a good overview of medical tourism in Turkey. However, the responses lacked detail, did not provide evidence-based information, and did not always address the nuances and cultural/social impacts of medical tourism. ChatGPT 4-o views the future of Turkey's medical tourism as shiny and will force the lead in general.

Conclusions: This study is important for revealing data on the current and future state of medical tourism through artificial intelligence. However, only a few studies have been conducted on artificial intelligence and medical tourism. To the best of our knowledge, there is no existing literature that systematically evaluates the ChatGPT responses of medical tourism experts. In this regard, it is believed that the study will benefit both academics and practitioners.

Keywords: Medical Tourism, AI, ChatGPT, CLEAR.

INTRODUCTION

Medical tourism is a rapidly growing global industry driven by the demand for high-quality, affordable, and specialized healthcare

combined with hospitality services [1]. Globalization and advancements in technology have significantly increased the number of people seeking medical care abroad [2].

Medical tourism typically involves individuals traveling to foreign countries for procedures, such as cosmetic surgery, motivated by factors such as lower costs, modern medical technology, and the availability of skilled healthcare professionals. Additionally, long waiting lists and high costs in home countries have pushed many toward this option [3]. This type of tourism, which is short-term and context-dependent, [4] has become an essential part of the economic development of many nations. Both developed and developing countries now compete to capture the share of this growing market.

Widely adopted in various countries, medical tourism has become a developmental aspect of the tourism industry, akin to other industries such as metals and sports [5]. Along with the continuous increase in demand for medical tourism and the significant investments that countries are making in this area, this indicates that the market will grow even further in the future [6].

Both developed and developing countries now compete to capture the share of this growing market [7]. For instance, American medical tourists prefer developing countries because of their high costs, long waiting lists, affordable air travel, favorable exchange rates, and availability of qualified doctors and healthcare personnel [8]. People are increasingly turning to medical tourism to find economical and effective medical treatment abroad. Travelers leverage online services when choosing and organizing medical trips [9]. Artificial intelligence (AI) applications are becoming increasingly popular within the medical tourism industry. AI applications are becoming particularly popular in the medical tourism industry [61]. Therefore, a paradigm shift will likely occur in the near future.

One of the most widely used artificial intelligence applications, chatbots, has garnered significant interest from the general public, businesses, and academia, heralding a new era of AI-driven innovations [10]. The growing adoption of artificial intelligence has led to the widespread presence of chatbots as facilitators of diverse tasks such as travel planning [11]. Among the preferred chatbots is the Generative Pre-trained Transformer (ChatGPT) developed by OpenAI.

ChatGPT is a natural language processing model with 175 billion parameters that can generate conversational style responses to user inputs [12]. It exhibits highly advanced capabilities in writing, solving coding problems, and answering questions. It has the potential to become a new generation of artificial intelligence, potentially serving as virtual assistants for patients and healthcare providers [13]. It is a flexible and accessible form of artificial intelligence that can be used in interactive learning environments [14]. It performs tasks such as language translation, text completion, and question-answering in a human-like manner [15] and can even express political opinions [16]. Moreover, it has the potential to be used in various fields, such as medicine [17], education [18], and sports [19]. Some businesses have integrated ChatGPT into their systems to provide a better customer experience [20]. The ChatGPT has numerous potential applications in healthcare. In health education, it can be utilized for personalized learning and the evaluation of clinical simulations. In clinical practice, the ChatGPT can support healthcare service delivery, decision-making assistance, and patient management. Additionally, in healthcare research, ChatGPT can aid in writing scholarly articles and analyzing large datasets. Its ability to process vast amounts of

information quickly and generate insights makes it a valuable tool for both practitioners and researchers seeking to improve outcomes and streamline processes within the healthcare sector [60].

ChatGPT outperformed the other LLMs in multitasking, multilingual, and multimodal tasks. However, they are not always reliable and suffer from hallucination issues [21]. Therefore, numerous versatile and detailed studies are required to understand its performance.

It is considered a crucial test for the potential of the ChatGPT to evaluate its performance in evaluations related to medical tourism, as it can sometimes experience hallucinations despite being capable of working with billions of data points and being used in various tasks across different domains. This study will benefit practitioners and theorists in the fields of medicine, tourism, and AI.

Medical Tourism

Medical tourism refers to the practice of patients choosing to travel abroad or across national borders to receive treatment. These treatments include IVF; organ and tissue transplantation; cardiac, orthopaedic, and bariatric surgery; and cosmetic and dental surgery [22]. As stated medical tourism is the practice of people traveling outside their nation of origin to receive scheduled medical care while combining a leisure trip with health-related needs[23].

