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ORIGINAL ARTICLE

Evaluating ChatGPT-5 for the Diagnosis of Benign Skin Lesions: Insights from Macroscopic and Dermoscopic Imaging

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Abstract

Background: While the potential of ChatGPT in the domain of medical diagnosis is noteworthy, the subject is intricate and has been examined in numerous studies across various medical disciplines. In this context, the objective of this study is to utilize ChatGPT-5 to evaluate its diagnostic accuracy for benign skin lesions using macroscopic and dermoscopic images.

Methods: During the in-person examination, the dermatologist documented macroscopic and dermoscopic images of each of the 40 patients. These images, along with basic clinical information, were uploaded to ChatGPT-5. The evaluation process was meticulously structured into two distinct phases. In the initial phase, the presentation was limited to macroscopic images alone. In the subsequent phase, the presentation expanded to encompass both macroscopic and dermoscopic images. The model was tasked with making a preliminary diagnosis and, in the event of an inaccuracy, was expected to provide three differential diagnoses. The model's accuracy was assessed by comparing its diagnoses with the histopathological results.

Results: In the evaluation conducted with ChatGPT-5, the diagnostic accuracy based solely on macroscopic images was 32.5%, whereas the accuracy for combined macroscopic and dermoscopic images decreased to 27.5% ($p = 0.450$). When three differential diagnoses were considered, the correct diagnosis was achieved in 48.1% of cases using macroscopic images, whereas this rate declined to 29.6% with the inclusion of dermoscopic images ($p < 0.001$).

Conclusion: ChatGPT-5 demonstrated modest diagnostic accuracy for benign skin lesions, with performance declined when dermoscopic images were included. These results suggest that ChatGPT-5 should be considered a supportive aid rather than a standalone diagnostic tool.

Keywords: Artificial intelligence, benign skin lesion, ChatGPT-5, diagnostic accuracy.

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INTRODUCTION

The integration of ChatGPT into the medical field presents a multifaceted landscape, as shown by numerous studies exploring its applications across various disciplines. Although ChatGPT still has certain limitations as a language model, it has demonstrated notable potential in healthcare, particularly in dermatology. Its ability to provide clear and clinically sound recommendations may help guide and support patients after diagnosis. Further evaluation and optimization are required to determine its full potential in healthcare (1). Artificial intelligence and machine learning methods have already proven diagnostically effective in skin diseases such as skin cancers, atopic dermatitis, and onychomycosis (2). In dermatology, Electronic Medical Records (EMRs) are of fundamental importance; however, since the majority of data is unstructured, analysis is challenging. Natural Language Processing (NLP) techniques help structure these data, enabling automated documentation, improved patient history collection, differential diagnosis suggestions, and integration with AI-driven image analysis. These capabilities are particularly beneficial in teledermatology, where organized patient information enhances the quality of remote consultations (3). In rare and complex diseases, ChatGPT has shown promise in supporting diagnostic and therapeutic decision making. However, it is imperative to acknowledge the limitations of this technology, particularly in the context of addressing atypical symptoms, where ethical considerations play a pivotal role (4). Within dermatology, image analysis plays a critical role in the diagnostic process. Clinical photographs, dermoscopic images, histology slides, and confocal microscopy enable high-resolution visualization of skin lesions. Dermoscopy increases diagnostic accuracy by revealing subtle structures that are not visible to the naked eye, enabling earlier detection of melanoma and other skin conditions (5,6). While the majority of skin lesions are benign, it is imperative to establish an accurate diagnosis for these lesions. The diagnostic phase is of critical importance for the subsequent monitoring and treatment of patients. This phase involves the evaluation of various parameters, including the physical examination of the patient's lesions, demographic information, any concomitant symptoms, the location and dimensions of the lesions, and the determination of the necessary treatment modalities. The treatment arrangements are then adapted in accordance with these parameters (7,8). ChatGPT can support clinicians during this process by reformulating ambiguous lesion descriptions or suggesting alternative terminology. When combined with expert input, these capabilities can further improve diagnostic accuracy (9). From a technological standpoint, earlier GPT models were restricted to text-based analysis and often failed to capture subtle visual nuances. GPT-4's multimodal abilities partially addressed these limitations but still underperformed compared to specialized vision models. GPT-5 offers enhanced multimodal capabilities with the potential to analyze macroscopic and dermoscopic images more effectively (10,11). Recent studies have reported that ChatGPT achieves up to 88% agreement with dermatologists in symptom recognition, with moderate-to-high accuracy in treatment recommendations (3). Comparative evaluations with other LLMs, such as Claude 3 Opus, show that ChatGPT performs well in benign lesion classification but remains weaker in distinguishing malignancies (12,13). Beyond diagnostic accuracy, ChatGPT has also been positively assessed in patient education and initial consultations, with patients reporting high satisfaction during first encounters. Collectively, these findings suggest that ChatGPT should not be regarded as a replacement for expert opinion but rather as a complementary tool that supports diagnosis and improves patient experience (12,14,15).

