

Patient Perceptions of Artificial Intelligence and Telemedicine in Dermatology: A Narrative Review

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Patient Perceptions of Artificial Intelligence and Telemedicine in Dermatology: A Narrative Review

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Abstract

Background: Artificial intelligence (AI) and telemedicine have great potential to transform dermatology care delivery, but patient perspectives on these technologies have not been systematically compared.

Objective: To examine patient perspectives on AI and telemedicine in dermatology to inform implementation strategies as these technologies increasingly converge in clinical practice.

Methods: A comprehensive literature search was conducted using PubMed, Scopus, and Embase databases between August 2024 and October 2024. We identified 48 articles addressing patient perspectives on AI and telemedicine in dermatology, with none directly comparing views on both technologies.

Results: Several distinct themes emerged regarding patient perspectives on these technologies: willingness to use, perceived benefits and risks, barriers to implementation, and conditions necessary for successful integration. Findings revealed that patients express hesitancy towards AI-based diagnoses that lack dermatologist involvement, while preferences for teledermatology varied by appointment reason, age, and prior technology exposure. Patients' motivations for AI implementation are connected to AI's potential for quicker diagnoses and improved triage efficiency, while telemedicine addresses logistical challenges such as reduced travel time and improved appointment availability. Both technologies were perceived to improve accessibility and diagnostic efficiency, though patients expressed concerns about AI's limited communication abilities and teledermatology's limits in performing physical examinations. Primary adoption barriers for these modalities included technological limitations and trust concerns, with patients emphasizing the need for dermatologist oversight, transparency, and adequate educational resources for successful integration.

Conclusions: The complementary strengths of AI and teledermatology suggest they could mitigate each other's limitations when integrated—AI potentially enhancing teledermatology's diagnostic accuracy while teledermatology addresses AI's lack of human connection. By thoroughly examining these perspectives, this review may serve as a guide for patient-centered technological integration in the future landscape of accessible dermatologic care.

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Original Manuscript

Review

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Keywords: digital health; technology; patient-centered care; healthcare innovation; trust; convergence; artificial intelligence; teledermatology

Introduction

Artificial Intelligence (AI) and telemedicine have the potential to transform healthcare delivery in dermatology, where they serve distinct yet complementary functions. Artificial intelligence is a sector of computer science that involves the automation of intelligent behavior [1]. Machine learning, a subfield of AI, can be applied in medicine and uses large datasets to uncover patterns for diagnosis and predict clinical outcomes [1]. In dermatology, AI applications include tools that classify dermatological images obtained from outside clinical settings, as well as clinician decision-support systems that analyze images of patient skin concerns at the point of care [2]. Complementing these AI innovations, telemedicine has experienced rapid growth, specifically after the COVID-19

pandemic catalyzed its widespread adoption as an alternative to face-to-face consultations amidst continued service demands [3,4]. Teledermatology, the subset of telemedicine specific to dermatology, offers various delivery modalities. These include synchronous approaches with real-time communication between patient and dermatologist, asynchronous methods where a dermatologist evaluates clinical images at a later time, and hybrid models combining both approaches [1]. Through such avenues, teledermatology allows for remote consultative recommendations, care prioritization through remote triage, and chronic condition monitoring [5].

The integration of AI within teledermatology platforms represents a natural progression in dermatologic care delivery [6]. Specifically, AI algorithms could enhance teledermatology visits by providing real-time image quality assessment, automated pre-screening of cases, and diagnostic decision support during virtual consultations [7,8]. This convergence of AI in teledermatology could particularly benefit underserved populations by combining AI's diagnostic capabilities with telemedicine's remote accessibility advantages [9]. While this technological marriage enables sophisticated care-anywhere models for the future of accessible dermatologic care [1], both technologies face unique challenges, and their convergence could potentially amplify or ameliorate the barriers and limitations of each other. Thus, considering patient perspectives on each modality is paramount to promoting responsible use of these technologies in dermatology as remote care platforms evolve into influential components of dermatologic practice [10,11]. By thoroughly examining patient perspectives on AI and telemedicine simultaneously, this literature review aims to inform implementation strategies that capitalize on synergistic benefits while addressing challenges. Ultimately, this review may serve as a guide for patient-centered technological integration in the future landscape of accessible dermatologic care.

Methods

A comprehensive literature search was conducted using PubMed, Scopus, and Embase databases between August 2024 and October 2024. To identify relevant articles addressing patient perspectives on artificial intelligence and telemedicine in dermatology, we used the following search terms: ((artificial intelligence) AND (dermatology)) AND (comfort OR perception OR perspective), as well as ((Telemedicine OR Teledermatology) AND (dermatology)) AND (comfort OR perception OR perspective).

The initial search yielded 622 articles, which were imported into Covidence for systematic screening. After removing 236 duplicates, 386 studies underwent independent title and abstract review by three researchers (C.M., D.Z., and L.D.S.). Conflicts were resolved through discussion until a consensus was reached. Following initial screening, 60 articles underwent full-text review, with particular attention to original research and data-supported observations.

Ultimately, 38 articles met our inclusion criteria: studies specifically addressing patient perspectives or perceptions of AI and telemedicine in dermatology, published after 2009, in English with full text available, and providing empirical data on patient perspectives (Table 1). Ten additional articles identified through reference list screening of included studies were incorporated to provide background context, bringing the total to 48 articles. Notably, our search revealed no publications directly comparing patient perspectives of AI and telemedicine in dermatology, highlighting a gap in the current literature.

Three reviewers independently extracted predefined attributes from each article, focusing on key themes including willingness to use, perceived benefits,

perceived risks, barriers to adoption, and conditions for use of each technology. Disagreements were resolved through discussion until a consensus was reached. Literature primarily focused on technical aspects of AI or telemedicine implementation, without substantial discussion of patient perspectives, was deemed outside the scope of this review.