Over the past decades, there has been an exponential growth in the lucrative industry of medical tourism, which combines the tourism and healthcare industries [24]. The increasing trend in medical tourism has policy consequences for health systems, especially in nations where it is being travelled [25] Seeking high-quality healthcare and wellness abroad has not

recently been developed. The most affluent patients from developing nations visited medical facilities in Europe and the United States between the 18th and 20th centuries to receive medical care. Owing to the globalization of communication and transportation technologies, this trend began to reverse in the late 20th century and picked up speed in the 21st century, with less-rich individuals from industrialized countries beginning to go to underdeveloped nations for medical care [26]. Medical procedures, personal characteristics (such as travel history, resiliency, and traveling companions), destination factors, and financial considerations all affect medical travel [27]. A wide variety of experiences are associated with medical travel: British couples visiting Thailand for pre-implantation sex selection of embryos for IVF operations, Germans traveling to Thailand for facelifts along with a vacation in Phuket, Travelers from Australia heading to India for orthopaedic surgery, Malaysians heading to Singapore for cancer treatment, or foreign professionals working in the area traveling to India to receive care at an Indian facility approved by their health insurance [28]. Treatment and medical service quality, cost, infrastructure, destination appeal, culture, and accessibility affect the experience of medical tourism [29]. In addition to having an indirect impact on medical tourist behavior, hospital services appear to have a significant direct impact on medical tourist satisfaction and perceived value [30].

The tourism industry, being information-intensive, relies heavily on web technology and the Internet for destination marketing and promotions [31]. In the context of medical tourism, patients can access information through advanced internet technology and

applications [32]. This enables individuals to make more informed and appropriate decisions by utilizing the Internet as a valuable resource [33]. Furthermore, the growth of medical tourism is driven by specialized websites that provide valuable information to assist individuals in seeking medical care abroad [34]. The integration of the Internet in medical tourism not only facilitates decision-making, but also enhances the perceived value of customers, influencing social, epistemic, and functional aspects [35].

Medical tourists extensively utilize the Internet as a multifaceted resource for information, inspiration, planning, scheduling, and assistance, drawing from both personal and professional sources during their decision-making process [36]. The impact of online word-of-mouth is noteworthy because it significantly influences both destination trust and travel intention in the context of medical tourism [37]. Interestingly, information acquired by medical tourists from the Internet has the potential to surpass the advice provided by family physicians [36].

Despite the valuable role of the Internet, websites dedicated to medical tourism vary in the quality of information offered, with some providing reliable content, whereas others fall short and often lack adequate privacy protection measures [38]. Artificial intelligence (AI) is a revolutionary technological development in the world. This is believed to have led to a paradigm shift in medical tourism.

Artificial Intelligence and ChatGPT

Recent advancements in artificial intelligence (AI) have enhanced the accuracy and efficiency of medical treatment. Modern machine learning techniques, as exemplified have significantly improved the capabilities

of software, enabling it to perform complex tasks with human-like proficiency [39].

The ChatGPT, introduced in November 2022, is the most widely used generative artificial intelligence system, bringing about a revolution in healthcare [40]. Its versatility allows it to respond transparently to a diverse array of queries akin to those of a personal tutor endowed with extensive knowledge. Functionally, ChatGPT excels in tasks such as question-and-answer sessions, mathematical problem solving, text generation, debugging, and language translation [41].

Constructed through Reinforcement Learning from Human Feedback, ChatGPT integrates human responses into its machine learning model, involving AI trainers engaging in dialogue as both users and AI assistants [42]. Users interact with ChatGPT through text, receiving responses that they can further engage with, modify, or express approval by 'liking' and providing feedback [43].

ChatGPT exhibits proficiency in addressing follow-up inquiries, rejecting inappropriate requests, challenging false assumptions, and acknowledging errors based on user interactions, particularly in nonprofessional domains. Its capabilities extend to various emergent skills, including code creation, complex reasoning, zero/low-shot learning, high-quality discourse, and chains of thought. The impact of ChatGPT transcends developmental spheres, profoundly altering the social economy and quality of life [44]. In the realm of tourism marketing, ChatGPT has the potential to revolutionize conventional approaches [45]. Considering these capabilities, it is theoretically proposed that the ChatGPT could significantly contribute to the evaluation of the current state and future

trajectories of medical tourism, with particular relevance in academic discourse.