The aim of this study is to assess the diagnostic accuracy of ChatGPT-5, a multimodal large language model, in the evaluation of benign skin lesions using clinical and dermoscopic images.

MATERIALS AND METHODS

A total of 40 patients with histopathologically confirmed cutaneous benign lesions were enrolled in the study. These patients had visited the dermatology outpatient clinic from December 2024 to August 2025. Each patient underwent a comprehensive clinical and dermoscopic evaluation, encompassing macro and dermoscopic images, performed by a dermatologist during a face-to-face examination. In a group of 40 patients, a dermoscopic examination was conducted using a handheld dermoscope (Dermlite-5®). The examination involved the capture of macro and dermoscopic images using a mobile phone (iPhone 15®). Macroscopic images were captured using an iPhone 15®, while dermoscopic images were obtained with a DermLite-5® dermoscope attached to the same device. All photographs were taken in an examination room under ambient indoor lighting, using polarized mode for dermoscopy and without flash. The images were uploaded in a standardized format by the researchers, with no modifications made prior to their incorporation into the AI model ChatGPT-5. No additional guidance or specialized instructions were applied to enhance ChatGPT-5's performance, as the objective was to evaluate diagnostic accuracy using simple, unprocessed inputs that reflect real-world scenarios.

For each case, the model was provided with limited clinical information, including patient age, gender, anatomical location of the lesion, and lesion duration. The evaluation was performed in two phases: in the first phase, only the macroscopic image was submitted; in the second phase, both macroscopic and dermoscopic images were uploaded. In each phase, the model was asked to provide a single preliminary diagnosis based on the visual findings and the clinical information. The interaction with ChatGPT-5 was performed using standardized prompts to ensure consistency across all cases. For the macroscopic-only phase, the model was asked: (1) 'Based on the patient's age, anatomical location of the lesion, and lesion duration, what would be your single most likely diagnosis after examining this macroscopic image?' and (2) 'Other than the primary diagnosis, what would be your top three differential diagnoses based on the macroscopic image?' In the second phase, which included both macroscopic and dermoscopic images, the following prompts were used: (3) 'Based on the patient's age, lesion location, lesion duration, and both the macroscopic and dermoscopic images, what would be your single most likely diagnosis?' and (4) 'Other than the primary diagnosis, what would be your top three differential diagnoses based on the macroscopic and dermoscopic images?' No additional instructions or optimization techniques were applied. In instances where the model's diagnosis differed from the histopathological diagnosis, the model was requested to offer three differential diagnoses for the lesion. A comparison was made between the diagnoses provided by the model, which were either preliminary or differential, and the patients' histopathological diagnoses. The diagnostic accuracy was defined as the degree of agreement between these diagnoses and the histopathological results.

