



Evaluation of patient attitudes towards the technical experience of synchronous teledermatology in the era of COVID-19

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Abstract

Teledermatology has become critical for maintaining patient access to dermatologic services since the eruption of the COVID-19 pandemic. This survey of first-time synchronous teledermatology patients ($n = 100$) seen by providers of the University of Mississippi Medical Center during Spring 2020 was designed to learn more about patient experiences associated with the technical challenges of synchronous teledermatology. Our patient population had considerable experience with various social media including Facebook (82%) and hardware platforms, such as Apple devices (66%). We found that the majority of patients were satisfied (88.9%) with their synchronous teledermatology encounter and 81.8% of patients did not experience a technical difficulty with their consult. About 15% of patients lost connection with their provider during their consultation. Furthermore, about 30% of patients rated “showing their skin” to their provider as “hardest” on a ten scale. However, about 34% of patients sent “store-and-forward”-type images to supplement their encounter. Despite overwhelming satisfaction with synchronous teledermatology, a majority prefer an in-person consultation for their next visit (68.7%). Synchronous teledermatology offers a critical service to patients to expand access to specialty consultation. It is well-received by patients despite technical barriers, especially during a global health crisis.

Keywords Teledermatology · Telehealth · COVID-19 · Attitudes · Experience

Introduction

The advent of the COVID-19 pandemic dramatically accelerated the demand for telehealth technology [1]. Telehealth services have become critical to maintaining patient access to health care services. As the supply of telehealth providers increased, the focus of these services expanded to include cost-savings, convenience, and chronic illness management. Adoption of various platforms including smartphone and tablet applications increased accessibility and simplified

connection between patients and providers [2]. In dermatology, telehealth services are provided via store-and-forward technology, synchronous telehealth, or a mix of both modalities [3]. Store-and-forward technology uses a still camera to photograph rashes or lesions. The photograph is then transmitted to the provider who evaluates the image and makes subsequent recommendations to the patient. This technique is typically asynchronous, meaning the patient receives recommendations at a later time after the consultant has evaluated the image. Synchronous telehealth, also known as live interactive, involves live audiovisual connection between patients and providers to simulate a virtual in-office experience. Recommendations are provided live during the video consult. The choice of which teledermatology modality to employ is dependent on the availability of technology and skill of both provider and patient. Teledermatology services have generally been well-received among both patients and clinicians [3]. Multiple studies have demonstrated that patients are generally satisfied with store-and-forward teledermatology services, but evaluation of live synchronous services is much more limited [4, 5].

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Teledermatology use has increased over the past decade prompting investigation into quality assessment and patient satisfaction. Recent results question the equivalency of in-person dermatologic assessment versus teledermatology, finding that biopsy was recommended significantly more often in synchronous teledermatology encounters than in-person [6]. Despite questions of equivalency between in-person consultation and teledermatology, surveys have demonstrated high levels of patient and provider satisfaction with teledermatology services. A recent systemic review found that 89% of surveys reviewed suggested patient satisfaction with synchronous teledermatology [7].

The advent of the COVID-19 pandemic dramatically accelerated the demand for telehealth technology by patients and providers in all practice settings. One institution noted an increase in telehealth utilization from < 1% of encounters to > 70% in Spring 2020 during the height of the coronavirus pandemic including over 1000 synchronous telehealth visits per day [1]. Similar adoption was facilitated for synchronous teledermatology by policy changes that increased reimbursement and eased Health Insurance Portability and Accountability Act (HIPAA) compliance regulations [8].

Regardless of the modality employed, a number of challenges have been identified that create barriers to patient access to teledermatology. A multitude of technical difficulties associated with technology used for teledermatology also has complicated widespread adoption in the past. These issues include poor internet connection and limited access to teledermatology hardware platforms including computers, phones, or tablets, along with lack of patient understanding of technology needed to access telemedicine [1, 9]. A previous study of both store-and-forward and synchronous teledermatology reported that 65% of clinicians experienced challenges resolving technology-related issues. These clinicians cited inefficient software programs, lack of integration with electronic medical records, and poor image quality as areas of concern [10].

Significant gaps exist in our understanding of patient attitudes towards the technical aspects and process of participating in synchronous teledermatology. Here, we report the results of a single-institution cross-sectional study conducted during the height of the COVID-19 pandemic in Spring 2020. Along with measuring patient satisfaction, we sought to evaluate the patient experience with synchronous teledermatology and identify technological and experiential barriers.

Methods

Study design and procedure

After Institutional Board Review approval, a cross-sectional internet-based study was conducted of patients seen via

synchronous teledermatology at the University of Mississippi Medical Center between March and May 2020. Candidates were identified by reviewing schedules of patients seen during this time period. Eligible patients were over 18 years of age and first-time users of teledermatology. An invitation letter and survey link were sent to each eligible patient's electronic mail address via RedCAP. A total of $n = 762$ patients were sent invitation links with $n = 100$ respondents. Patient informed consent was explained in this letter, and consent was given via submission of the survey. The survey consisted of 20 questions administered and recorded through RedCAP and took about 5 min to complete.

