

Analyzing the Satisfaction of Egyptian Patients with Tele Dermatology for Various Skin Diseases: A Cross-Sectional Study

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Abstract

Background: Tele dermatology (TD) has become an increasingly important modality for providing dermatologic care worldwide, offering rapid access and reducing the burden on traditional face-to-face consultations. Despite its growing utilization, data from low- and middle-income countries, including Egypt, remain scarce regarding patient satisfaction, utilization patterns, and determinants of positive experiences.

Objective: To analyze the value of using TD in management of diverse skin diseases and to assess patient satisfaction with this service in Egypt.

Methods: A cross-sectional study was conducted from May 2024 to May 2025 using a validated predesigned constructed google form questionnaire in Arabic language and distributed through various online platforms. Eligible participants were adults (≥ 18 years) who had previously used TD services for their skin diseases, a total of 230 respondents were included. Data on demographics, service utilization, consultation experience, perceived accuracy, satisfaction, and future willingness to use TD were collected. Statistical analyses included chi-square tests, independent t-tests, non-parametric tests for ordinal data, and multivariate binary logistic regression to identify independent predictors of high satisfaction.

Results: The mean age of participants was 34.1 ± 11.3 years, with a predominance of females (62.6%, $n=144$) and urban residents (60%; $n=138$). Image-based consultations were the most common modality (86.5%, $n=199$), with skin rash (53.9%, $n=124$) representing the main presenting complaint. Eczema (19.1%, $n=44$) was the most frequent final diagnosis. Most participants (77.4%, $n=178$) reported rapid response times (<24 hours), ease of platform use (98.3%, $n=226$), and clarity of physician explanations (98.7%, $n=227$). Confidence in the diagnosis was high (93.1%, $n=214$), and the majority reported effective treatment (89.6%, $n=206$) and overall satisfaction (94.0%, $n=216$). Multivariate regression identified excellent interaction quality (aOR = 5.82; 95% CI: 3.12–10.85), very easy access (aOR = 4.76; 95% CI: 2.58–8.79), and image-based consultations (aOR = 3.15; 95% CI: 1.21–8.19) as the strongest predictors of high satisfaction. Male gender (aOR = 2.42; $p = 0.005$) and rural residence (aOR = 1.87; $p = 0.042$) were also significant demographic determinants.

Conclusion: TD demonstrates substantial utility in the Egyptian setting, achieving high patient confidence, diagnostic reliability, and satisfaction. Service-related factors, particularly accessibility, interaction quality, and consultation modality, are pivotal determinants of favorable outcomes. TD represents a viable, patient-centered alternative to conventional dermatology practice, with potential for broader integration into healthcare systems.

Keywords: Tele Dermatology (TD), Egypt, Patient Satisfaction, Dermatology Services, Digital Health, Cros

Abbreviations

LI : Live-Interactive
SAF : Store-and-Forward
TD : Tele Dermatology
VS : Versus

1. Introduction

Teledermatology – delivering dermatological care via digital communication (store-and-forward or live video consultations) – has emerged as an increasingly valuable modality for addressing barriers such as geographic distance, specialist shortages, and long wait times. Recent evidence suggests that TD is generally well accepted by patients and providers, particularly when quality of care, ease of access, and the patient–provider interaction are strong [1]. A patient satisfaction meta-analysis conducted on 2024 (*Diaz et al.*) found that overall satisfaction with TD is high across many studies, with patients often rating TD services as comparable to face-to-face care in terms of communication, access, and treatment follow-up. Likewise, a recent evidence map of systematic reviews showed that in store-and-forward (SAF) TD, about 96% of patients were satisfied; for live-interactive (LI) TD, around 89% reported satisfaction [2].