METHODS

This study aimed to evaluate the performance of the ChatGPT as an expert in the field of medical tourism. Another objective of this study was to assess its evaluations regarding the current state and future prospects of medical tourism in Turkey from an artificial intelligence perspective. To understand this, we developed a questionnaire. First, the draft was prepared by the authors of this article using a study titled “Bridging the gap of bibliometric analysis: The evolution, current state, and future directions of tourism research using ChatGPT” [62]. All questions were evaluated by experts through online interviews. Totally 8 experts have been evaluated the questionnaires. These experts consisted of two tourism professors who had research on medical tourism, three major medical tourism hospital managers, one reconstructive aesthetician clinic owner, and the Turkish Healthcare Travel Council Founding Chairman. To explain the methodology appropriately, reporting was conducted using the METRICS checklist, which was prepared for artificial intelligence studies [46]. This study included thirteen questions. The questions were asked to ChatGPT on 26.6.2024 at 09.45 UTC. Before asking the questions, the prompt "As an expert in both practice and theory in the field of medical tourism in Turkey, please answer the following questions: No additional questions were asked based on the answers provided. Interviews were conducted using the same chat screen. The 13 questions created within the scope of the study were asked simultaneously. The questions were answered by the ChatGPT for 29 seconds.

When asked about the sources utilized for the answers, the following data sources were listed.

- **Academic Research and Articles:** Published academic articles and research on health tourism and medical tourism. These articles typically contained in-depth analyses and statistical data.
- **Government and Official Institutions:** Reports and statistics published by the Ministry of Health in Turkey and other relevant official institutions. These sources provide information on a country's health tourism policies and regulations.
- **World Health Organization (WHO) and Other International Organizations:** Reports and publications offering global data and trends in health tourism.
- **Sectoral Reports and Analyses:** Reports and market analyses prepared by consulting firms or sector analysts related to health tourism.
- **News Sources:** Reliable news sources following current developments and trends in health tourism.

No other study on a different topic was conducted, although the questions were asked to the ChatGPT 4-o. The selected questions were designed based on expert opinions and asked solely to assess the current situation and future of medical tourism in Turkey. The second step of the research questionnaire was applied to the ChatGPT Model 4-o, which was trained as a medical tourism expert. Then test the answers of the AI used the tools “Completeness of content, Lack of false information in the content, Evidence supporting the content, Appropriateness of the content, and Relevance,” referred as a CLEAR which has been developed by Sallam et al., [46]. All answers were evaluated by FourtyOne

experts who had articles and research on medical tourism in Turkey between 2020-2024. Additionally, an open-ended question was posed to experts to evaluate the responses to the ChatGPT, and their answers were documented in the report.

A total of 107 e-mails were sent to the experts, and 41 responses were returned. All responses were analyzed using the statistical package programs SPSS 27 and MAXQDA 2024 Pro with AI. "SPSS was used for

internal consistency analysis and average calculations. MAXQDA was used to summarize statements containing expert opinions.

RESULTS

To use the CLEAR tool, every answer was rated with the help of five questions has been showed in the Table 1. The relevance of the tools is listed below.

Table 1 CLEAR tools and measurement questions

Completeness	Is the content sufficient?
Lack of false information	Is the content accurate?
Evidence	Is the content evidence-based?
Appropriateness	Is the content clear, concise, and easy to understand?
Relevance	Is the content free from irrelevant information?

With the help of CLEAR tools, 13 answers to ChatGPT 4-o generated questions about medical tourism, which were tested using SPSS. Clear scores were obtained using this test. All answers were categorized using the

CLEAR scores. These are: 5 out of 11 categorized as "poor" content, 12 between 18 categorized as "average" content, and 19 between 25 categorized as "very good" [46]).

Table 2 Questionnaires and the answers of the ChatGPT 4-o

1. What is the current status of medical tourism in Turkey compared to other types of tourism, and what is its future outlook?			
Turkey has become a significant centre for medical tourism in recent years, particularly for cosmetic surgery, dental treatments, eye surgery, and IVF treatments. Currently, medical tourism holds a substantial share of Turkey's tourism revenues, and this share is expected to increase further with advancements in the healthcare sector. High-quality healthcare services and affordable costs make Turkey an attractive destination. The sector is anticipated to continue growing, especially with government incentives for health tourism.			
	Mean	SD	Cronbach's Alpha
Completeness	3,51	,978	,714
Lack of false knowledge	4,07	,905	
Evidence-based	2,24	1,241	
Appropriateness	4,15	,910	
Relevance	4,12	,872	
	Mean Sum	SD	Category
CLEAR SCORE	18,10	3,382	Average
2. What are the most common reasons for traveling to Turkey for medical tourism?			
The most common reasons for traveling to Turkey for medical tourism include cosmetic surgery, hair transplants, dental treatments, eye surgery, and IVF treatments. Orthopedic surgeries and cardiovascular treatments are also popular.			