Table 1. Inclusion Study Characteristics

Reference	Technology	Study Aim	Setting	Sample	Study Type
Abeck <i>et al.</i> , 2023	Telemedicine	To investigate the impact of teler dermatology on patient care by characterizing consultations on a direct-to-consumer telemedicine store-and-forward platform	Retrospective data obtained from Wellster Healthtech Group in Germany.	n=1999 (retrospective analysis), n=166 (follow-up survey)	Retrospective Analysis and Survey
Asabor <i>et al.</i> , 2021	Telemedicine	To examine the experience of patients and physicians with teler dermatology during the COVID-19 pandemic	Patients seen via Epic MyChart synchronous video visits	n=548	Survey
Balakrishnan <i>et al.</i> , 2018	Telemedicine	To explore patient satisfaction with teler dermatology and two distinct teler dermatology models	Patients seen at the Atlanta Veterans Affairs Medical Center	n=100	Survey
Choi <i>et al.</i> , 2022	Telemedicine	To understand patient perceptions toward teler dermatology	Patients or their caregivers at an academic tertiary dermatologic center in Singapore	n=913; 26 patients recruited for in-depth interviews	Survey and Semi-structured Interview
Chow <i>et al.</i> , 2022	Telemedicine	To explore patients' perceptions of a teler dermatology service linking public primary care clinics to a national specialist dermatology clinic	Five separate dermatology clinics in Singapore	n=21; patients aged 22–72 years, 65% male. Diagnoses included rashes (52%), pigmented lesions (19%), itching (14%), and dry skin (10%).	Qualitative Interview
DeVries <i>et al.</i> , 2022	Telemedicine	To assess perceptions and experiences with teler dermatology visits in the context of the COVID-19 pandemic	Patients of a South Dakota dermatology practice	Not specified	Survey
Ford <i>et al.</i> , 2018	Telemedicine	To evaluate the impact of an online Collaborative Connected Health model compared to in-person care on access to specialty care for psoriasis management	Patients from outpatient clinics and general adult populations in California and Colorado	n=300; male (50.3%), average age of 49 years; White (63.2%); Hispanic or Latino (33.8%); uninsured (4.4%)	Randomized Controlled Trial
Frühauf <i>et al.</i> , 2012	Telemedicine	To explore patient satisfaction with video consultations for inflammatory skin conditions in a dermatology outpatient setting	A teaching hospital in Wales, United Kingdom in an outpatient dermatology clinic	n=48; female (72%); age range from 13-80 years old	Survey
Ghani <i>et al.</i> , 2021	Telemedicine	To identify demographic and behavioral factors associated with patient interest in using teler dermatology.	Data from the Health Information National Trends Survey 4 cycle 4 of the National Cancer Institute	n=3677; male (36.4%); age 50-64 (31.8%); college or higher education (38.6%); Non-	Survey

				Hispanic (51.5%); White (26.2%); income > \$75,000	
Gnanappiragasam <i>et al.</i> , 2021	Telemedicine	To assess patient satisfaction and preferences between face-to-face and remote (telephone or video) consultations in dermatology settings	Two dermatology centers in the United Kingdom	n=156; 50% female; mean age: 53.3; divided into new and follow-up groups	Survey
Goessinger <i>et al.</i> , 2024	Artificial Intelligence	To investigate the perspectives of patients and dermatologists after skin cancer screening by human, artificial, and augmented intelligence	The University Hospital Basel, Switzerland	n=205; mean age: 54.8 ± 13.6 years; 53% male	Survey
Hadjieconomou <i>et al.</i> , 2022	Telemedicine	To explore patient satisfaction with video consultation within a dermatology outpatient clinic setting for preselected inflammatory skin disorders	Dermatology outpatient clinic in Wales, United Kingdom	n=48; 72% female; age range 13-80+ years (8.5% >65 years)	Survey
Handa <i>et al.</i> , 2021	Telemedicine	To analyze patient and physician experiences and acceptability of teledermatology over a six-month period	A tertiary care center in North India	patients: n=5229; mean age 33.60 ± 16.99 years; 51.9% male	Survey
Horsham <i>et al.</i> , 2022	Artificial Intelligence	To investigate the factors that determine consumers' comfort and willingness to share 3D total-body images for research, AI development, clinical, and teaching scenarios	Virtual consumer forum for consumers of 3D total-body imaging studies at the UQ Dermatology Research Centre	n=39	Survey
Hsueh <i>et al.</i> , 2012	Telemedicine	To assess patient satisfaction with a store-and-forward teledermatology.	27 Veterans Integrated Service Network; 20 clinics in Alaska, Idaho, Oregon, and Washington	Face-to-Face: n=196; 97% male; average age of 71 years Teledermatology Care: n=504; 92% male, average age of 65 years	Survey
Hwang <i>et al.</i> , 2023	Telemedicine	To review patient satisfaction with the utilization of teledermatology since the COVID-19 pandemic	Not applicable	32 studies: 13 randomized controlled trials, 14 narrative reviews, 5 systematic review	Narrative Review
Jutzi <i>et al.</i> , 2020	Artificial Intelligence	To investigate the hopes and fears of patients with and without a history of melanoma toward the use of AI in skin lesion diagnostics	Web-based questionnaire using LimeSurvey sent to university hospitals in Germany	n=298; 75.5% female, 41.3% between age 46-60, 40.6% with university degree	Survey
Kawsar <i>et al.</i> , 2023	Artificial Intelligence	To explore patients' perspectives on the use of AI as part of their skin cancer management pathway	A teledermatology skin cancer clinic at Chelsea and Westminster Hospital, London, United Kingdom	n=268; 57.5% female, ages 18-93 year old. Skin type: majority (81.3%) were Fitzpatrick type I-II	Randomized Controlled Trial and Survey
Kohn <i>et al.</i> , 2022	Telemedicine	To evaluate the acceptance of synchronous telehealth for pediatric dermatology	Children's Hospital Colorado Pediatric Dermatology	n=125; average age of 9.2 years; male (45.5%); new patient (38.5%)	Survey
Lim <i>et al.</i> , 2022	Artificial Intelligence	To obtain opinions of patients on the use of AI in a dermatology setting,	Dermatology outpatient skin cancer clinics in two	n=603; 52% female; age range: 18-100 years; 75% new	Survey

