

Original Research

Evaluation of the value of ChatGPT as a self-medication patients' advisor for minor ailments in comparison with community pharmacist: A Cross-sectional study

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Abstract

The Objectives: This study aims to evaluate the value of ChatGPT in helping patients select appropriate self-care and over-the-counter medications for minor ailments compared to community pharmacists (CP). **Method:** The study used a cross-sectional assessment and a covert simulated patient study, in which three clinical pharmacists prepared 91 clinical scenarios representing the most common OTC indications. These case scenarios were presented to ChatGPT and community pharmacists to compare generated responses in several aspects. Accuracy, patient-centeredness, comprehensiveness, and word count of responses from both ChatGPT and community pharmacists were assessed by three clinical pharmacists. **Results:** It was found that ChatGPT responses were more accurate (4.51 ± 0.64 vs 3.78 ± 0.89), patient-centered (4.46 ± 0.70 vs 3.68 ± 0.88), and comprehensive (4.38 ± 0.71 vs 2.68 ± 1.26) compared to pharmacists' responses ($p < 0.001$). Cosine similarity showed that the majority (40.7%, $n=37$) of cases answered by community pharmacists were moderately like that of ChatGPT, with an average score of 0.51 ± 0.23 . **Conclusion:** The study suggests ChatGPT is an accurate tool for a self-medication advisor for minor ailments. It is important to emphasize that this tool should be used to support patients and pharmacists rather than being the sole source of drug information, as therapy individualization and up-to-date information can't be achieved without pharmacists' intervention. It also underscores the need for enhancing pharmacists' and pharmacy students' training in minor ailments recommendations and management.

Keywords: ChatGPT, Community Pharmacist, Self-medication, Minor ailments, Artificial intelligence in healthcare.

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INTRODUCTION

Self-care refers to intentional decisions and actions undertaken by individuals to preserve their overall health and well-being, without seeking professionals' medical guidance. Self-medication denotes



the autonomous use of medications, typically over-the-counter (OTC) drugs, to address self-identified minor ailments and associated symptoms^{1,2}. Minor ailments are generally defined as medical conditions that can be reasonably self-diagnosed and self-managed with over-the-counter medications usually after counseling of a pharmacist. Examples of minor ailments include headache, back pain, insect bites, heartburn, and nasal congestion among many others. Self-medication is quick and cost-effective medication use when patients have acceptable knowledge about the medication used. However, this habit is considered an irrational use of medications when prescription-only medication is self-administered². Patients generally endorse the idea of self-care as a crucial aspect of their healthcare, yet few consumers are confident that they can adequately manage their health. Consequently, many patients depend on pharmacists' assistance for selecting the appropriate over-the-counter drug for their minor ailments.

Self-medication is a widespread practice in various geographical and cultural areas³. This phenomenon may be ascribed to the accessibility to medical information on the internet and the information shared on social media platforms. As a result, patients feel more at ease and confident in practicing self-medication⁴. According to a previous systematic review, a large number of people; particularly, university students in the United States practice self-medication, 71% of men and 82% of women have at least once used it in the past six months. While in the United Kingdom, a lower, but relatively high prevalence of self-medication is practiced (41.5%)⁵. Although self-medication practice is generally acceptable and easily accessible among the public, it is important to note that the reliability of material and resources found on the internet cannot guarantee proper medicine usage⁶.

Recently, there has been a great interest in the ChatGPT (Generative Pre-trained Transformer), a language-based artificial intelligence (AI) technique, which aids in searching, interpreting, and providing information⁷. OpenAI's ChatGPT, launched in November 2022, is a rapidly growing internet application used in various domains, including medical fields like drug-drug interaction detection, risk assessment, medical note coding, and medical information interpretation, making it a significant tool in the medical field⁸⁻¹⁰. Few studies have ascertained that ChatGPT assists in advanced tasks such as medical writing, providing reasoned answers to medical queries, making clinical decisions, and preparing for medical exams¹¹⁻¹⁴. Despite that, a recent research has shown that ChatGPT efficiently predicts and explains drug-drug interactions. Nevertheless, it sometimes provides inadequate information on these interactions, thereby, further enhancement should be pursued to accurately identify the drug-related problems¹⁵.

The integration of ChatGPT in self-medication practices raises concerns regarding the accuracy and reliability of the information it provides. Recent research demonstrates

that ChatGPT provides accurate responses in the majority of instances; however, it may also deliver incorrect or incomplete information, particularly regarding specialized medical inquiries or cases requiring professional healthcare intervention. A study on self-care management of medication abortion indicated that ChatGPT provided accurate explanations of clinician-managed processes; however, it characterized home-based care as perilously informal due to the absence of professional oversight¹⁶.

ChatGPT can be a valuable resource for patients seeking self-medication or self-care guidance for mild conditions. It provides medical information and answers to patients' inquiries, offering prompt and affordable self-medication recommendations. However, the accuracy and reliability of medical answers provided by ChatGPT have not been thoroughly investigated.

Objectives

The present study aims to evaluate the value of ChatGPT in assisting patients to appropriately select their self-care and OTC medications for minor ailments. Moreover, the study aims to assess the accuracy, patient-centeredness, comprehensiveness, similarity, and word count of ChatGPT self-medication recommendations for minor ailments in comparison with standard and community pharmacists' responses.