In the context of Egypt, "Dermatological consultations in the COVID-19 era: An Egyptian experience" reported an overall satisfaction and future usage score of 91% among patients who received TD services. In the same study, the usefulness score was 93.7%, interface and interaction quality were 85.9% and 87.0%, learnability (ease of learning to use the system) was 87.8%, and reliability was 86.7% [3]. These data illustrate strong acceptance of TD in an Egyptian setting during the pandemic. Despite these encouraging findings, gaps remain: many studies have been cross-sectional, few have sufficiently large or diverse samples, and fewer still examine predictors of satisfaction (e.g., modality, demographic variables, wait times, clarity of communication). In addition, patient preferences concerning TD vs. in-person visits for certain aspects (e.g., physical examination, diagnostic confidence) are not always clearly delineated [4].

Therefore, this study aims to evaluate TD among patients in Egypt during May 2024–2025, focusing on multiple dimensions: diagnostic and treatment accuracy, satisfaction across different consultation modalities, experience (including access, waiting time, platform usability), and willingness to recommend or reuse TD services. By using culturally adapted Arabic questionnaire and recruiting participants across urban and rural areas, we seek to provide comprehensive evidence to inform TD implementation in Egypt.

2. Patients and Methods

- **Study Design and Population:** This cross-sectional study was conducted online across Egypt between May 2024 and May 2025. Adults (≥ 18 years) with prior experience using

TD services at least once for any skin condition were eligible. Exclusion criteria included diagnosed psychological disorders and incomplete survey responses ($>20\%$ missing data).

- **Sample Size:** The sample size was determined based on evidence from previous literature. Clarke et al. reported that the sensitivity and specificity of TD for biopsy decision-making were 0.71 and 0.85, respectively [5]. At a power of 80% and a 95% confidence level, the estimated minimum number of participants was 196 subjects increased to 235 participants after adding 20% non-response rate and to round the figure. To enhance the study's validity and to allow for potential exclusions or non-response, the final sample size was 230 participants. This adjustment aimed to minimize data loss, strengthen the precision of subgroup analyses, and improve the generalizability of the findings. Only 230 participants completed the questionnaire with a response rate of 97.9%.
- **Sampling and Recruitment:** A convenience and snowball sampling method was applied. Recruitment posts were disseminated via various online platforms (national dermatology social media groups, online patient networks, dermatology support groups and hospital networks). To minimize sampling bias, posts were reposted at different times of day to reach participants with varied internet usage patterns.
- **Data Collection Tool:** Data were collected using a self-administered structured Arabic questionnaire adapted from validated TD satisfaction instruments. The tool underwent translation and back-translation, content validation by an expert panel (3 dermatologists, 2 public health specialists; CVI >0.85), and pilot testing for face validity. The final questionnaire included five sections: (1) demographics; (2) utilization patterns; (3) experience with TD; (4) perceived accuracy and satisfaction; and (5) Likert-scale items on future use and recommendation.
- **Ethical Considerations:** Participants provided electronic informed consent after reviewing the study purpose and confidentiality statement. No personal identifiers were collected. Ethical approval was obtained from the Menoufia University Faculty of Medicine Research Ethics Committee (Approval No. 1/2025DERM19).
- **Statistical Analysis:** Data were analyzed using IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics (mean \pm SD, frequencies, percentages) summarized baseline characteristics and satisfaction scores. Associations between categorical variables were tested using chi-square analysis, while continuous variables were compared with independent t-tests. Multivariate binary

logistic regression identified independent predictors of high satisfaction. A $p \leq 0.05$ was considered statistically significant.

3. Results

- **Demographic and Clinical Characteristics:** Among 230 participants, the mean age was 34.1 ± 11.3 years, with the majority aged 18–40 years (78.2%, $n=180$). Females predominated (62.6%, $n=144$), and most resided in urban areas (60.0%, $n=138$). Higher education was common, with 58.3%

holding a college degree ($n=134$) and 20.4% postgraduate qualifications ($n=47$). Internet access was universal (100%, $n=230$). Skin rash was the most frequent presenting complaint (53.9%, $n=124$), followed by change in skin color (20.4%, $n=47$). Final diagnoses were diverse, with eczema (19.1%, $n=44$) and acne (18.7%, $n=43$) being most common, followed by vitiligo (13.5%, $n=31$) and fungal infections (13.5%, $n=31$) (Table 1).