		when aiding the diagnosis of skin cancers	United Kingdom hospitals	referrals; 92% concerned about skin cancer	
Lowe <i>et al.</i> , 2021	Telemedicine	To evaluate clinician and patient/parental perspective of a virtual paediatric dermatology telephone clinic in comparison to traditional face-to-face clinics	United Kingdom single-centre cohort of pediatric dermatology patients managed during the COVID-19 pandemic	n=116; average age of 8.47 years; new patients (24%); cases of inflammatory dermatoses (75%)	Survey
Ly <i>et al.</i> , 2023	Artificial Intelligence	To understand individuals' perceptions towards sharing their images for AI	Adult United States respondents via Amazon Mechanical Turk	n=1010; mean age: 36.5 years; 56% male; 71% White; 84.3% employed	Survey
Maul <i>et al.</i> , 2023	Telemedicine	To investigate the acceptance of and satisfaction with telemedicine	One secondary and two tertiary referral centers for dermatology in Switzerland	n=512; 53.3% male, mean age: 49.5 years	Survey
Moore <i>et al.</i> , 2021	Telemedicine	To evaluate patient satisfaction with university medical center's interactive dermatology service	Penn-State's Dermatology Department	n=171; 69% female, 90% non-Hispanic	Survey
Munoz <i>et al.</i> , 2022	Telemedicine	To investigate and compare patient satisfaction with recorded video counseling versus traditional, in-office counseling	Not specified	n=16: video counseling (n=11) and face-to-face counseling (n=5)	Survey
Naik, 2022	Telemedicine	To gain a global perspective on the experiences of patients and healthcare staff who adapted to tele dermatology in the coronavirus disease era	Recruitment through social media and WhatsApp groups	n=653	Survey
Nelson <i>et al.</i> , 2020	Artificial Intelligence	To explore how patients conceptualize AI and perceive the use of AI for skin cancer screening	Brigham and Women's Hospital and melanoma clinics at the Dana-Farber Cancer Institute	n=39; mean age: 53.3 years; 54% female; 94% non-Hispanic white; 42% graduate/professional degree	Qualitative Interview
Oh <i>et al.</i> , 2023	Telemedicine	To examine patients' perceptions of teledermatology and identify barriers to its adoption	Outpatient dermatology clinic at a tertiary academic medical hospital in Singapore	n=997; 51% female; 49% aged ≥60 years)	Survey
Pathoulas <i>et al.</i> , 2021	Telemedicine	To compare patient satisfaction between virtual visits and in-office visits in a specialty hair loss clinic	Patients who received either in-office or virtual hair loss new patient consultation by a single provider	n=40; in-office (72.5%), telemedicine (27.5%)	Survey
Ramjee <i>et al.</i> , 2023	Telemedicine	To assess patient satisfaction with telephone consultations compared to face-to-face consultations in secondary-care dermatology during the COVID-19 era	A single dermatology center in London, United Kingdom	n=74; female (58.1%); median age of 52 years	Survey
Richey <i>et al.</i> , 2024	Telemedicine	To evaluate teledermatology patient perspectives and preferences regarding cosmetic acne scar treatment	Patients at FORMEL Skin in Berlin, Germany	n=842	Survey
Ruggiero <i>et al.</i> , 2020	Telemedicine	To assess how teledermatology visits were subjectively	The Acne Care Centre, Dermatology Unit, University of Naples	n=52; 53.9% female; mean age: 22.5 years.	Survey

		experienced by acne patients	Federico II, Italy.		
Sangers <i>et al.</i> , 2021	Artificial Intelligence	To explore the perceived barriers and facilitators to using mHealth artificial intelligence apps for skin cancer screening	The Netherlands	n=27; median age 25 years; 68% female; 41% had previous experience with mHealth apps; 15% had a history of skin cancer	Survey
Stratton <i>et al.</i> , 2021	Telemedicine	To assess patient preferences regarding the use of postprocedural photographs compared with in-person follow-up.	The University of Alabama Birmingham Department of Dermatology	n=150; 59.5% male	Survey
van Erkel <i>et al.</i> , 2022	Telemedicine	To evaluate the perceived quality of follow-up telephone consultations of multiple medical disciplines during the COVID-19 pandemic	Large university hospital in the Netherlands	n=82; 54% female, mean age: 59.1 years	Semi-structured Interview
Wortman <i>et al.</i> , 2024	Telemedicine	To evaluate the pandemic's implications on psoriasis patients, focusing on access to information, consultation methods, patient satisfaction, disease control assessment, and treatment management	Multicenter survey from four Dutch hospitals during the second wave of the pandemic	n=551; 56% male, median age: 59 years old, median disease duration: 25 years old	Survey
Wu <i>et al.</i> , 2024	Artificial Intelligence	To gather opinions from a diverse dermatology patient population on AI use in dermatology and establish a specific accuracy at which patients would be comfortable receiving a diagnosis solely from an AI tool	Adult patients who visited the University of Texas Southwestern Medical Center Dermatology	n=141; 52% male; mean age: 55.3; 56% non-Hispanic white; 39% household income \$50,000–\$99,999	Survey
Yadav <i>et al.</i> 2022	Telemedicine	To assess patient perception and satisfaction with a smartphone-based tele dermatology service initiated during the COVID-19 pandemic	The Department of Dermatology and Venereology, All India Institute of Medical Sciences (AIIMS), New Delhi	n=201; 54.2% male, mean age 38.4 ± 15.7 years	Survey

Results

The literature revealed several distinct themes regarding patient perspectives on AI and telemedicine in dermatology. The following sections examine these themes for each technology including: patient willingness to use, perceived benefits and risks, barriers to implementation, and conditions necessary for successful integration into dermatology. Each section compares perspectives between AI and telemedicine while highlighting how these viewpoints might inform future implementation strategies. Tables 2 and 3, located after the results section, summarize key themes from patient perspectives on AI and telemedicine, respectively. The column categories of these tables were adapted from Kalkman et al [12].

Willingness to Use AI Versus Telemedicine in Dermatology

The literature shows that patients exhibit hesitancy towards AI-based diagnoses without dermatologist interventions. In a survey conducted by Wu et al., if a dermatologist and an AI model made different diagnoses, the majority of patients (84%, n=119/141) favored the dermatologist's

diagnosis [13]. They also found that about 14% (n=21/141) of patients expressed “complete unwillingness” to be evaluated by AI alone [13]. In contrast, Lim et al. found that patients would be happy for their general practitioner to use AI to make dermatologist referral decisions (39%, n=235/603) [14]. In suspected skin cancer cases, patient trust in human expertise remained high, with a significant majority (87%, n=524/603) of patients strongly preferring a dermatologist’s diagnosis, and only 12% (n=73) willing to accept a diagnosis made solely by AI [14]. Despite hesitancy toward standalone AI diagnoses, the Wu et al. survey data revealed that most patients (68%, n=96/141) preferred dermatologists to utilize an AI model that could provide differential diagnoses based on a photograph at point of care rather than working alone [13].