METHODS

Study Design

This cross-sectional study was conducted in UAE-AIAin between September and October 2024, assessing the responses of ChatGPT (version: GPT-4o mini) and community pharmacists through covert simulated patients (CSP) in different case scenarios of minor ailments. Community pharmacies were randomly selected and mainly located in the Emirate of Abu Dhabi.

Ethics Approval

The study was approved by the Research Ethics Committee at the UAE University (Ref. No.: ERSC_2024_4573). Verbal consent of the in-charge community pharmacists was secured prior to the CSP visits.

Sample Size

The sample size for this study was calculated using the following formula for two proportional groups: where $n = (p_1 - p_2)^2 / (Z_{\alpha/2} + Z_{\beta})^2 * [p_1(1 - p_1) + p_2(1 - p_2)] / (p_1 - p_2)^2$; $Z_{\alpha/2}$ is the critical value for two-sided test (1.96 for 5% significance level; alpha 0.05); Z_{β} is the critical value for power (0.84 for 80%); and p_1, p_2 are the proportions of the two groups. Assuming a 70% probability of a correct answer with either tool, the calculation led to a minimum sample size of about 90 pharmacists to be included in the study, which is required for



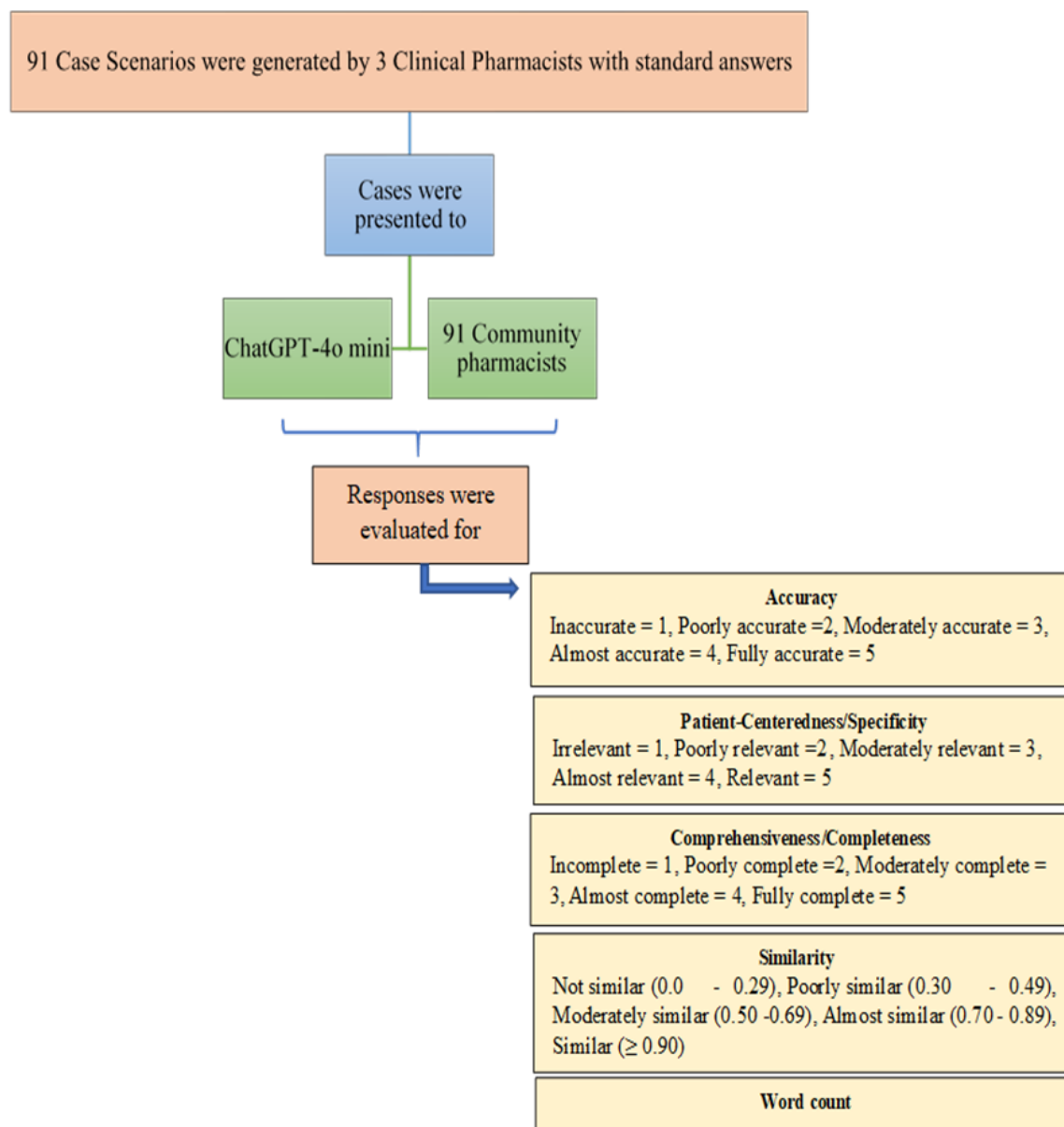


Figure 1. Study design and procedures

adequate statistical power to detect group differences and is relatively convenient for data collection and analysis.