	Mean	SD	Cronbach's Alpha
Completeness	4,12	,980	,715
Lack of false knowledge	4,27	,837	
Evidence-based	2,39	1,358	
Appropriateness	4,24	1,019	
Relevance	4,46	,711	
	Mean Sum	SD	Category
CLEAR SCORE	19,49	3,436	Very Good
3. At what stage are the most issues encountered in medical tourism operations in Turkey? (Transfer, accommodation, visa, legal issues, etc.) The most issues in medical tourism operations in Turkey occur during the transfer and accommodation stages. Additionally, there can be challenges related to visa and legal regulations. Language barriers also lead to communication problems. Better organization and coordination are needed to overcome these issues.			
	Mean	SD	Cronbach's Alpha
Completeness	3,46	1,206	,860
Lack of false knowledge	3,61	1,302	
Evidence-based	2,15	1,333	
Appropriateness	4,12	,980	
Relevance	4,10	1,044	
	Mean Sum	SD	Category
CLEAR SCORE	17,44	4,728	Average
4. What are the factors limiting medical tourism activities in Turkey recently, and what measures are needed to overcome these limitations? Recently, factors limiting medical tourism activities in Turkey include political and economic instability, security concerns, post-pandemic travel restrictions, and uncertainties in legal regulations. Overcoming these limitations requires ensuring security and stability, clarifying legal regulations, and increasing international promotional activities.			
	Mean	SD	Cronbach's Alpha
Completeness	3,66	1,196	,862
Lack of false knowledge	4,00	1,049	
Evidence-based	2,29	1,365	
Appropriateness	4,27	,949	
Relevance	4,24	,969	
	Mean Sum	SD	Category
CLEAR SCORE	18,46	4,484	Average
5. What are your predictions for the future of medical tourism in Turkey, and what measures are needed for its development? What should stakeholders focus on? The future of medical tourism in Turkey looks promising. To support growth in this field, it is necessary to improve the quality of healthcare services, enhance staff training, and comply with international standards. Additionally, integrating digital health services and keeping up with technological innovations are important. Collaboration and increased coordination among sector stakeholders are also crucial.			
	Mean	SD	Cronbach's Alpha
Completeness	3,54	1,142	,859
Lack of false knowledge	4,02	1,037	
Evidence-based	2,39	1,464	
Appropriateness	4,24	,943	
Relevance	4,22	,962	
	Mean Sum	SD	Category
CLEAR SCORE	18,41	4,500	Average
6. How does Turkey compare to its competitors in medical tourism? What are its strengths and weaknesses?			

Turkey is advantageous compared to many of its competitors due to competitive prices, high-quality healthcare services, and a wide range of treatments. However, language barriers and uncertainties in some legal regulations are weaknesses. Competing with countries like South Korea, India, and Thailand, Turkey is an attractive destination, especially for patients from Europe and the Middle East.			
	Mean	SD	Cronbach's Alpha
Completeness	3,63	1,135	,778
Lack of false knowledge	4,20	,782	
Evidence-based	2,46	1,398	
Appropriateness	4,24	,830	
Relevance	4,22	,936	
	Mean Sum	SD	Category
CLEAR SCORE	18,76	3,787	Average
7. What are the leading destinations for medical tourism in Turkey?			
Leading destinations for medical tourism in Turkey include Istanbul, Ankara, Izmir, Antalya, and Bursa. These cities stand out with their advanced healthcare infrastructure, easy access, and tourist attractions.			
	Mean	SD	Cronbach's Alpha
Completeness	3,93	1,127	,815
Lack of false knowledge	4,12	1,029	
Evidence-based	2,61	1,481	
Appropriateness	4,34	,911	
Relevance	4,22	1,013	
	Mean Sum	SD	Category
CLEAR SCORE	19,22	4,281	Very Good
8. What are the most common reasons for traveling to Turkey for medical tourism?			
Collaboration and coordination among professionals, NGOs, local governments, and universities in medical tourism in Turkey are increasing. However, more organization and joint efforts are needed. Active roles of health tourism associations and chambers are important.			
	Mean	SD	Cronbach's Alpha
Completeness	3,02	1,369	,856
Lack of false knowledge	3,73	1,141	
Evidence-based	2,34	1,389	
Appropriateness	4,07	1,010	
Relevance	4,00	1,118	
	Mean Sum	SD	Category
CLEAR SCORE	17,17	4,837	Average
9. What is the level of technology acceptance in health tourism in Turkey? (AI, mobile applications, robots, etc.)			
Technology acceptance in health tourism in Turkey is increasing. AI, mobile applications, and robotic surgery technologies are becoming widespread. Especially, digital health platforms and telemedicine services provide great convenience for international patients.			
	Mean	SD	Cronbach's Alpha
Completeness	3,56	1,266	,866
Lack of false knowledge	3,98	1,060	
Evidence-based	2,54	1,502	
Appropriateness	4,07	1,104	
Relevance	4,20	1,030	
	Mean Sum	SD	Category
CLEAR SCORE	18,34	4,861	Average
10. What is the level of medical practice competence in Turkey within the scope of medical tourism?			
The level of medical practice competence in Turkey is aligned with international standards. Many hospitals have JCI accreditation and use modern medical technologies. Additionally, doctors and healthcare personnel in Turkey have international education and experience.			
	Mean	SD	Cronbach's Alpha