Patients' acceptance of dermatology-based AI tools showed overall mild concerns for data sharing privacy. While Lim et al. found that 87% (n=508/603) of patients were willing to share their patient images for AI training and to help other patients [14], Ly et al. determined that patient comfort levels declined when more facial or sensitive areas were in question [15]. For example, 81% (n=820/1010) of patients were comfortable with sharing images of their hands, 70% (n=710/1010) with images of their face, 57% (n=326/563) with images of male genitals, and 47% (n=203/428) with female genitals [15]. The willingness to share sensitive or identifiable images was also dependent on the AI tool’s development, and Horsham et al.’s study concluded that patients were more willing to share pictures with university-developed tools than those that were industry-developed [16].

Despite the rising popularity of teledermatology appointments, patient preferences for consultation methods remain mixed. Balakrishnan et al. identified that older age was associated with an increased likelihood of using telemedicine for follow up appointments, whereas studies by Devries et al. and Choi et al. found a negative association between age and willingness to use teledermatology services for follow up appointments [17–19]. In studies with patients who experienced both face-to-face appointments and teledermatology, preferences widely varied. In Gnanappiragasam et al.’s study of patients with a mean age of 53.3 years, 61% (n=97/156) preferred face-to-face for future consultations, while 39% (n=60/156) did not have a preference for appointment modality [4]. Meanwhile, Hsueh et al. reported that 66% (n=332/503) of veterans, with a 97% male population and a mean age of 71 years, preferred teledermatology over face-to-face [20]. Lastly, Hadjieconomou et al. had a 72% female demographic, with 91.5% under 65 years old and an 8% (n=4/48) preference for face-to-face visits [3]. Therefore, a wide variety of preferences surround willingness to use teledermatology, and these varied preferences across different demographic groups suggest that factors such as age, gender, prior technology exposure, and health status may influence teledermatology acceptance.

Regarding positive feelings towards telemedicine, the prospective study conducted by Lowe et al. reported that patients (98%, n=41/42) with telemedicine consultations felt their concerns were addressed during consultations [21]. Whereas Ford et al.’s randomized controlled trial demonstrated that 70% (n=210/300) believe telemedicine improves care, 27% (n=82/300) see no change, and 2% (n=6/300) perceive a negative impact [22]. Adding to these findings about patient preferences, Frühauf et al. demonstrated strong patient acceptance of teledermatology among psoriasis patients, with 90% (n=9/10) reporting they felt 'in good hands' with remote care while experiencing a more flexible lifestyle [23]. The same study found that 80% (n=8/10) of patients considered teledermatology a viable alternative to in-person consultations, suggesting high levels of patient confidence in remote care delivery [23]. Finally, a small subset of patients in a Dutch study who used chat or email consultations graded their experience as a nine out of ten in satisfaction [24]. A few studies, however, reported that the majority of patients expressed concerns about the quality of physical exams and the lack of patient-physician connection during initial consultations [4,21,25]. This reflects a broader trend of acceptance tempered by a desire for personal connection and high-quality physical assessments. Additionally, in a survey study by Oh et al., patients were more likely to decline telemedicine if they had minimal exposure to video conferencing [26]. This hesitation for telemedicine based on lack of experience highlights the importance of gradually exposing patients to

relevant technologies.

A final interesting observation was that patient preferences for telemedicine varied significantly based on their specific dermatological conditions and needs. Handa et al. report that the highest levels of satisfaction (65.4%, $n=3419/5229$) with telemedicine were seen in patients with infectious dermatologic manifestations [27]. However, for chronic disease management, Ford et al. found that 65% ($n=195/300$) of patients surveyed preferred in-person follow-ups [22]. Findings from a survey by Devries et al. demonstrate that patients with acne had a strong preference for teledermatologic visits, whereas those with possible malignant lesions strongly preferred an in-person visit [18]. Another study comparing video counseling to in-office counseling for acne isotretinoin initiation found no significant difference in patient satisfaction scores across multiple domains, including comfort starting isotretinoin and concerns about side effects [28]. Ruggiero et al. offer specific aspects of teledermatology that patients with acne were highly satisfied with, including dermatologist attention (92.3%, $n=48/52$), quality of time spent with the dermatologist (86.5%, $n=45/52$), and the treatment received (71%, $n=37/52$) [29].

Collectively, these findings demonstrate that patient preferences for both AI and teledermatology are influenced by factors such as demographic characteristics, prior technology experience, the level of clinician involvement, and specific dermatological needs. Understanding these preference patterns is helpful for designing patient-centered implementation strategies that maximize patient acceptance and engagement.

Perceived Benefits of AI Versus Telemedicine in Dermatology

Many facets of patient care could be impacted by the use of AI in dermatology, and patients' motivations for its implementation are optimistic. In a qualitative study by Nelson et al. some of the primary patient values of AI relate to its potential for quicker diagnoses (60%, $n=29/48$), greater ease of healthcare access (60%, $n=29/48$), and increased triage efficiency (29%, $n=14/48$) [2]. Approximately 35% ($n=17/48$) also associate AI with reduced healthcare costs [2]. Additional research by Sangers et al. provided valuable insights into the practical benefits that patients associate with using AI, specifically for skin cancer screening. These included the ability to perform skin cancer screenings from home and monitor lesions over time, giving patients a better sense of involvement in their dermatological healthcare [30]. Reinforcing these positive perspectives, patients surveyed by Goessinger et al. following AI-assisted skin cancer screening believed that AI enhances diagnostic performance (95.5%, $n=195/205$) [31]. These patient perceptions of the beneficial potentials of AI reflect some of AI's greatest strengths as it integrates into dermatological healthcare.