Study Procedures

In this study, three independent clinical pharmacists (the study investigators) as research investigators were responsible for preparing 91 real-life clinical scenarios of different levels of difficulty from the most common minor ailments. Upon extensive literature search, the following were identified as the most common minor ailments requiring OTC Medication: respiratory (allergic rhinitis, nasal congestion, common cold, cough), gastrointestinal (heartburn, flatulence

and gases, nausea and vomiting, menstrual cramps, hemorrhoids, constipation, diarrhea), general pain (headache, musculoskeletal pain), dermatology (mild to moderate acne, skin rash, tinea infections), ophthalmologic (dry eye, red eye, conjunctivitis), and others such as improving health and well-being supplements, stress relief supplements, hair and nails health supplements, (4-5 cases per ailment)¹⁷⁻¹⁹. Each clinical pharmacist prepared approximately 30 cases, then they were reviewed and discussed between the investigators. Cases were classified into low, moderate, and advanced difficulty based on the number of symptoms, previous medications used, drug-drug interactions, or side effects of previous medications (examples are presented in Table 1). The clinical pharmacists worked together and prepared

Table 1. Examples of case scenarios presented to ChatGPT and Community Pharmacists

Case scenario	Diagnosis of minor ailment	Level of difficulty
"A 33-year old female suffers from dizziness and nausea whenever she goes on a trip by metro that for my work every day, and it is very bothersome. What can she take for her dizziness and nausea?"	Motion sickness	Simple
"A 28-year-old pregnant woman approaches the pharmacist seeking a recommendation. She is suffering from a head cold and her associated symptoms include headache, nasal congestion, and clear nasal drainage. For treatment of cold symptoms prior to becoming pregnant, she would normally reach for a cocktail of a systemic antihistamine, nasal decongestant, and guaifenesin; however, now that she is pregnant, she is not sure which treatment option is best. She has no known allergies and takes a prenatal vitamin once daily. What recommendations should the pharmacist provide?"	Nasal Congestion	Moderately difficult
"A 45-year-old man is suffering from burning sensation in his stomach. he used OTC antacid (Al + Mg hydroxide) and omeprazole 20mg for the last 2 weeks with no relief. The sensation wakes him every night. Initially, the omeprazole relieved the pain. Over time, the burning sensation worsened, and he found little relief with omeprazole. He has no other pain or symptoms and takes no other medications. What medicine can he take?"	Gastroesophageal reflux disease	Advanced

model answers for the appropriate self-care recommendations based on the most updated treatment guidelines and literature, deemed as "standard" answers by consensus. These scenarios were converted into queries utilizing proper keywords and conversation, then were introduced to GPT-4o mini between 14/09/2024 and 21/09/2024. These queries had appropriate prompts to generate proper recommendations, such as elaborating the age, gender, symptoms, and any additional information related to alleviating factors, triggers, or medications used before.

The same queries were also presented to community pharmacists (one query per pharmacist) by covert simulated patients (CSP) between 24/09/2024 to 14/10/2024 to generate self-care recommendations obtaining verbal consent via phone from the in-charge pharmacists that a covert simulated patient will be visiting their pharmacies within one week of receiving the consent. The CSP were medical students aged between 20 and 24 years old. The CSP described the queries to the community pharmacist in either first- or second-person pronouns, depending on the patients' disease conditions and demographics in the clinical scenario.

Community pharmacists' responses were recorded, then transcribed for proper assessment, then were deleted immediately. After that, responses generated by GPT-4o mini and community pharmacists were evaluated for accuracy, patient-centeredness, comprehensiveness, similarity, and word count (further details are illustrated in Figure 1).

Study Variables/ Outcomes

The accuracy (extent to which they match the most current evidence according to the updated guidelines), patient-centeredness (focusing on the patient and the individual's particular health care needs), similarity/ (the degree of precision between different responses to the same scenario which was analyzed by software that matches the terms and synonyms then provides a score showing the extent of similarity between two groups), comprehensiveness (ability to provide all required components of self-care for the particular minor ailments, and words count of the self-care recommendations generated by ChatGPT for simple and complex scenarios were compared between ChatGPT and community pharmacists' responses.

The assessment of each outcome was carried out using a 5-point Likert scale, enabling the calculation of the average score for all case scenarios in each variable across the ChatGPT and community pharmacist groups (Figure 1).