The diagnostic accuracy was evaluated in two distinct ways. Initially, the concordance between the preliminary diagnosis, which was based on macroscopic images in conjunction with the integration of macroscopic and dermoscopic images, and the histopathological diagnosis was assessed. Secondly, the correlation between any of the top three differential diagnoses and the histopathological diagnosis was analyzed, once more separately for macroscopic images and for combined macroscopic and dermoscopic images. To ensure the independence of the assessment process and prevent the influence of prior inputs on subsequent results, a separate session was initiated with the model for each diagnostic approach. The model was not provided with additional contextual information beyond the image and basic clinical descriptors, ensuring a blinded assessment and minimizing potential bias.

All ethical approvals for the study were obtained from the ethics committee with the file dated 3.11.2025 and decision number 25.11.03.08/10. All participants were informed of the study's protocol and provided with consent forms.

Statistical Analysis

The collected data was then compiled into a database, which was subsequently analyzed using SPSS version 22 (IBM Co., USA). The data were subsequently classified, and the categorical data were defined as percentages and frequencies. The determination of numerical data was accompanied by the execution of distribution analysis. Data sets that conformed to a normal distribution were defined as mean ± standard deviation. The relationship between categorical variables was analyzed using the chi-square test and Fisher's exact test. The McNemar test was performed to determine the agreement between them. In accordance with the established protocol, outcomes exhibiting a p-value below 0.05 were designated as statistically significant.

Table 1. Demographic Characteristics of Study Population and the Distribution of the Lesion Diagnoses and Location of Lesions Among Patients

Characteristics		Value
Number of patients		40
Gender	Males n (%) Females n (%)	18 (45%) 22 (55%)
Age	Range (years) Average, mean (SD), years	4-79 36.73 ± 21.1
Lesion Duration	Average, median ± IQR, months	42 ± 103
Location of Lesions	n (%)	
Face	n (%)	20 (50%)
Scalp	n (%)	5 (12.5%)
Extremity	n (%)	5 (12.5%)
Trunk	n (%)	10 (25%)
Dermal nevus	n (%)	5 (12.5%)
Nevus	n (%)	5 (12.5%)
Solar lentigo	n (%)	5 (12.5%)
Dermatofibroma	n (%)	4 (10%)
Verruca vulgaris	n (%)	3 (7.5%)
Seborrheic keratosis	n (%)	3 (7.5%)
Blue nevus	n (%)	2 (5.0%)
Eccrine hidrocystoma	n (%)	2 (5.0%)
Pilomatricoma	n (%)	2 (5.0%)
Linear epidermal nevus	n (%)	2 (5.0%)
Spitz nevus	n (%)	1 (2.5%)
Lichen planus pigmentosus	n (%)	1 (2.5%)
Nevus sebaceous	n (%)	1 (2.5%)
Angiokeratoma	n (%)	1 (2.5%)
Inverted follicular keratosis	n (%)	1 (2.5%)
Fibroepithelial polyp	n (%)	1 (2.5%)
Reed nevus	n (%)	1 (2.5%)

Note: This table summarizes the demographic characteristics of the study population along with the histopathologically confirmed diagnosis of the included benign skin lesions.

RESULTS

The Demographic and Clinical Features of the Study Population

The study population comprised 40 patients, 55% of whom were female, with ages ranging from 4 to 79 years. The mean age was determined to be 36.73 years (±21.1). The analysis revealed that 50% of the detected lesions were located on the face, with the most prevalent diagnoses being dermal nevus (12.5%), nevus (12.5%), and solar lentigo (12.5%). Demographic characteristics of the study population, the distribution of lesion diagnoses, and the anatomical distribution of the lesions are outlined in Table 1. (Diagnostic Accuracy of ChatGPT-5 in Preliminary Diagnosis Based on Macroscopic and Dermoscopic Images)

In the evaluation conducted by ChatGPT-5, the diagnostic accuracy for macroscopic images was 32.5%, while the diagnostic accuracy for macroscopic and dermoscopic images was 27.5% with no significant difference between the two groups (p = 0.450).The diagnostic performance of ChatGPT-5 for preliminary diagnosis based on macroscopic images and macroscopic plus dermoscopic images is summarized in Table 2. (Diagnostic Accuracy of ChatGPT-5 in Three Differential Diagnoses Based on Macroscopic and Dermoscopic Images)

In the evaluation conducted by ChatGPT-5, the diagnostic accuracy for three differential diagnoses based on macroscopic images was 48.1%, while for macroscopic and dermoscopic images it was 29.6%, with a statistically significant difference between the two groups (p < 0.001). The diagnostic performance of ChatGPT-5 for three differential diagnoses is summarized in Table 3.