Characteristic	Category	n (%)	Mean ± SD
Age (years)	18–30	96 (41.7)	
	31–40	84 (36.5)	
	41–50	38 (16.5)	
	51–60	12 (5.2)	
Age, continuous	—	—	34.1 ± 11.3
Gender	Female	144 (62.6)	—
	Male	86 (37.4)	—
Residency	Urban	138 (60)	—
	Rural	92 (40.0)	—
Education	College	134 (58.3)	—
	Postgraduate	47 (20.4)	—
	Secondary	47 (20.4)	—
	Primary	2 (0.9)	—
Regular Internet Access	Yes	230 (100)	—
	No	0 (0.0)	—
Chief Complaint	Unspecified skin rash	124 (53.9)	—
	Change in skin color	47 (20.4)	—
	Skin mass	16 (7.0)	—
	Acne	39 (17.0)	—
	Other	4 (1.7)	—
Final Diagnosis	Eczema	44 (19.1)	—
	Acne	43 (18.7)	—
	Vitiligo	31 (13.5)	—
	Fungal infection	31 (13.5)	—
	Psoriasis	25 (10.9)	—
	Viral infection	22 (9.6)	—
	Skin mass (pending histopathology)	19 (8.3)	—
	Bacterial infection	15 (6.5)	—

Table 1: Demographic and Clinical Characteristics of Participants (N=230)

- **TD Service Utilization and Experience:** Image-based consultations were the dominant modality (86.5%, $n=199$), while text- (5.2%, $n=12$) and video-based (8.3%, $n=19$) consultations were infrequent. More than half of participants (55.7%, $n=128$) used TD as their first consultation, with convenience being the leading driver (53.5%, $n=123$). Investigations were rarely requested, with only 9.1% requiring

blood tests ($n=21$) and 8.3% skin biopsy ($n=19$). Access was rated easy or very easy by 78.7% ($n=181$), and 77.4% ($n=178$) reported receiving a consultation within 24 hours. Nearly all participants found the platforms easy to navigate (98.3%, $n=226$) and reported clear explanations from their dermatologists (98.7%, $n=227$). (Table 2)

Variable	Category	n (%)
Mode of Consultation	Image-based	199 (86.5)
	Text-based	19 (8.3)
	Video call	12 (5.2)
First Consultation Or Follow-up	First consultation	128 (55.7)
	Follow-up	102 (44.3)
Primary Reason for Use	Convenience	123 (53.5)
	GP referral	38 (16.5)
	Unavailable nearby specialists	37 (16.1)
	Others (including past Covid 19 restrictions)	32 (13.9)
Investigations Requested	None	190 (82.6)
	Blood test	21 (9.1)
	Skin biopsy	19 (8.3)
Ease of Access	Easy/Very Easy	181 (78.7)
	Neutral	39 (17.0)
	Difficult	10 (4.3)
Consultation Time	<24 hours	178 (77.4)
	1–3 days	51 (22.2)
	>3 days	1 (0.4)
Platform Usability	Easy to navigate	226 (98.3)
	Difficult	4 (1.7)
Clear Explanation Received	Yes	227 (98.7)
	No	3 (1.3)

Table 2: TD Service Utilization and Experience (N=230)

- Participant Satisfaction and Perceived Outcomes:** Overall satisfaction was high, with 94.0% of participants reporting being satisfied or very satisfied (n=216). Diagnostic confidence reached 93.0% (n=214), and treatment effectiveness was perceived in 89.6% (n=206). TD was considered time-saving by 90.4% (n=208) and reduced the need for in-person visits in 89.6% of cases (n=206). Likert scale analysis revealed high mean scores for willingness to use TD again (4.3 ± 0.7), recommending it to others (4.2 ± 0.8), and recognizing it as a suitable alternative (4.1 ± 0.9). **(Table 3)**