Meanwhile, telemedicine addresses several logistical challenges patients face when accessing dermatological care. Efficiency was a primary benefit noted by patients, and Abeck et al. reported that the most frequent reason for using teledermatology was shorter waiting times for appointments (62%, $n=103/166$) [32]. This finding was reinforced by Pathoulas et al. who found that patients preferred a telemedicine visit with a 2-3 week wait time over an in-office visit with a wait longer than 6.89 months [33]. Another significant advantage of telemedicine cited by patients across studies is its reduction in travel and parking time and costs [3,4,11,21,22,32,34,35], which is particularly important for patients living in remote areas to improve access to care. This advantage is complemented by telemedicine's potential to minimize absences from work or school [3]. Patients also appreciate teledermatology's flexibility and the ability to send dermatological concerns at any time [36]. Uniquely, Hadjieconomou et al. found that 71% of patients ($n=34/48$) valued its reduction in the risk of infection exposure, and 55% ($n=26/48$) appreciated more feasible family involvement during the telemedicine consultation [3].

Improved treatment outcomes also emerged as a noteworthy patient-reported benefit of teledermatology. A randomized controlled trial by Ford et al. found that telemedicine facilitated

better psoriasis management, as patients could submit photos and receive real-time updates to their treatment plans based on disease progression [22]. Patients in this study highlighted the value of teledermatology in managing chronic conditions rather than for initial consultations [22]. Similarly, participants from a Swiss questionnaire expressed their willingness to replace in-person consultation with telemedicine for minor skin problems and hesitancy for severe or acute skin problems [37]. A German survey also found that patients believe telemedicine represents a useful and underutilized screening tool for cosmetic dermatology prior to physician evaluation [38].

Overall, patients report similar perceived benefits in the usage of AI and telemedicine services in dermatologic practice, ranging from improved accessibility to enhanced care outcomes.

Perceived Risks of AI Versus Telemedicine in Dermatology

Patients perceived the greatest risks of integrating AI into dermatologic practice to be its limited communication abilities and inherent constraints as an algorithmic tool. One study by Nelson et al. reported that the greatest perceived risk of AI for skin cancer screening was increased patient anxiety (40%, n=19/48), mainly due to AI's inability for compassion and empathy [2]. Loss of social interaction (38%, n=18/48) was similarly identified as a risk, as patients doubted AI's ability to respond appropriately to emotional distress [2]. In terms of verbal communication, patients emphasized AI's limited capacity to provide education or answer follow-up questions [2]. As AI advances in its real-time interaction capabilities, this particular concern may gradually diminish.

Patients also expressed concerns about potential misdiagnoses by AI, including false negatives and positives, limited training datasets, lack of physical examination, and operator error [2]. A UK questionnaire of 603 patients found that only 12% (n=73) of patients were willing to accept a diagnosis of skin cancer made solely by AI, while 87.3% (n=529) considered it extremely important for a specialist physician to make the final diagnosis [14]. Data security emerged as another potential risk, with patients in the Nelson et al. study highlighting concerns about loss of privacy (29%, n=14) and nefarious use of AI (23%, n=11) [2].

In response to teledermatology, patients perceived substandard physical examinations as the greatest risk, and numerous studies reported patient concerns regarding the quality of virtual complete skin examinations, especially for those being monitored for skin cancer [1,4,11,21,34,39,40]. Respondents to an Alabama survey of 150 patients expressed concerns that doctors might miss critical details in an online setting (63.8%). They also noted that an in-person check might still be needed after teledermatology care (13.5%) [36]. Hsueh et al. reported similar apprehensions, finding that patients were concerned about improper treatment recommendations due to lower diagnostic accuracy during telemedicine interactions [20]. Qualitative interviews by Chow et al. revealed that camera quality was a key reason patients were concerned with diagnostic accuracy [41]. Pediatric patient surveys identified additional diagnostic limitations, specifically that laboratory tests and procedures could only be performed in-person [34].

A limited personal element also contributed to patients' concerns about reduced quality of care via virtual platforms [4,21]. Specifically, patients in a London survey reported that teledermatology consultations lacked non-verbal cues, which led to worse patient-physician understanding and weakened rapport [11]. Similar sentiments were expressed through qualitative feedback on telemedicine experiences in a study by Yadav et al., where patients noted concern for the lack of personal touch during the consultation [25]. In a UK cohort, parents of pediatric patients reported that telemedicine was less effective in easing their anxiety compared to face-to-face visits, and 52% of surveyed participants expressed significant dissatisfaction with the telephone clinic [21].

Overall, patients share similar concerns about both AI and teledermatology centered around diagnostic accuracy limitations and reduced human connections. However, teledermatology faces additional scrutiny of physical examination quality, while AI elicits concerns about emotional responsiveness and data security.

Barriers to Adoption of AI Versus Telemedicine in Dermatology

Studies show that patients identify barriers to integrating AI in dermatology primarily in reference to AI as a non-human technology. As noted previously, patients perceive that AI cannot replicate essential interpersonal skills, such as eye contact and human touch [2,42]. Additionally, patients criticize AI as an independent diagnostic tool, with concerns for poor training datasets and the necessity for clinicians to still interpret AI results in order to develop effective treatment plans. Patients in qualitative interviews by Sangers et al. specifically mentioned that limited knowledge about the use and functionality of AI was a barrier to its integration [30].

Patient trust in dermatologic AI services may also be undermined by data security risks. Participants in a poll for consumers of 3D total-body imaging emphasized the need to protect sensitive images for personal biosecurity, particularly when data is shared internationally [16]. While 59% (n=23/39) of study participants were willing to share sensitive or identifiable images for a university-developed AI, this proportion decreased to 33.3% (n=13/39) for AI developed by private companies or industries [16].

A survey on patient acceptance of AI in skin cancer diagnostic pathways revealed that Fitzpatrick skin type strongly influenced patient agreement scores regarding the use of AI to assist their general practitioner ($p=0.021$) [43]. Patients with darker Fitzpatrick skin types IV–VI reported a median agreement score of 44.60, significantly lower than those with Fitzpatrick types I (79.89), II (81.39), and III (74.77) [43]. Therefore, ensuring that AI training datasets are representative of all skin types is imperative to ensure that AI operates equitably and to foster trust among patients.