Completeness	3,68	1,234	,852
Lack of false knowledge	3,93	1,034	
Evidence-based	2,54	1,398	
Appropriateness	4,12	,980	
Relevance	4,17	,919	
	Mean Sum	SD	Category
CLEAR SCORE	18,44	4,467	Average
11. Could the ability of advanced technology and AI to enable remote surgeries be a potential opportunity or threat for the development of medical tourism in the future? Please explain.			
Advanced technology and AI enabling remote surgeries present both opportunities and threats for medical tourism. Remote surgeries can enhance quality in specialized surgeries and eliminate geographical barriers. However, concerns about technological infrastructure security and patient safety exist.			
	Mean	SD	Cronbach's Alpha
Completeness	3,54	1,120	,834
Lack of false knowledge	3,90	1,068	
Evidence-based	2,39	1,282	
Appropriateness	4,02	1,107	
Relevance	4,02	,961	
	Mean Sum	SD	Category
CLEAR SCORE	17,88	4,314	Average
12. What are the impacts of the high number of hospitals with Health Tourism Authorization Certificates on medical tourism in Turkey?			
The high number of hospitals with Health Tourism Authorization Certificates in Turkey increases the quality and reliability of medical tourism. These certificates ensure patients receive services at international standards and reinforce Turkey's credibility in this field.			
	Mean	SD	Cronbach's Alpha
Completeness	3,59	1,303	,844
Lack of false knowledge	3,76	1,135	
Evidence-based	2,61	1,464	
Appropriateness	4,12	1,005	
Relevance	4,17	1,022	
	Mean Sum	SD	Category
CLEAR SCORE	18,24	4,705	Average
13. What could be the impacts of AI and language support on medical tourism?			
AI and language support facilitate communication in medical tourism and enhance service quality. Overcoming language barriers helps patients feel more comfortable during treatment processes and increases satisfaction. Additionally, AI can assist in faster and more accurate diagnosis and treatment processes.			
	Mean	SD	Cronbach's Alpha
Completeness	3,68	1,105	,837
Lack of false knowledge	3,98	1,037	
Evidence-based	2,71	1,470	
Appropriateness	4,22	,936	
Relevance	4,34	,911	
	Mean Sum	SD	Category
CLEAR SCORE	18,24	4,705	Average
Cronbach Alpha ,714 - ,866 CLEAR Scores 17,17 – 19,49 Standard Deviation 3,436 – 4,837			
Average of Completeness 3,61			
Average of Lack of false knowledge 3,97			
Average of Evidence-based 2,44			
Average of Appropriateness 4,17			
Average of Relevance 4,19			

For adequate consistency validity, items with Cronbach's alpha values of 0,60 or higher on a single factor are expected [48]. The questionnaire had 13 questions, and the Cronbach's alpha values ranged from 0,714 to 0,866. Thus, the results showed that all questions were statistically valid.

The ChatGPT 4-o generated responses were divided into two categories using the CLEAR scores. The two answers "second" and "seventh" scores are "very good, and the rest are averages. In Table-2 all the 4-o generated questions are sorted, and their mean, standard deviation, Cronbach's alpha value, and CLEAR scores are given.