Variable	Category	n (%)
Overall Satisfaction	Satisfied/Very satisfied	216 (94.0)
	Neutral	14 (6.1)
Confidence in Diagnosis	Confident/Very confident	214 (93.0)
	Neutral	16 (7.0)
Treatment Effectiveness	Yes	206 (89.6)
	No	24 (10.4)
Saved Time vs In-person Visit	Yes	208 (90.4)
	No	22 (9.6)
Reduced In-person Follow-up	Yes	206 (89.6)
	No	24 (10.4)
Likert Scale (Mean \pm SD)	Recommend TD	4.2 ± 0.8
	Suitable alternative	4.1 ± 0.9
	Willing to use again	4.3 ± 0.7

Table 3: Participant Satisfaction and Perceived Outcomes (N=230)

- **Bivariate Associations with Satisfaction:** Satisfaction was significantly associated with gender, residency, education, consultation mode, and interaction quality. Male participants reported higher rates of being “very satisfied” compared to females (41.7% vs. 20.8%; $p = 0.004$). Rural residents were more satisfied than urban counterparts (26.1% vs. 30.1%; p

= 0.021). Educational level also influenced satisfaction, with secondary and primary education linked to higher “very satisfied” responses ($p = 0.032$). Image-based consultations were associated with higher satisfaction compared to text-based only (31.2% vs. 5.3%; $p = 0.043$). (**Table 4**)

Variable	Category	Neutral n (%)	Satisfied n (%)	Very Satisfied n (%)	χ^2	df	p-value	Cramér's V
Age	18–30	4 (4.2)	66 (68.8)	26 (27.1)	5.9 ^a	6	0.407 ^a	0.118
	31–40	7 (8.3)	48 (57.1)	29 (34.5)				
	41–50	3 (7.9)	28 (73.7)	7 (18.4)				
	51–60	0 (0.0)	9 (75.0)	3 (25.0)				
Gender	Female	11 (7.6)	103 (71.5)	30 (20.8)	11.1	2	0.004*	0.219
	Male	3 (3.6)	48 (57.1)	35 (41.7)				
Residency	Rural	1 (1.1)	67 (72.8)	24 (26.1)	7.8	2	0.021*	0.184
	Urban	13 (9.6)	84 (61.8)	41 (30.1)				
Education	Secondary/Primary	0 (0.0)	33 (70.2)	14 (29.8)	12.7 ^a	6	0.032* ^a	0.175
	College/Postgraduate	14 (8.0)	118 (67.4)	43 (24.6)				
Mode of Consultation	Image-based	13 (6.5)	124 (62.3)	62 (31.2)	8.9 ^a	4	0.043* ^a	0.14
	Text-based	0 (0.0)	18 (94.7)	1 (5.3)				
	Video call	1 (8.3)	9 (75.0)	2 (16.7)				
Interaction Quality	Excellent	3 (3.9)	23 (30.3)	50 (65.8)	84.0 ^a	4	<0.001* ^a	0.445
	Good	8 (5.5)	123 (84.8)	14 (9.7)				
	Neutral	3 (33.3)	5 (55.6)	1 (11.1)				
Investigations	None	11 (5.8)	127 (66.8)	52 (27.4)	10.8 ^a	6	0.068 ^a	0.152
	Blood test	2 (6.5)	8 (25.8)	11 (35.5)				
	Biopsy	1 (4.2)	16 (66.7)	2 (8.3)				

^a Fisher–Freeman–Halton exact test was used where >20% of cells had expected counts <5; the reported p-values correspond to the exact test. Cramér's V is reported as the measure of effect size.
* $p \leq 0.05$ considered statistically significant.