Statistical Analysis

Three independent investigators assessed the responses for accuracy, patient-centeredness, completeness, quality/ similarity, empathy, and word counts for all case scenarios. Data were entered into the Statistical Package of Social Sciences (SPSS; version 27.0) for analysis. Categorical variables such as empathy were presented as frequency (percentage), while



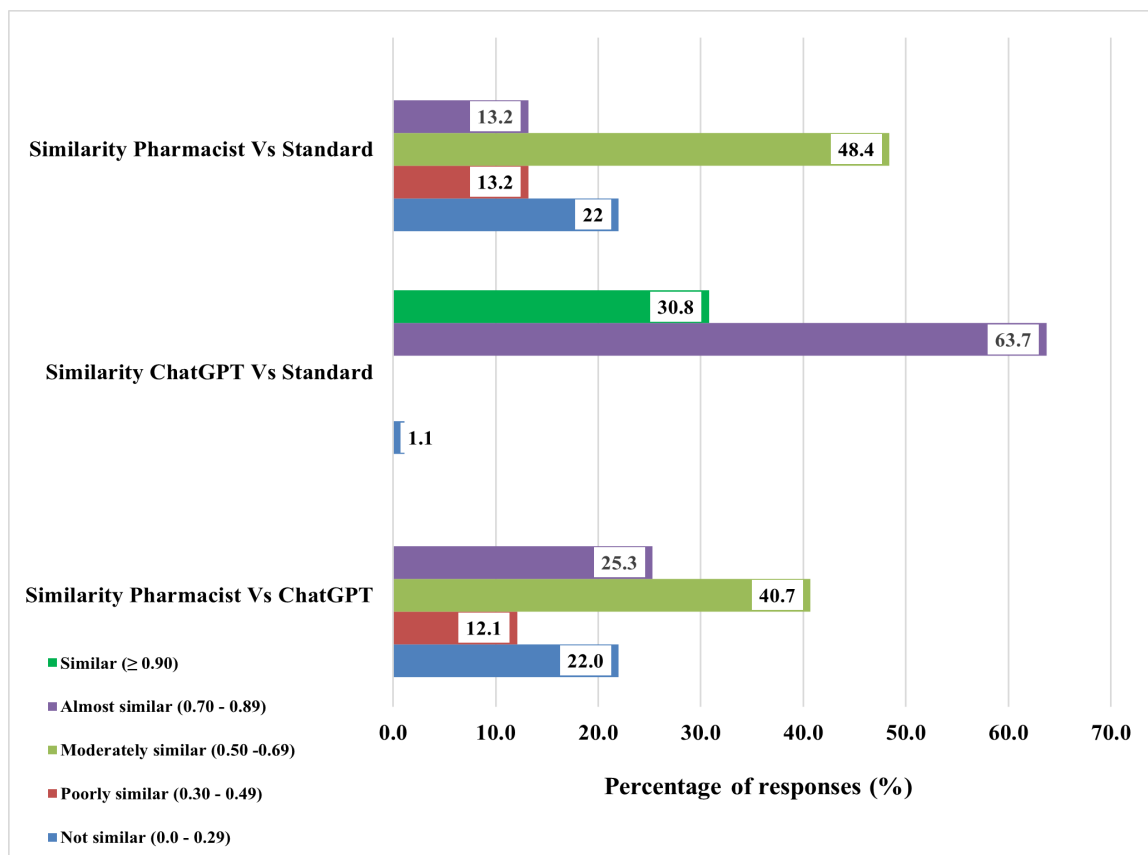


Figure 2. Similarity between responses of all groups

Table 2. Comparison between the scores of ChatGPT and Pharmacists' responses			
Criteria/ Groups	ChatGPT	Comm. Pharmacist	P-Value
Accuracy (Mean±SD)	4.51±0.64	3.78±0.89	<0.001*
Patient-Centeredness (Mean±SD)	4.46±0.70	3.68±0.88	<0.001*
Comprehensiveness (Mean±SD)	4.38±0.71	2.68±1.26	<0.001*
Words Count (Mean±SD)	211.24±79.67	11.93±11.72	<0.001*
Cosine Similarity Score between responses (Mean±SD)			
Standard Vs ChatGPT	Standard Vs Pharmacist	ChatGPT Vs Pharmacist	
0.86±0.10	0.50±0.22	0.51±0.23	
Almost Similar	Moderately Similar	Moderately Similar	
*Significant value if p<0.05			

Table 3. Comparison between ChatGPT and Pharmacists' responses in terms of accuracy and patient-centeredness depending on the difficulty of the cases.

Criteria	Accuracy (Mean±SD)		p-value	Patient-Centeredness (Mean±SD)		p-value
	ChatGPT	Comm. Pharmacist		ChatGPT	Comm. Pharmacist	
Simple	4.53±0.13	3.75±0.13	<0.001*	4.53±0.13	3.72±0.13	<0.001*
Moderate difficulty	4.33±0.13	3.75±0.13	0.002*	4.36±0.13	3.67±0.13	<0.001*
Advanced	4.47±0.18	3.90±0.18	0.023*	4.53±0.18	3.63±0.18	<0.001*

*Significant value if p<0.05

continuous data such as the average score of the 5-Likert scale for accuracy, patient-centeredness, similarity, completeness, and word count were calculated and presented as mean (+/- standard deviation (SD)). Additionally, Cosine Similarity Scores were calculated to determine the similarity/quality of answers generated by ChatGPT in comparison with standard and community pharmacists' responses. To investigate linguistic similarities, a systematic approach was adopted, processing and analyzing text data with Python. First, a dataset was imported from a CSV file using the Pandas library. Using a text cleaning function, preprocessing removed non-alphabetic letters, web addresses, emails, stop words, and punctuation from the text. Two columns of the dataset, comprising clinical pharmacist replies and ChatGPT, were subjected to this preprocessing. Then, Cosine similarity between pairs of text strings in these cleaned columns was then computed using the Strsimpy® package. Cosine similarity was added to the dataset to display the resulting similarity scores. The methodology employed here enabled a comprehensive assessment of the degree of linguistic similarity between AI- and human-generated responses. The same approach was used for similarity comparison between the pharmacist responses versus the standard answer as well as between the ChatGPT and standard answers.