Table 2. Evaluation of the Diagnostic Accuracy of ChatGPT-5 for Preliminary Diagnosis in Macroscopic Images and in Combined Macroscopic and Dermoscopic Images

N:40	n/N	%	p value
Macroscopic images	13/40	32.5	0.450[a]
Macroscopic and dermoscopic images	11/40	27.5	

[a]McNemar Test
Note: This table shows the agreement between ChatGPT-5's preliminary diagnoses and the histopathological diagnoses, comparing diagnostic accuracy based on macroscopic images versus combined macroscopic and dermoscopic images.

Table 3. Evaluation of the Diagnostic Accuracy of ChatGPT-5 for Three Differential Diagnoses in Macroscopic Images and in Combined Macroscopic and Dermoscopic Images

N:27	n/N	%	p value
Macroscopic images	13/27	48.1	p<0.001[b]
Macroscopic and dermoscopic images	8/27	29.6	

[b]Fisher exact test
Note: This table shows the agreement between the top three differential diagnoses provided by ChatGPT-5 and the histopathological diagnoses, comparing diagnostic accuracy derived from macroscopic images versus combined macroscopic and dermoscopic images.

DISCUSSION

The integration of artificial intelligence (AI) into healthcare has gained significant momentum in recent years. One of the primary drivers of this trend is the increasing tendency of patients to seek professional medical guidance based on preliminary diagnoses obtained from online sources (16). While AI offers opportunities to improve diagnostic workflows, concerns regarding reliability, diagnostic accuracy, and data security remain substantial (17–19). Therefore, AI should be viewed as a complementary tool rather than a replacement for clinical expertise, and collaboration between developers and healthcare professionals is essential for safe implementation (20,21). As AI continues to evolve, it may optimize diagnostic pathways, improve patient outcomes, and address the growing global demand for healthcare services, thereby holding the potential to transform health systems fundamentally (22).

In our study, the ChatGPT-5 model achieved a diagnostic accuracy of 32.5% for macroscopic images and 27.5% for combined macroscopic and dermoscopic images, with no statistically significant difference between the two groups. When evaluated for three differential diagnoses, ChatGPT-5 reached an accuracy of 48.1% with macroscopic images, compared to 29.6% with macroscopic plus dermoscopic images, a difference that was statistically significant. These findings suggest that while ChatGPT-5 demonstrates a certain level of diagnostic capacity in cutaneous benign lesions, the integration of dermoscopic inputs did not enhance performance and may even have impaired accuracy. This outcome indicates that the model currently struggles to effectively interpret multimodal visual data, underscoring the need for further refinement before such tools can be reliably integrated into clinical decision making.