Table 4: Bivariate Associations with Overall Satisfaction (N=230)

- **Multivariate Predictors of High Satisfaction and Recommendation:** Independent predictors of high satisfaction included excellent interaction quality (aOR = 5.82, 95% CI: 3.12–10.85; $p < 0.001$), very easy access (aOR = 4.76, $p < 0.001$), image-based consultations (aOR = 3.15, $p = 0.018$), male gender (aOR = 2.42, $p = 0.005$), and rural residence (aOR = 1.87, $p = 0.042$). Conversely, blood test

requests predicted lower satisfaction (aOR = 0.48, $p = 0.027$). Willingness to recommend TD was most strongly predicted by clear explanations (aOR = 5.14, $p = 0.024$), excellent interaction (aOR = 4.62, $p < 0.001$), and very easy access (aOR = 3.95, $p < 0.001$). Response within 24 hours (aOR = 1.87, $p = 0.023$) and image-based consultations (aOR = 2.87, $p = 0.008$) further enhanced recommendation rates. (**Table 5**)

Outcome	Predictor	aOR	95% CI	p-value
High Satisfaction	Excellent interaction quality	5.82	3.12–10.85	<0.001*
	Very easy access	4.76	2.58–8.79	<0.001*
	Image-based consultation	3.15	1.21–8.19	0.018*
	Male gender	2.42	1.31–4.48	0.005*
	Rural residence	1.87	1.02–3.42	0.042*
	Blood test requested	0.48	0.25–0.92	0.027*

Willingness to Recommend	Clear explanation received	5.14	1.25–21.1	0.024*
	Excellent interaction quality	4.62	2.58–8.27	<0.001*
	Very easy access	3.95	2.18–7.15	<0.001*
	Image-based consultation	2.87	1.32–6.24	0.008*
	Response <24 hours	1.87	1.09–3.21	0.023*
* $p \leq 0.05$ considered significant.				

Table 5: Multivariate Predictors of High Satisfaction and Willingness to Recommend

4. Discussion

TD has become an increasingly valuable tool for dermatologic care, particularly during the COVID-19 pandemic, offering safe, rapid, and convenient access to specialists. Meta-analyses have shown that up to 84% of patients report high satisfaction across both synchronous and asynchronous modalities, emphasizing its reliability and clinical acceptability [6,7]. Beyond diagnostic accuracy, patient satisfaction is largely driven by timely access, convenience, and effective communication [7]. In resource-limited regions, TD has further demonstrated its utility; for instance, in Botswana, 99% of HIV-positive patients reported comfort with its use, with 91% perceiving equivalent quality to in-person visits [8]. Our study revealed that the majority of Egyptian TD users were young adults (mean age 34.1 years), predominantly female (62.6%, $n = 144$), urban-dwelling (60.0%, $n = 138$), and highly educated, with 58.3% holding a college degree ($n = 134$) and 20.4% postgraduate qualifications ($n = 47$). All had internet access (100%, $n = 230$). These demographic patterns mirror reports from Saudi Arabia and global systematic reviews, where younger, educated, and digitally literate individuals were most likely to adopt telemedicine [7,9]. In contrast, studies from rural India and Switzerland showed greater uptake among older or less educated populations, though with lower satisfaction—likely reflecting contextual differences in internet infrastructure, health-seeking behavior, and reliance on telehealth out of necessity [8,10].

Clinically, the most common presenting complaint was skin rash (53.9%, $n = 124$), followed by change in skin color (20.4%, $n = 47$), with eczema (19.1%, $n = 44$) and acne (18.7%, $n = 43$) being the most frequent final diagnoses (Table 1). Most consultations were image-based (86.5%, $n = 199$) and served as first consultations rather than follow-up (55.7%, $n = 128$) (Table 2). Convenience was the primary reason for use (53.5%, $n = 123$), and additional investigations were rarely required, with 82.6% requiring none ($n = 190$) (Table 2). These findings align with U.K. and European studies reporting that inflammatory dermatoses are most often managed remotely and that TD reduces the need for ancillary testing [11,12]. By contrast, studies from Singapore and the U.S. reported higher rates of in-person follow-up and investigation requests, suggesting more cautious approaches in certain health systems [13,14].