Regarding teledermatology, patients mentioned technological limitations as the primary barrier to adoption [4,39,44,45]. One survey revealed that patients with lower satisfaction scores were significantly more likely to have experienced technical difficulties or to perceive their virtual physical examination as unsatisfactory [45]. The literature shows that for patients with limited digital literacy, non-user friendly or uninviting online platforms may exacerbate challenges with virtual visits [21,22].

Other logistical barriers emerged for teledermatology use and adoption. Two studies noted that patients often struggled to take photos of hard-to-reach areas for online evaluation, occasionally requiring assistance from others [22,36]. Additionally, a retrospective survey on telephone consultations found that teledermatology visits were less preferred by patients due to reduced natural social interactions and the clinicians' inability to physically examine the patients' skin [11]. Notably, patients also emphasized the importance of visually seeing the clinician as a care preference [11].

In summary, barriers to both AI and teledermatology adoption stem from certain technological limitations and trust concerns that are important to address prior to technological convergence or implementation.

Conditions for Using AI Versus Telemedicine in Dermatology

For AI and teledermatology to be successfully integrated into dermatological care, patients have distinct considerations and requirements. Patients emphasize the need for dermatologist oversight for system model validation and to provide assurance that AI would not replace human discussion [2,13,14,42]. Current AI models that utilize patient images have brought up concerns about the adequacy of existing guidelines and policies around AI [16]. Consequently, patients desire safeguards and transparency of the tools to guarantee clear AI privacy policies, secondary uses of data, and AI's effectiveness [14,16,46]. Wu et al. found that patients require AI models to be, on average, 12.9% (+/- 8.1%) more accurate than dermatologists for them to feel comfortable receiving a stand-alone AI evaluation [13]. Most importantly, patients indicated that endorsement from their dermatologist and government regulatory bodies would promote their acceptance of AI use in dermatological care [30].

To improve the adoption of teledermatology services, patients outlined several practical and operational factors surrounding their appointments. For example, patients expressed that pre-

appointment teledermatology educational materials and adequate follow-up care systems are important considerations for use [1,20]. Technical difficulties were frequently cited as a reason for preferring face-to-face consultations [4]. For this reason, patients noted that high-quality images and video should be required for their visit [1,4]. Similar to the concerns surrounding AI's safeguards and transparency, measures for building trust in telemedicine were important considerations for utilizing telemedicine platforms [44]. Finally, patients emphasized the importance of dermatologists addressing accessibility barriers, including patient ability to navigate technology for telemedicine appointments [1,4], in order to ensure equitable care across diverse populations. This highlights important implications for health equity as teledermatology continues to expand [44].

Collectively, these findings suggest that patients will embrace AI and teledermatology only with appropriate safeguards, such as transparency about technological limitations, adequate educational resources, clear privacy policies, and, most importantly, continued dermatologist involvement that preserves the human elements of care.

Table 2. Patient Perspectives on Artificial Intelligence in Dermatology

Overall Willingness to Use	Perceived Benefits	Perceived Risks	Barriers to Using	Factors Affecting Willingness to Use	Conditions for Acceptance
84.4% would trust a diagnosis from a dermatologist over AI alone [13]	Increased diagnostic speed (60%) [2] and accuracy (95.5%) [31] due to the ability of AI to learn and evolve and draw on more data/experience than humans [2,14]	Lack of verbal communication (58%) and nonverbal communication (40%) [2]	Inaccurate/limited training sets [2]	Being familiar with AI significantly associated with positive view (OR: 17.8, $p<0.01$) [13]	AI must be 12.9% $\pm$ 8.1% more accurate than dermatologists [13]
68.1% preferred dermatologist working with AI versus alone [13]	Enhanced healthcare access (60%) [2]	Increased patient anxiety (40%) [2]	Age-related differences in familiarity [13]	Age 40-59 associated with decreased AI familiarity (OR: 0.21, $p<0.01$) [13]	Integration with human oversight [2, 14]
Even with equal diagnostic accuracy, most respondents preferred to see a dermatologist over an AI model alone (84.4%) [13]	Lifesaving potential through earlier detection of skin cancer [2]	Loss of human interaction (38%) and human emotion (42%) [2, 42]	Limited explanation of AI decisions [2]	Higher education levels associated with increased willingness to share images with AI [15]	Clear privacy policies and safeguards [16]
14.9% of patients were completely unwilling to be evaluated by AI model alone [13]	Patient engagement in self-examination [2]	Privacy concerns [2, 30]	Concern about AI's inability to provide emotional support [2]	97% of respondents with previous history of melanoma support AI use in medicine compared to 91% of non-melanoma patients ($p=0.03$) [42]	System validation by medical professionals [2]
12% of patients would accept diagnosis of skin cancer made solely by AI [14]	Reduced healthcare costs (35%) [2]	Patient loss to follow-up (29%) [2]	Anxiety about receiving diagnosis without human support [2]	Comfort with technology and social media sharing [15]	Clear guidelines for image control and use in AI [16]
Willingness to share images varied by body part: hands (81.2%), face (70.3%), sensitive areas [15]	More convenient (29%), consistent (27%), and objective (23%) diagnosis [2]	Nefarious use of AI [2, 42]	Potential for false positives and false negatives [2]	Trust in developing institution affects willingness (59% willingness if AI from university vs 33% willingness if AI from company)	Need for demonstrated effectiveness and openness of AI use [14]