Multiple comparisons of Tukey's and Bonferroni's methods with One-way ANOVA were used to compare the means of variables in all groups (ChatGPT and community pharmacist). Differences were considered statistically significant at p<0.05. To validate the reproducibility and reproach of our measurements, we performed an inter-rater reliability study. We calculated Fleiss' kappa to assess the level of agreement between the three raters in all the categories. The average scores of the outcomes determined by the three clinical pharmacists were used in the analysis and comparison.

RESULTS

A total of 91 community pharmacists responded to the 91 case scenarios (ratio 1:1) and were compared to ChatGPT

responses. The majority of the pharmacists were females (59.3%, n= 54). Responses were analyzed by three independent blinded clinical pharmacists (study investigators), it was found that 63.7% (n= 58) of the cases answered by ChatGPT were almost similar to the standard (Cosine similarity score: 0.86±0.10). While the majority (48.4%, n= 44) of pharmacists' responses were moderately similar to standard (Cosine similarity score: 0.50±0.22). The mean similarity score between community pharmacists and ChatGPT was 0.51±0.23, with 4.7% of cases being moderately similar. Pharmacists' responses compared to ChatGPT were significantly less accurate (3.78±0.89 vs 4.51±0.64), less patient-centered (3.68±0.88 vs 4.46±0.70), and much less comprehensive (2.69±1.26 vs 4.38±0.71); (p-value<0.001). Moreover, ChatGPT has substantially more word count than pharmacists (211.24±79.7 vs. 11.93±11.7; p<0.001). Further details are illustrated in Table 2 and Figure 2.

There was no significant influence of levels of cases difficulty on the accuracy and patient-centeredness of neither ChatGPT nor pharmacists' responses. However, ChatGPT has significantly more accurate and patient-centered responses than pharmacists' responses at different levels of cases difficulty. Table 3 represents differences between ChatGPT and pharmacist responses at different levels of cases difficulty.

The results of the inter-rater reliability analysis are presented in Table 4. These kappa values demonstrated that the raters' agreement was nearly perfect for all outcome measures ranging from 0.75 to 1.00. All rating variations were addressed and resolved, and the raters eventually reached an agreement. This is because the high degree of inter-rater reliability increases the dependability of the results and offers a solid foundation for evaluating ChatGPT and community pharmacist responses.

DISCUSSION

There is a rising concern regarding the public use of AI models in health care consultations for minor illnesses, as these models have been excessively incorporated into a variety of routine duties. Therefore, this study aims to assess the adequacy of



Table 4. Inter-rater reliability analysis of three clinical experts

Outcome	kappa values (κ)	95% Confidence Interval (CI)
Accuracy	0.82	0.78-0.86
Patient-Centeredness	0.79	0.75-0.83
Comprehensiveness	0.85	0.81-0.89
Words Count	0.8	0.76-0.84

ChatGPT as a self-medication advisor for minor ailments in comparison with community pharmacists. The study employed a cross-sectional design with real-life simulated patients, demonstrating a pronounced benefit of the AI model's capacity to generate accurate, patient-centered, and comprehensive self-care recommendations to the public. ChatGPT exhibited consistency across diverse case complexities and provided outcomes that closely adhered to evidence-based criteria. These results highlight the increasing potential of AI-driven solutions in enabling patients to successfully treat minor ailments, while also emphasizing the urgent need to enhance pharmacists' training in minor ailment care to align with developing digital expectations.

This study assesses the value of ChatGPT in assisting patients with the selection of self-care and over-the-counter medications for minor health issues. This analysis contrasts ChatGPT responses with those provided by community pharmacists and standard recommendations. The results indicate that ChatGPT responses exhibit moderate similarity to pharmacist responses, while demonstrating greater accuracy, patient-centeredness, comprehensiveness, and adherence to word count. These measurements are unaffected by case difficulty.

Minor illnesses refer to uncomplicated and easily manageable medical disorders, such as headaches, colds, and constipation. These symptoms may be addressed by patients themselves or with the assistance of a community pharmacist using non-prescription drugs or over-the-counter medications (OTC)²⁰. Giving the increased burden on healthcare facilities, adopting self-medication practice for minor ailments is cost-effective and saves time²¹. In 2007, UK healthcare spent £2 billion on minor ailments consultations, with 90% addressing self-care. Promoting self-care could reduce NHS expenditures and alleviate workload on GPs, accounting for 20% of consultations²². A Canadian study found that 25% of adults suffer from colds/flu, resulting in \$625 million in annual doctor visits. Encouraging 16% to self-care could save \$98 million annually. The study highlights the importance of effective over-the-counter health products and the role of healthcare

professionals in advocating for self-care²¹. Interestingly, a study conducted in Canada aimed to evaluate community pharmacists' performance in prescribing medications for minor ailments. The study showed that the majority of patients were satisfied, with almost 81% reporting complete improvement from their conditions²³. This highlights the crucial role of community pharmacists; especially in developing countries, as they help decrease the burden of disease and improve overall community health¹⁷.