In the literature, several studies have evaluated the diagnostic performance of artificial intelligence–based models in benign skin lesions. Chetla et al. reported accuracy rates of 79.3% for nevi and 74.4% for benign keratoses. Similarly, another analysis demonstrated accuracy rates of 72.8% for nevi and 73.7% for benign keratoses (17). In the study by Rundle et al., 22 benign neoplasms were assessed, with correct diagnoses achieved in 69.6% of cases. Importantly, the diagnostic accuracy for benign lesions was higher than that for malignant lesions (69.6% vs. 58.8%). These findings suggest that ChatGPT may provide more reliable outcomes in benign conditions by generating fewer differential diagnoses and thus offering a higher degree of diagnostic confidence (23). In line with these observations, Scheinkman et al. reported that ChatGPT-4o achieved high diagnostic accuracy in benign lesions. The highest accuracy was observed in lichen planus (100%), whereas the lowest accuracies were recorded for blue nevus (40%) and cherry angioma (53%) (24). In contrast to prior reports, our study demonstrated substantially lower accuracy rates with the ChatGPT-5 model, particularly in the classification of benign lesions. Overall diagnostic accuracy was 32.5% with macroscopic images and 27.5% with the combined use of macroscopic and dermoscopic images, with no statistically significant difference between the two groups. When limited to three differential diagnoses, performance improved to 48.1% with macroscopic images but declined markedly to 29.6% when multimodal inputs were incorporated. These findings indicate that, unlike earlier models, ChatGPT-5 currently faces challenges in effectively integrating dermoscopic information, underscoring the need for further refinement in multimodal data interpretation. An additional limitation concerns the unexpected decline in diagnostic accuracy when dermoscopic images were incorporated. This reduction appears to be related to several technical and model-specific factors. ChatGPT-5 is not specifically trained on dermoscopic pattern recognition, limiting its ability to interpret fine structures such as pigment networks or vascular details. Variations in lighting, polarization, and smartphone-based imaging may also have reduced the clarity of subsurface features. Furthermore, some lesions exhibited subtle or non-specific dermoscopic patterns, providing limited diagnostic cues for a general-purpose multimodal model. Collectively, these factors suggest that ChatGPT-5 currently relies more on macroscopic global features than on detailed dermoscopic structures, contributing to its lower performance when dermoscopic inputs are added.

The observed decline in accuracy with dermoscopic images may be explained by several technical and model-related factors. ChatGPT-5 is not specifically trained to recognize dermoscopic structures, which limits its ability to interpret fine details such as pigment networks or vascular features. Variations in lighting, polarization, and smartphone-based image acquisition may have reduced subsurface clarity, and some lesions exhibited subtle or non-specific dermoscopic patterns that offered limited diagnostic cues. Overall, these findings indicate that ChatGPT-5 may currently have difficulty integrating dermoscopic information into its decision-making process, which may partially explain the reduced accuracy observed with dermoscopic images.

A key strength of this study is the use of histopathologically confirmed real patient data and the inclusion of a broad diagnostic spectrum. Additionally, the separate and combined evaluation of macroscopic and dermoscopic images provides a comprehensive assessment of the model's performance across different visual modalities.

Despite these strengths, several limitations should be acknowledged. The small sample size and uneven distribution of diagnostic categories limit generalizability and may have affected accuracy estimates. Furthermore, the absence of a direct head-to-head comparison between ChatGPT-5 and dermatologist evaluations limits the interpretation of clinical relevance.

Given the low diagnostic accuracy observed in this study, the clinical applicability of ChatGPT-5 remains limited. Such performance may pose risks in real-world use, including delayed diagnosis or inappropriate reassurance. Therefore, clinician oversight is essential, and AI-assisted diagnostic tools should not be used independently. With advancements in dermoscopic pattern recognition and domain-specific training, multimodal large language models may, in the future, provide supportive value in triage, patient communication, and preliminary lesion assessment but they cannot replace expert clinical judgment.

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Abbreviations List

AI: Artificial Intelligence
LLM: Large Language Model
NLP: Natural Language Processing
EMR: Electronic Medical Records
SD: Standard Deviation
IQR: Interquartile Range
SPSS: Statistical Package for the Social Sciences.

Ethics Approval and Consent to Participate

All ethical approvals for the study were obtained from the Ufuk University Faculty of Medicine Ethics Committee with the file dated 03.11.2025 and decision number 25.11.03.08/10. All participants were informed about the study protocol and provided with written consent forms.

Consent for Publication

The authors confirm that they have reviewed and approved the final version of the manuscript and agree with its submission and publication. No personal data from any individual were used in this study.

Availability of Data and Materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Author Contributions

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