				[16].	
39% comfortable with general practitioner using AI for referral decisions [14]	Unburdening of the healthcare system [2]	Human deskilling (21%) [2, 42]	Lack of in-person physical examination [2]	No association between age and acceptance of an AI-only diagnosis, age and preferred AI involvement by diagnosis severity, or prior skin cancer diagnosis and reluctance to use AI for diagnosis [14].	Assurance that AI will not replace discussion with human dermatologist [14]
87% willing to share their own skin images for AI training to help diagnose skin cancer in others [14]	Physicians can learn from AI-based systems and direct comparison may motivate specialists to continue to improve performance [42]	Potential misdiagnosis or inaccuracy [14, 30]	Operator dependence [2]	Patients felt a better sense of safety with AI when it worked in tandem with a dermatologist rather than on its own. [31]	Endorsement from healthcare providers and government regulating bodies [30]
75% would recommend AI tools to family/friends while on 6% would not [2]	Improved triage efficiency (29%) [2]	Inability to answer follow-up questions [2, 42]	Inability to assess treatment options [2]	Patients didn't believe AI could answer follow-up questions, discuss treatment options, educate, or reassure [2]	Useable by all ages [30]
59% would share sensitive images if university-developed AI vs 33% if company developed [16]	Reduced patient anxiety (33%) [2]	Lack of context in AI decisions [2]	Inability to educate/reassure patients [2]	More trust if AI applications are set up by dermatologists rather than companies [2].	Low cost of use [30]
The majority (87.3%) considered it 'very' or 'extremely' important to have a specialist doctor make diagnosis of skin cancer over AI [14]	Acts as second opinion to refer to dermatologist [2, 14]	Concerns about image control and secondary use [16]	Lower agreement scores for AI guiding general practitioners in Fitzpatrick IV-VI (44.6/100) vs. Fitzpatrick I-II (74.8–81.4) [43]		
An average score of 70/100 agreement for computer assessment over waiting weeks for in-person dermatology [43]	Can perform skin cancer screening from home, monitor skin lesions overtime, and integrate with existing skin cancer care [30]	Data privacy risks for sensitive biometric data [16]	Limited knowledge about the use and functionality of AI [30]		
Confidence scores for AI: 85/100 for supporting general practitioners, and 70/100 for aiding dermatologists' diagnoses [43].	More reliable and less subjective diagnoses [42]		Lack of integration into the health system and therefore perceived lack of value [30]		
91% agreement that AI should be used to support physicians to make skin cancer diagnostics even more reliable [42]			Lack of reliability of AI app developers for skin cancer screening [30]		
56% stated that they might use AI-based applications					

even at home, such as a diagnostic smartphone app [42]					
91% of respondents would agree to a biopsy/excision if the algorithm rated it as necessary and the physician did not [42]					

Table 3. Patient Perspectives on Telemedicine in Dermatology

Overall Willingness to Use	Perceived Benefits	Perceived Risks	Barriers to Using	Factors Affecting Willingness to Use	Conditions for Acceptance
61% preferred face-to-face for future consultations, 39% didn't mind either face-to-face or telemedicine [4]	Reduced wait times and efficiency [1, 4, 11, 19, 20, 22, 35, 41], reduced travel needs [3, 4, 11, 21, 22, 32, 34, 35], reduced work/school absence [3, 4, 21, 22, 35], and parking cost savings [4, 22]	Concerns over quality of clinical examination [4, 19, 21, 25, 39]	Technology limitations, poor internet connectivity, and digital health literacy challenges [4, 26, 39, 45]	Distance from clinic (increased preference with greater distance) ($p=0.0395$) [36]	Carefully select patients who are better able to navigate technology for telemedicine appointments [1,4]
66% preferred teledermatology over face-to-face [20]	More efficient triage for acne and skin cancer [1]	Doctor may miss important details (63.8%) [11, 25, 36]	Less social/natural interaction, reduced ability for clinician to feel skin pathologies [11]	Rural patients rate their experiences higher than urban counterparts, suggesting that satisfaction reflects the regional availability of care [5]	Clear pre-appointment instructions [1]
83% would recommend teledermatology to others [20]	Improved medication compliance and treatment adherence [1]	Technical difficulties affecting care [4, 20, 39, 41]	Need for assistance taking photos (10.6%) [36]	Previous telemedicine experience increases acceptance [5]	Adequate follow-up care systems [20]
84.4% interested in future video visits [35] and 69% would use teledermatology again [17]	No need to find childcare [34, 39]	Privacy concerns [36, 39, 41]	Sensitivity of health condition [4]	Trusting web-based health information, and prior experience sharing medical data online [22, 44]	Address digital divide factors to ensure equitable access across diverse populations [44]
71.8% open to telehealth for isotretinoin encounters and 58.8% open to non-isotretinoin acne [34]	Improved access to care [3, 20]	Decreased quality of care [11, 26]	Variable digital literacy levels [21]	Preferred for chronic conditions versus for an initial consultation [22]	Educational materials provided [20]
70.3% believe telemedicine would lead to improvement in care, 27.6% believing no change in care, and 2.1% perceiving a negative impact to	Better family involvement (55%) [3]	May still require in-person visit (13.5%) [36]	Cost issues for some patients [39]	For patients with alopecia, about one-third of patients maintain a strong preference for in-person evaluation [33]	High-quality image requirements and technical quality of telemedicine video [1, 4]

care [36]					
28.6% would never opt for telemedicine regardless of wait time [33]	Ability to send concerns anytime (41.2%) [36]	Inadequate follow-up care [20]	Difficulty with photos of hard-to-reach areas for online clinical evaluation [22]	Patients with acne preferred tele dermatology whereas patients with possible malignant lesions preferred in-person visits [18]	Trust building measures [44]
Only 8% preferred face-to-face [3]	Quicker reassurance (16.9%) and follow-up (11.5%) [36]	Inability to perform labs and procedures [34]	Platform not user-friendly enough for mobile interface [22]	Older age increased likelihood of agreeing to use telemedicine again in some studies [17], but decreased the likelihood in others [18]	
65% preferred face-to-face future visits, 23% preferred telephone, 12% wanted combination [21]	Reduced anxiety (60%) [3]	Lack of personal element [4, 21, 25]	Language barriers [4, 22]	No significant difference between patient age or visit type with patient satisfaction and comfort with telemedicine use (P=0.79) (P = 0.90) [33]	
Patients were more willing to use the telemedicine platform for management of chronic diseases rather than for initial consultations due to desire for patient-physician connection at first appointment [22]	70.3% believed it would improve care [36]	Substandard physical examinations [1, 4, 11, 21, 34, 39]	Privacy concerns specifically about sending personal information (10.6%) [36]	Telemedicine becomes preferable at 6.89 months in-person wait time [33]	
Of patients on long-term systemic medication needing follow-up, only 32% opted for telephone follow ups in the future [21]	Useful for monitoring systemic therapies [1]	Limited visual cues/body language [11, 21]	Technical difficulties were a common reason for preferring face-to-face consultations [4]	53% would consider remote over face-to-face if appointment expedited [4]	
Nearly all (98%) respondents felt that their concerns had been addressed. However, the majority (65%) preferred to follow-up fact-to-face in the future, while only 23% preferred a telephone follow-up, and 12% would be happy with both [21]	Valuable for various conditions: acne, atopic dermatitis, psoriasis [1, 29]	Reduced quality of patient-clinician communication [21] and lower chance to discuss other skin concerns [4]	Patients who had to travel longer distances were not significantly more likely to think that tele dermatology is more convenient than face-to-face appointments [17]	The quality of virtual exams, images [1], and audio [3]	
Approximately half of patients reported a worse physical exam (51%) and a preference of in-person care (57%) [45]	Video allows family viewing of consultation multiple times and on own time [28]	Concerns of improper treatment recommendations due to lower accuracy during telemedicine interaction [20]		Strong emotional support and rapport with their physicians [22]	