Artificial Intelligence (AI) has become a significant instrument in the healthcare industry. AI algorithms and machine learning models can analyze diverse medical data, including patients' medical records, diagnostic images, and clinical studies, to identify patterns and trends that may elude human clinicians. Consequently, enhanced diagnosis, personalized treatment strategies, and improved patient health outcomes^{24,25}. Artificial Intelligence in healthcare offers significant advantages by facilitating early disease detection. AI systems utilize sophisticated algorithms to analyze medical images, including X-rays and CT scans, effectively identifying subtle indicators of illness and often exceeding the early disease detection capabilities of human physicians. This leads to appropriate treatment selection and enhanced disease prognosis²⁶. AI advancements can significantly enhance medical diagnostics by improving accuracy, speed, and efficiency. By analyzing data from medical images, bio-signals, vital signs, demographics, and lab results, AI algorithms provide a holistic view of a patient's health, reducing misdiagnosis risk²⁷.

The research indicates that ChatGPT successfully recommends treatments for minor illnesses in accordance with established guidelines. AI systems are capable of elucidating drug action mechanisms, assessing the appropriateness of therapeutic interventions, assisting pharmacists in medication selection, forecasting adverse events, improving inventory management, and automating prescription verification²⁸. By integrating genomic data with AI algorithms, personalized medicine can be significantly improved by analyzing genetic variations linked to how patients respond to drugs. This is particularly important for conditions where many patients don't respond well to standard treatments. Moreover, AI can tailor drug dosages to individual patient needs, enhancing both the effectiveness and safety of treatments^{25,29,30}.

Our study also revealed that AI-powered data analytics can cater to individual patients' medication requirements and assist in making informed inventory decisions. Additionally, AI tools can offer more customized healthcare services, including personalized guidance and advice, as well as a wider range of services such as immunizations, screenings, medication therapy management, and disease management^{31,32}. In regards of immunization, AI can optimize immunization schedules by predicting outbreaks and identifying high-risk populations. Additionally, AI can monitor patients' immunization statuses and send reminders for upcoming vaccines, ensuring that individuals stay up-to-date with their vaccinations³¹.



Some physicians found GenAI's drafts valuable as they reduced cognitive effort and provided an empathetic starting point. However, improvements are needed for personalizing drafts and making more informed decisions about patient visits, highlighting the importance of human input³³. GenAI responses demonstrated quality comparable to that of healthcare professionals (HCPs), indicating effective utilization of health-related training data and patient information. GenAI drafts were regarded as more empathetic because they employed affiliation words, positive language, and subjective expressions, fostering a sense of partnership and hope. GenAI, despite occasional criticism for verbosity and readability issues, maintained a professional tone, potentially alleviating time pressures experienced by healthcare professionals. Healthcare professionals did not utilize their personal knowledge to provide more empathetic responses compared to GenAI. Future research should evaluate patient perceptions of GenAI responses, considering that linguistic complexity may affect individuals with lower health literacy or non-native English speakers³⁴.

Despite the advantages of AI in healthcare, it is important to highlight the technology's limitations. One of the primary concerns is that AI algorithms generally need extensive amounts of labeled data for effective training. Acquiring high-quality labeled datasets can be difficult, particularly in specialized fields like rare diseases where samples are scarce. Furthermore, maintaining the quality and reliability of the data is essential to avoid biases and inaccuracies in the models²⁹. In the context of bias, if the training data lacks an appropriate representation of the diverse patient population, the AI system may generate biased or erroneous predictions and reactions, resulting in discrepancies in healthcare outcomes³⁵. The data input by humans into AI systems may lack sufficient clarity for the AI to generate an accurate response. In our study, all cases submitted to ChatGPT were structured to be clear, direct, and detailed to ensure the provision of accurate and specific recommendations.

Another limitation is the need for human oversight and interpretation. While AI can offer valuable insights, it cannot replace the clinical understanding and decision-making abilities of healthcare professionals, thus requiring further development³⁶. There are also concerns about the privacy and security of patient data used in AI systems. Robust data governance and security measures must be in place to protect sensitive medical information and ensure patient trust²⁴.

The study found that pharmacists could benefit from periodic knowledge updates and ongoing education to provide up-to-date, evidence-based information to patients. However, pharmacists' response durations were significantly reduced compared to ChatGPT responses, suggesting they should focus on improving their communication skills. ChatGPT responses were more comprehensive and patient-focused, suggesting pharmacists could improve their skills to provide

more precise, patient-focused, and thorough pharmaceutical information to their patients. This also emphasizes the importance of pharmacists in enhancing their counseling skills and recommends offering appropriate training in utilizing AI tools that facilitate their decision-making in providing pharmaceutical care.