With these quantitative questions, we asked for general opinions about the answers given by artificial intelligence. Almost all participants expressed their general opinions about the answers to ChatGPT 4-o. They were classified as negative or positive. Consequently, 24 answers were classified as positive, 20 of which were negative. Some of the answers coded both negative and positive. The answers were summarized using MAXQDA 2024 Pro with AI support.

Positive opinions

- The ChatGPT 4-o responses were generally accurate, informative, and helpful in providing a good overview of medical tourism in Turkey.
- The responses cover key aspects, such as the current state of medical tourism, technological infrastructure, patient safety concerns, and the role of various stakeholders (healthcare professionals, NGOs, local governments, and universities).
- However, the responses lack detailed, evidence-based information, and do not always address the nuances and cultural/social impacts of medical

tourism.

- The responses of ChatGPT 4-o, which are mostly aligned with the existing literature, show some gaps, such as not fully addressing the issues surrounding language barriers and communication challenges between health care providers and international patients.
- The responses of ChatGPT 4-o, which are concise and easy to understand, could benefit from a more in-depth analysis and the inclusion of specific data or research findings to support the claims made.
- Overall, the performance of ChatGPT 4-o was impressive; however, further development is needed to provide more comprehensive, evidence-based, and contextually relevant summaries on the topic of medical tourism in Turkey.

Negative opinions

- The responses provided by ChatGPT 4-o lacked sufficient evidence, reference to previous studies, or statistics to support the information provided.
- ChatGPT 4-o sometimes misses small but important details such as the need for qualified personnel to communicate directly with customers in health tourism.
- The responses tended to be overly general and lacked the depth of knowledge expected of experts in the field.
- The information provided is often superficial and mechanical, and is not grounded in empirical evidence.
- While ChatGPT 4-o may have some correct ideas in various areas, a deeper examination reveals that the information is often a simplistic interpretation of textbook knowledge, rather than a

nuanced understanding.

- The concern is that ChatGPT 4-o may be drawn from websites primarily for advertising purposes rather than academic or scientific sources.
- Traditional responses are considered inadequate, and their accuracy is questionable.
- The ChatGPT 4-o responses were limited, and further development and refinement of the system could improve the quality of answers.
- ChatGPT 4-o provides short answers without evidence or justification of conclusions, which may result in inaccurate or biased results.
- AI's explanatory, observational, and interpretative capabilities of AI seem to be lacking, which may prevent it from providing reliable conclusions.
- Although the responses were generally adequate, they lacked detailed information that could be provided with a specific request for more details.
- The most significant shortcoming is the lack of evidence (citations, references, etc.) to support the information provided.
- In many areas, ChatGPT 4-o has gone beyond rote memorization; however, a lack of thorough research and data is evident.
- ChatGPT 4-o responses often do not align well with the realities of the field.
- There are issues with ChatGPT 4-o, such as lack of evidence, openness to discussion, and limited explanations.
- AI has made some important and appropriate observations regarding medical tourism, but its responses generally lack a more comprehensive understanding of the topic, including information on goals, trends, the role and potential of information and

communication technologies, and future projections.

- Despite these limitations, AI is considered a valuable asset in the healthcare field and its future is bright.
- However, there are concerns about the potential misuse of ChatGPT 4-o, such as breaches of personal privacy, increased crime rates, and exploitation of good intentions, which must be addressed to enable the further advancement of the intersection of AI and medical tourism.
- ChatGPT 4-o does not always provide accurate information because it may collect and organize information incorrectly, leading to an inaccurate data presentation.
- Some responses had notable gaps, such as a lack of information on insufficient international promotion activities for health tourism in Turkey and the need for government support due to the limited budgets of hospitals for marketing.
- The absence of numerical data in the responses raises doubts regarding their accuracy and objectivity as some readers may have more specific knowledge in certain areas.
- Overall, the responses provided by ChatGPT 4-o were considered inadequate, with generic and academically insignificant answers that may be sufficient for general information but not for in-depth research.

In general, it appears that the results of the quantitative table and qualitative responses are compatible. The most emphasized negative topic is evidence based. In addition, in the Table-2 lowest average score is evidence-based at 2,44. On the other hands for the experts ChatGPT's answers are accurate, informative, and helpful, providing

a good overview of the topic of medical tourism in Turkey. Similarly, the appropriateness and relevance scores were the highest in Table-2.