90% felt 'in good hands' with teledermatology, while 80% viewed it as viable alternative to in-person care [23]	Less exposure to infection risk [3, 39]	Inability to relay parental anxiety about the care of their children for pediatric patients as effectively over telemedicine versus face-to-face [21]		Older patients were more likely to always prefer an in-person wound check compared to younger patients (p=0.0002) [36]	
60.8% willing to use teledermatology for a routine follow-up visit, 21.9% for a first-time visit, and 17.9% for a new problem [19]	Increased time to spend with family [39]	Technology literacy limitations [4, 39]		Age was not a factor in willingness to use [27]	
				Experiencing technical difficulties during a previous telemedicine encounter [18]	
				Prior exposure to video conferencing and higher education levels [26]	
				Some patients reported preferring phone consultations for discussing sensitive topics due to not having to make eye contact [40]	
				47% more willing to use teledermatology during the pandemic compared with 26% before the pandemic [19]	

Discussion

Throughout this review, we identified diverse factors that shape patient perspectives on AI and telemedicine in dermatologic care. Given the significant workforce shortage in dermatology and subsequent barriers to provider access [47], understanding patient perspectives of AI and telemedicine becomes increasingly valuable as remote care platforms evolve into essential components of dermatologic practice [11]. By assessing and understanding a patient's level of knowledge about AI and teledermatology, clinicians can tailor potential implementations to align with patient preferences and ensure that these innovations enhance rather than disrupt the patient experience.

Patient motivations for using AI and telemedicine in dermatology indicate complementary strengths addressing distinct healthcare needs. While both technologies reduce wait times, they achieve this through different mechanisms—AI utilizes automated diagnostics and data analysis [2,14], whereas telemedicine minimizes logistical barriers, such as travel and appointment times [3,4,21,22,35]. This distinction is significant because it suggests implementation strategies should consider each technology's unique advantages rather than applying a one-size-fits-all approach.

Additionally, the sources of trust differ notably between the technologies. AI trustworthiness depends heavily on professional oversight, as patients strongly prefer AI that includes dermatologist [13,14], and patients required AI models to be more accurate than dermatologists before they would feel comfortable with AI-only evaluations [13]. In contrast, telemedicine's trustworthiness stems from patients' confidence in its diagnostic capabilities for specific conditions, with studies showing high acceptance rates for certain dermatologic issues like acne and infectious manifestations [18,27,29], while patients consistently preferred in-person evaluations for potentially malignant lesions [18]. Overall, patient acceptance of both technologies depends on perceptions of convenience, accessibility, and care quality, but concerns about privacy, data security, and remote consultation efficacy can impede implementation.

As the technological revolution expands, the convergence of AI and telemedicine in healthcare may become inevitable. These technologies may no longer remain distinct but instead function in tandem to provide a more integrated approach to care. Our results support that this integration should be gradual and that AI and telemedicine should not replace traditional face-to-face services, but rather complement them [2,13,14,18,22]. While this simultaneous integration may exacerbate shared concerns—such as data privacy, loss of human interaction, and diagnostic accuracy—it also offers avenues to mitigate the risks inherent to each technology. For instance, AI tools could address concerns regarding the quality of teledermatology by standardizing image quality assessment and supporting diagnostic accuracy [8,9], while teledermatology's real-time communication capabilities could mitigate patient concerns about AI's lack of human interaction [2]. This synergy has the potential to enhance diagnostic accuracy, optimize resource allocation, and prioritize a patient-centered approach that maintains both technological efficiency and essential human touchpoints in healthcare delivery.

To increase patient acceptance of these technologies in dermatology, implementation strategies must prioritize transparency and education. Once implemented, clinicians can begin by teaching patients how to use the AI or telemedicine service during in-person consultations, explaining how the technology works and emphasizing its role as a complementary tool that augments traditional care models [14,48]. For successful integration, improving patient digital literacy is key [1,20–22]. Practices could connect patients with follow-up resources, such as public libraries or help desks, to help train them on basic digital skills for health-oriented patient technology and empower them to engage fully with the services. Our review highlights that patients view successful integration as requiring dermatologist oversight and the preservation of meaningful patient-provider relationships [4,13]. Therefore, providing ongoing support throughout the transition may help address patient concerns and maximize comfort with the platforms.

Beyond technical training, building trust necessitates transparent communication about security protocols and the protection of personal health information [16,46]. As the literature explains, endorsement from dermatologists alongside these trust-building measures may enhance patient acceptance of these technologies [30]. Ultimately, the success of these technologies in dermatologic care depends on thoughtful implementation that balances technological advancement with patient-centered care delivery. By ensuring that integration strategies align with patient concerns and expectations, these innovations can maximize their potential to improve access, efficiency, and quality in dermatologic care.

Conclusion

Patient perspectives surrounding AI and telemedicine in dermatology provide central considerations for clinical implementation. While patients value the benefits of improved access to care and reduced wait times, they continue to have concerns about data privacy, diagnostic accuracy, and maintaining meaningful doctor-patient relationships. These perspectives are especially important for informing healthcare accessibility in dermatology. As AI and telemedicine potentially converge in dermatologic

care, balancing technological advancements with patient-centered care delivery should drive responsible implementation strategies. Research examining how patients experience these modalities together could guide healthcare systems in harnessing their complementary strengths, while continued investigation will be essential to understand how these technologies can best address patient needs in dermatologic care, both independently and in combination.

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Conflicts of Interest

The authors report no conflicts of interest in this work.

Abbreviations

AI: artificial intelligence

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