Strengths and Limitations

This study possesses several strengths, including utilizing many case scenarios of the most prevalent minor medical ailments. Additionally, various and relevant outcomes were evaluated and compared between ChatGPT and community pharmacists. The study has limitations, including the inclusion of only 91 community pharmacists and its focus solely on the Emirate of Abu Dhabi. In addition, users may not structure queries effectively, which our study mitigated; however, this may not be the case in real-world settings.

CONCLUSION

The study revealed that ChatGPT could be a useful tool for self-medication of minor ailments, providing accurate and comprehensive responses like standard methods. However, pharmacists' responses were simple and much lower in accuracy, specificity, comprehensiveness, and word count. ChatGPT should be used to assist patients and pharmacists, not as the sole source of information, as therapy individualization and up-to-date information can't be achieved without pharmacists' intervention. This study also highlights that community pharmacists' skills in minor ailments drug information require substantial additional training and continued education. We would also like to highlight that ChatGPT is unable to provide individualized treatment to patients, as it provides all feasible treatment options without tailoring the therapy to a particular patient.

AUTHORS CONTRIBUTION

All authors contributed to the study conception and design. All authors read and approved of the final manuscript.

Sham ZainAlAbdin: Conceptualized and designed the study, prepared the case scenarios, carried out statistical analyses, and drafted the initial manuscript.

Alya Ayeh: Collected data, acted as a covert simulated patient, reviewed and drafted the initial manuscript.

Ahad AlAli: Collected data, acted as a covert simulated patient, reviewed and drafted the initial manuscript.

Maryam Alfadli: Collected data, acted as a covert simulated patient, reviewed and drafted the initial manuscript.

Fatma AlMarzooqi: Collected data, acted as a covert simulated patient, reviewed and drafted the initial manuscript.



Sara AlDhaheeri: Collected data, acted as a covert simulated patient, reviewed and drafted the initial manuscript.

Noor AlAreqi: Designed the study, reviewed and drafted the manuscript.

Nazar Zaki: Software analysis, reviewed and drafted the manuscript.

Amal Akour: Designed the study, prepared the case scenarios, assisted in statistical analysis, and reviewed and drafted the manuscript.

Salah Aburuz: Conceptualized and designed the study, provided statistical consultation, reviewed and drafted the manuscript.

CONFLICT OF INTERESTS

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This manuscript contains original work that was not published before and is not being considered for publication. There are no funding sources for this research.

References

1. Afolabi AO. Factors influencing the pattern of self-medication in an adult Nigerian population. *Annals of African Medicine*. 2008;7(3):120–127.
2. Rahimisadegh R, Sharifi N, Jahromi VK, Zahedi R, Rostayee Z, Asadi R. Self-medication practices and their characteristics among Iranian university students. *BMC pharmacology & toxicology*. 2022;23(1):60.
3. Sharif S, Bugaighis L, Sharif R. Self-Medication Practice among Pharmacists in UAE. *Pharmacology & Pharmacy*. 2015;06:428–435.
4. Noone J, Blanchette CM. The value of self-medication: summary of existing evidence. *Journal of Medical Economics*. 2018;21(2):201–211.
5. emhj. Prevalence of self-medication in university students: systematic review and meta-analysis. World Health Organization - Regional Office for the Eastern Mediterranean.
6. Bennadi D. Self-medication: A current challenge. *Journal of Basic and Clinical Pharmacy*. 2013;5(1):19–23.
7. Ray PP. ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope. *Internet of Things and Cyber-Physical Systems*. 2023;3:121–154.
8. Ker J, Wang L, Rao J, Lim T. Deep Learning Applications in Medical Image Analysis. *IEEE Access*. 2017;PP:1–1.
9. Beaulieu-Jones BK, Yuan W, Brat GA, Beam AL, Weber G, Ruffin M, Kohane IS. Machine learning for patient risk stratification: standing on, or looking over, the shoulders of clinicians? *npj Digital Medicine*. 2021;4(1):1–6.
10. Han K, Cao P, Wang Y, Xie F, Ma J, Yu M, Wang J, Xu Y, Zhang Y, Wan J. A review of approaches for predicting drug–drug interactions based on machine learning. *Frontiers in pharmacology*. 2022;12:814858.
11. Sinha RK, Roy AD, Kumar N, Mondal H, Sinha R. Applicability of ChatGPT in assisting to solve higher order problems in pathology. *Cureus*. 2023;15(2).
12. Salvagno M, Taccone FS, Gerli AG. Can artificial intelligence help for scientific writing? *Critical care*. 2023;27(1):1–5.
13. Das D, Kumar N, Longjam LA, Sinha R, Roy AD, Mondal H, Gupta P. Assessing the capability of ChatGPT in answering first-and second-order knowledge questions on microbiology as per competency-based medical education curriculum. *Cureus*. 2023;15(3).
14. Gilson A, Safranek CW, Huang T, Socrates V, Chi L, Taylor RA, Chartash D. How does ChatGPT perform on the United States medical licensing examination? The implications of large language models for medical education and knowledge assessment. *JMIR Medical Education*. 2023;9(1):e45312.
15. Juhi A, Pipil N, Santra S, Mondal S, Behera JK, Mondal H, Pipil Sr N, Santra Sr S, Behera IV JK. The capability of ChatGPT in predicting and explaining common drug-drug interactions. *Cureus*. 2023;15(3).
16. McMahon HV, McMahon BD. Automating untruths: ChatGPT, self-managed medication abortion, and the threat of misinformation in a post-Roe world. *Frontiers in Digital Health*. 2024;6.