DISCUSSION

Artificial intelligence is beginning to be used in many industries and is being increasingly integrated into everyday life. Artificial intelligence has been the subject of discussion in numerous scientific domains since its inception [49,50]. Artificial is a useful assistant capable of generating information by leveraging multiple sources. Owing to their obligation to provide the requested information, they fill in the gaps themselves. Sometimes, the sources they use are unreliable, and for these reasons, they may experience hallucinations [21]. Consequently, the data generated by artificial intelligence must be verified.

The main purpose of this study was to evaluate the performance of the ChatGPT as an expert in the field of medical tourism. Another objective of this study was to assess its evaluations regarding the current state and future prospects of medical tourism in Turkey from an artificial intelligence perspective. Upon examining the Cronbach's alpha values, it can be asserted that CLEAR is a valuable tool for the evaluation of responses generated by artificial intelligence. The Cronbach's alpha values were similar to those reported by Sallam et al. [47].

As a result of the CLEAR tool, 11 out of 13 questions answered by artificial intelligence were classified as average, and two were classified as very good. In particular, answers related to the reasons why people travel to Turkey for medical tourism and destinations in Turkey were classified as very good. These questions were mostly related to motivation and geography. It was

observed that artificial intelligence was very successful in answering these questions. For other types of questions that require deeper answers and more philosophical approaches, such as the current situation within different tourism types, future predictions, and Turkey's level of adequacy, the answers given by the ChatGPT were found to be average.

In addition, none of the "Evidence-based" question points were higher than 2.71, and the average of all the questions was 2.44. Similar to the questions that resulted from the experts' opinions, this strongly indicates that the ChatGPT 4-o answers are not evidence-based. This shows that the most important deficiency is that the answers of the Chat GPT 4-o are not "evidence-based." This situation in ChatGPT 4-o is similar to that in the study by Denniston and Liu [51].

For ChatGPT 4-0, Turkey emerged as a major hub for medical tourism, particularly in cosmetic surgery, dental treatment, eye surgery, and IVF treatment. This evaluation was also supported by other studies [52,53]. The medical tourism sector is growing rapidly and driven by high-quality healthcare services and affordable costs. High-quality healthcare services and affordable costs make Turkey an attractive destination [54]. This sector is expected to continue to grow, especially with government incentives for health tourism. Government incentives support this growth further. The primary reasons for medical tourism in Turkey include cosmetic procedures, hair transplants, dental care, and surgeries [55] with the popular destinations being Istanbul, Ankara, Izmir, Antalya, and Bursa [56]. Challenges to this growth include political and economic instability, security concerns, and unclear legal regulations. Addressing these issues involves enhancing security, clarifying legal frameworks, and boosting

international marketing [57,58,59]. To continue growing, Turkey must maintain high healthcare standards, improve staff training, adopt digital health services, and enhance stakeholder coordination.

Turkey's competitive advantages include cost-effective services and a comprehensive range of treatments, although it faces competition from other countries, such as South Korea, India, and Thailand. The country is improving its technology adoption with AI, mobile applications, and robotic surgeries becoming more common. Many hospitals are JCI accredited to ensure compliance with international standards of care. AI and language support tools can improve communication and service quality, thus making treatment more accessible and comfortable for international patients.

This study focused on the use of ChatGPT as an expert in the field of medical tourism. However, ChatGPT and AI can also be used in medical tourism applications. For example, AI can be used for pain management, surgical simulators, and other mental health treatments with the help of telemedicine, wearables, and smartphone apps to assess chronic disease treatment [63,64]. In addition, AI and Chat GPT could help in the pre-diagnosis of the illness that can be cured within the scope of medical tourism [65]. On the other way AI and ML can revolutionize various aspects of medical tourism, including personalized patient care, accurate diagnostics, and efficient treatment planning [66, 67].

LIMITATION

This study has some limitations. This study used ChatGPT as an expert, while it did not test other generative AI models such as Gemini or Bing. Future research could compare their answers, which might provide

more valid and generalizable results.

Additionally, ChatGPT still has several ethical issues such as experiencing hallucinations.

CONCLUSION

The general answers to ChatGPT 4-o were accurate, informative, and helpful in providing a good overview of medical tourism in Turkey. However, the responses lacked detail, did not provide evidence-based information, and did not always address the nuances and cultural/social impacts of medical tourism. ChatGPT 4-o views the future of Turkey's medical tourism as shiny and will force the lead in general. Based on these evaluations, it can be concluded that the ChatGPT 4-o is a significant data source.