Patient experience in our study was notably positive. Over three-quarters (77.4%, $n = 178$) received consultation within 24 hours, and nearly all found the platform easy to navigate (98.3%, $n = 226$) and explanations clear (98.7%, $n = 227$) (Table 2). Interaction

quality was rated “Good” or “Excellent” by 96% of participants (Table 3). These findings support systematic reviews that identify prompt response times and clear physician communication as critical drivers of satisfaction [6,7]. Conversely, in lower digital literacy populations, up to one-quarter of patients report difficulty navigating platforms and unclear communication, both associated with reduced satisfaction [15,13]. Recent evidence from the United States has further supported the diagnostic reliability of store-and-forward (SAF) tele dermatology, even when benchmarked against histopathological confirmation. A large retrospective cohort from Boston University (McDowell et al., 2025) analyzed 3,293 e-consults and found an overall eConsult-biopsy concordance rate of 64.4 %, which increased to 69.2 % for lesions compared with 53.0 % for rashes. Interestingly, diagnostic concordance was not significantly affected by photo quality—contradicting earlier assumptions—but varied by race, being highest among Asian (88.9 %) and Latino (71.4 %) patients. These findings emphasize that SAF systems can achieve robust diagnostic accuracy across diverse populations when combined with high-quality clinical information [16].

Satisfaction outcomes were robust: 94% of respondents were satisfied, 93% expressed confidence in diagnosis, 90.4% reported time-saving benefits, and 89.6% noted reduced in-person follow-ups (Table 4). These results are consistent with studies from the U.K. However, in Saudi Arabia only 54.7% reported high satisfaction, and in Singapore nearly half rated TD as inferior to in-person care, underscoring the importance of contextual healthcare and cultural expectations [9,11-13]. Importantly, satisfaction differed by consultation mode. Image-based consultations scored highest, with a mean recommendation score of 4.4 ± 0.6 and nearly 90% of participants willing to recommend them, outperforming video (3.9 ± 0.9) and text-based consultations (3.3 ± 1.1) (Table 3). This preference for asynchronous, image-based methods mirrors findings from Austria and the U.K., where patients cited better accuracy and convenience [12,15]. However, other cohorts found higher satisfaction with video-based care, suggesting patient priorities differ across settings, with some favoring real-time interaction over convenience [6,13].

Multivariate analysis in our cohort demonstrated that excellent interaction quality (aOR 5.82), very easy access (aOR 4.76), image-based consultations (aOR 3.15), male gender (aOR 2.42), and rural residence (aOR 1.87) were independent predictors of high satisfaction, while requests for blood tests reduced satisfaction (aOR 0.48) (Table 5). Similarly, willingness to recommend was

strongly predicted by clear explanations (aOR 5.14), excellent interaction quality (aOR 4.62), very easy access (aOR 3.95), image-based consultations (aOR 2.87), and response within 24 hours (aOR 1.87) (Table 5). These findings highlight that beyond technical accuracy, communication clarity, usability, and service responsiveness are key determinants of patient endorsement. Comparable predictors have been reported in Saudi Arabia, global systematic reviews, and European studies, strengthening the generalizability of our results [7,9,11,12]. Strengths of this study include its status as one of the first large-scale assessments of TD in Egypt, the use of a validated bilingual tool adapted for cultural relevance, and recruitment across multiple regions to enhance representativeness. Limitations include its cross-sectional design, self-reported measures, and possible selection bias toward younger, digitally literate populations. Additionally, long-term outcomes and direct head-to-head comparisons with in-person dermatology were not assessed.

5. Conclusion

TD has emerged as a reliable, patient-centered approach to dermatologic care in Egypt, with high levels of satisfaction, diagnostic confidence, and reduced need for in-person follow-up. Younger, educated, digitally literate patients were the primary users, and image-based consultations provided the greatest satisfaction. Predictors of positive outcomes were linked less to technology itself and more to communication clarity, accessibility, and service responsiveness. These findings highlight TD's potential to complement traditional care, especially in resource-constrained settings, while emphasizing the importance of tailoring services to cultural, demographic, and healthcare system contexts.

Declarations

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