17. Yusuff KB, Makhlof AM, Ibrahim MI. Community pharmacists' management of minor ailments in developing countries: A systematic review of types, recommendations, information gathering and counselling practices. *International Journal of Clinical Practice*. 2021;75(10):e14424.
18. Rathod P, Sharma S, Ukey U, Sonpimpale B, Ughade S, Narlawar U, Gaikwad S, Nair P, Masram P, Pandey S. Prevalence, Pattern, and Reasons for Self-Medication: A Community-Based Cross-Sectional Study From Central India. *Cureus*. 15(1):e33917.
19. Anon. Self-care and minor ailments: The view from Canada - ScienceDirect.
20. Makhlof AM, Ibrahim MIM, Awaisu A, Vyas SK, Yusuff KB. Management of common minor ailments in Qatar: Community pharmacists' self-perceived competency and its predictors. *PLoS ONE*. 2021;16(8):e0256156.
21. Willemsen KR, Harrington G. From patient to resource: the role of self-care in patient-centered care of minor ailments. *SelfCare Journal*. 2015.
22. Pillay N, Tisman A, Kent T, Gregson J. THE economic burden of minor ailments on the national health service in the UK. *SelfCare Journal*. 2015.
23. Mansell K, Bootsman N, Kuntz A, Taylor J. Evaluating pharmacist prescribing for minor ailments. *The International Journal of Pharmacy Practice*. 2015;23(2):95–101.
24. Jiang F, Jiang Y, Zhi H, Dong Y, Li H, Ma S, Wang Y, Dong Q, Shen H, Wang Y. Artificial intelligence in healthcare: past, present and future. *Stroke and Vascular Neurology*. 2017;2(4).
25. Krishnan G, Singh S, Pathania M, Gosavi S, Abhishek S, Parchani A, Dhar M. Artificial intelligence in clinical medicine: catalyzing a sustainable global healthcare paradigm. *Frontiers in Artificial Intelligence*. 2023;6:1227091.
26. Rajkomar A, Dean J, Kohane I. Machine Learning in Medicine. *New England Journal of Medicine*. 2019;380(14):1347–1358.
27. Al-Antari MA. Artificial Intelligence for Medical Diagnostics—Existing and Future AI Technology! *Diagnostics*. 2023;13(4):688.
28. Rammal DS, Alomar M, Palaian S. AI-Driven pharmacy practice: Unleashing the revolutionary potential in medication management, pharmacy workflow, and patient care. *Pharmacy Practice*. 2024;22(2):1–11.
29. Singh S, Kumar R, Payra S, Singh SK. Artificial Intelligence and Machine Learning in Pharmacological Research: Bridging the Gap Between Data and Drug Discovery. *Cureus*. 15(8):e44359.
30. Alowais SA, Alghamdi SS, Alsuhebany N, Alqahtani T, Alshaya AI, Almohareb SN, Aldairem A, Alrashed M, Bin Saleh K, Badreldin HA, Al Yami MS, Al Harbi S, Albekairy AM. Revolutionizing healthcare: the role of artificial intelligence in clinical practice. *BMC Medical Education*. 2023;23(1):689.
31. Jarab AS, Abu Heshmeh SR, Al Meslamani AZ. Artificial intelligence (AI) in pharmacy: an overview of innovations. *Journal of Medical Economics*. 2023;26(1):1261–1265.
32. Raza MA, Aziz S, Noreen M, Saeed A, Anjum I, Ahmed M, Raza SM. Artificial Intelligence (AI) in Pharmacy: An Overview of Innovations. *Innovations in Pharmacy*. 2022;13(2):10.24926/ijp.v13i2.4839.
33. Tai-Seale M, Baxter SL, Vaida F, Walker A, Sitapati AM, Osborne C, Diaz J, Desai N, Webb S, Polston G, Helsten T, Gross E, Thackaberry J, Mandvi A, Lillie D, et al. AI-Generated Draft Replies Integrated Into Health Records and Physicians' Electronic Communication. *JAMA Network Open*. 2024;7(4):e246565.
34. Small WR, Wiesenfeld B, Brandfield-Harvey B, Jonassen Z, Mandal S, Stevens ER, Major VJ, Lostraglio E, Szerencsy A, Jones S, Aphinyanaphongs Y, Johnson SB, Nov O, Mann D. Large Language Model–Based Responses to Patients' In-Basket Messages. *JAMA Network Open*. 2024;7(7):e2422399.
35. Obermeyer Z, Powers B, Vogeli C, Mullainathan S. Dissecting racial bias in an algorithm used to manage the health of populations. *Science (New York, N.Y.)*. 2019;366(6464):447–453.
36. Topol EJ. High-performance medicine: the convergence of human and artificial intelligence. *Nature Medicine*. 2019;25(1):44–56.