Turkey's competitive advantages include cost-effective services and a comprehensive range of treatments, although it faces competition from other countries, such as South Korea, India, and Thailand. The country is improving its technology adoption with AI, mobile applications, and robotic surgeries becoming more common. Many hospitals are JCI accredited to ensure compliance with international standards of care. AI and language support tools can improve communication and service quality, thus making treatment more accessible and comfortable for international patients.

Finally, it was determined that CLEAR provides significant benefits in evaluating AI language models. The reliability and satisfaction levels of the responses given by the AI language models can be assessed using CLEAR. However, in this study, ChatGPT 4-o allowed only a single response, and no request was made regarding the level of detail of the responses. Considering the potential of ChatGPT 4-o, it should be acknowledged that higher scoring responses could be obtained.

Future research should concentrate on assessing in-depth answers to gain a deeper understanding of the 4-o's actual potential.

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Ethical Committee Approval

This study has been approved by the University of Tarsus Scientific Research and Ethical Committee Date 20/03/2023, meeting number 02, approval number: 2023/13.

Conflict of Interest declaration

The authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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تقييم دور تشات جي بي تي في تقييم اتجاهات السياحة العلاجية في تركيا

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المخلص

الخلفية والأهداف: الهدف الأساسي من هذه الدراسة هو تقييم أداء ChatGPT كخبير في مجال السياحة الطبية. هدف آخر من هذه الدراسة هو تقييم تقيّماتها فيما يتعلق بالحالة الحالية والآفاق المستقبلية للسياحة الطبية في تركيا من منظور الذكاء الاصطناعي.

الطرق: في نطاق أهداف الدراسة، تم إنشاء أسئلة لـ ChatGPT فيما يتعلق بالحالة الحالية والآفاق المستقبلية للسياحة الطبية في تركيا. أولاً، أعد مؤلفو هذه المقالة مسودة الأسئلة باستخدام الأدبيات. تم تقييم جميع الأسئلة من قبل خبراء من خلال المقابلات عبر الإنترنت. تم تقييم الاستبيانات من قبل 8 خبراء. يتكون هؤلاء الخبراء من أستاذين سياحيين أجريا أبحاثاً حول السياحة الطبية، وثلاثة مديري مستشفيات سياحة طبية رئيسية، ومالك عيادة تجميل ترميمية، والرئيس المؤسس لمجلس السفر الصحي التركي. تم تطبيق الخطوة الثانية من استبيان البحث على نموذج ChatGPT 4، والذي تم تدريبه كخبير في السياحة الطبية. ثم اختبر إجابات الذكاء الاصطناعي باستخدام الأدوات "اكتمال المحتوى، وعدم وجود معلومات خاطئة في المحتوى، والأدلة الداعمة للمحتوى، وملاءمة المحتوى، والأهمية"، والتي يشار إليها باسم CLEAR. تم تقييم جميع الإجابات من قبل 41 خبيراً لديهم مقالات وأبحاث حول السياحة العلاجية في تركيا. لشرح المنهجية بشكل مناسب، تم إجراء التقارير باستخدام قائمة التحقق من METRICS، والتي تم إعدادها لدراسات الذكاء الاصطناعي.

النتائج: كانت الإجابات العامة لـ ChatGPT 4-o دقيقة وغنية بالمعلومات ومفيدة، حيث قدمت نظرة عامة جيدة على السياحة العلاجية في تركيا. ومع ذلك، كانت الردود تفتقر إلى التفاصيل، ولم تقدم معلومات قائمة على الأدلة، ولم تعالج دائماً الفروق الدقيقة والتأثيرات الثقافية / الاجتماعية للسياحة العلاجية. يرى ChatGPT 4-o مستقبل السياحة العلاجية في تركيا لامعاً وسيغرض الصدارة بشكل عام.

الخلاصات: هذه الدراسة مهمة للكشف عن البيانات حول الحالة الحالية والمستقبلية للسياحة العلاجية من خلال الذكاء الاصطناعي. ومع ذلك، لم يتم إجراء سوى عدد قليل من الدراسات حول الذكاء الاصطناعي والسياحة العلاجية. على حد علمنا، لا توجد أدبيات موجودة تقييم بشكل منهجي استجابات ChatGPT لخبراء السياحة الطبية. وفي هذا الصدد، يُعتقد أن الدراسة ستفيد الأكاديميين والممارسين على حد سواء.

الكلمات الدالة: السياحة الطبية، الذكاء الاصطناعي، تشات جي بي تي، أداة كليلر.

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