Measures and analysis

Demographic questions were answered by respondents first. These included questions to describe participant age, gender, ethnic identity, level of education, and insurance. Next, the patients were asked questions involving the manner of their engagement with technology including the types of devices they own (e.g. Windows computer, Apple iPhone, iPad, Mac, etc.) and their use of social media platforms. Participants were then asked if their recent teledermatology encounter had been their first experience with teledermatology. Any respondents who had used teledermatology previously were excluded. Next, patients answered questions regarding their recent experience with technology used in their teledermatology encounter including whether they experienced loss of connection or any other technical problems along with rating the quality of the audio and visual connection. Patients were asked whether they provided supplemental digital photographs, which were either requested by the provider or sent by the patient independently. Finally, patients answered questions about the quality of their encounter and to rate their experience with teledermatology. Descriptive statistics were computed to describe and summarize data. Chi-square test was conducted to determine if satisfaction was different among different age groups. All data analyses were conducted using IBM SPSS Statistics 27.

Results

Table 1 shows the demographic results obtained from our study cohort. The majority of patients had experience in using social media platforms, including Facebook (82%), Instagram (47%), Twitter (25%), Snapchat (28%), and Pinterest (38%). Over two-thirds of patients used an Apple device with Facetime, such as iPhone, iPad, or Mac computer, for their teledermatology visit (66%). Patients also reported that they used other smartphones, such as Google or Android phones (25%), Windows laptop or desktop (13%), or other devices (3%).

Table 1 Socio-demographic characteristics of the participants ($n = 100$)

	<i>n</i> (%)
Age (years)	
18–29	16 (16.0%)
30–45	25 (25.0%)
46–60	24 (24.0%)
61–75	31 (31.0%)
Older than 75	4 (4.0%)
Gender	
Male	24 (24.0%)
Female	75 (75.0%)
Other	1 (1.0%)
Race/ethnicity	
Black or African American	42 (60.9%)
White or Caucasian	55 (37.0%)
Other	1 (1.0%)
Prefer not to answer	2 (2.0%)
Education	
Less than high school degree	6 (6.0%)
High school degree	25 (25.0%)
Vocational or associate degree	22 (22.0%)
Undergraduate degree (4 years)	23 (23.0%)
Graduate degree	23 (23.0%)
Missing	1 (1.0%)
Insurance	
Uninsured	5 (5.0%)
Health marketplace insurer	10 (10.0%)
Employer-sponsored	52 (52.0%)
Medicare and/or medicare advantage plans	30 (30.0%)
Medicaid	13 (13.0%)

Most of the patients felt satisfied with the overall tele dermatology experience (88.9%). Satisfaction was not statistically significantly different among different age groups. The majority of patients did not experience technical problems during their tele dermatology consultation (81.8%). About 15% of patients lost connection with their provider during their consultation. Over half of patients rate the audio and visual quality excellent or good (53.5% and 35.4%, respectively) with 11% reporting “acceptable” or “poor” quality. About 34% of patients sent supplemental still photographs.

Patients were asked to rate their provider’s ability to see their skin during their consult. Approximately 33.3% responded “excellent,” 32.3% responded “good,” and 22.2% feel that it was “acceptable,” with the remaining 12.1% responding “poor.” However, a plurality (30%) of patients rated “sharing their skin with their provider” as a “1 (hardest)” on a ten-point scale. Furthermore, the majority of patients feel that their problem was adequately addressed (90.8%). The majority of patients felt that the quality of care

from tele dermatology was either better (13.3%) or as good as (70.4%) in-patient visits. About 36.7% felt that tele dermatology was more convenient, while 55.1% felt that it was as convenient as an in-person visit. All in all, a majority of patients prefer an in-person consultation for their next visit (68.7%). The questions from our survey are available in supplemental Fig. 1.

Discussion

Tele dermatology has played a critical role in providing patients increased access to dermatology services, especially in the era of COVID-19. Previously, tele dermatology has been a resource mostly directed towards rural populations. In the future, remote access to physician consultation will remain critical for many patients regardless of their geographic location. For this reason, it is crucial to understand the strengths and weaknesses of tele dermatology services.

A number of technology-related complications and barriers were noted by our patients. Nearly one in five of our survey participants experienced a technical problem during their consultation. Additionally, about one in three patients reported that their provider was only able to see their skin to a “poor” or “acceptable” degree. A similar proportion of patients sent supplemental photographs. These results demonstrate a significant weakness of synchronous tele dermatology. The comments section of our survey shed further light on these technical barriers. Multiple patients pointed to low resolution of video or audio as a key detraction from their experience. Several commenters suggested that the resolution only seemed appropriate for follow-up visits rather than evaluation of a new dermatologic complaint. Other noted issues included local disruption of internet services, problems using phones or tablets to show different parts of their body, and audio or video lag.

Prior studies have identified technological complications as a key barrier to more widespread use of synchronous telehealth services. In 2016, a Department of Veterans Affairs program provided veterans with tablets for synchronous primary care telehealth appointments and studied patient satisfaction with their appointments. The majority of participants identified as living in a rural area. The authors found that nearly half of the participants indicated experiencing a technical difficulty during their video call [11]. Many of the technical difficulties associated with synchronous primary care telehealth translate to synchronous tele dermatology. The proportion of patients in study population encountering technical difficulties was far lower than the VA study. This disparity likely represents a difference in the populations studied but demonstrates further proof of concept that, even in 2020, technology used for synchronous telehealth has room for improvement.

The addition of store-and-forward option for our patients and providers likely improved rates of satisfaction with our service. The proportion of our patients that sent accompanying store-and-forward-type photographs (about 1/3) calls into question whether these encounters would have been satisfactory or successful without these supplements. Digital photographs were sent if either patient or provider believed they were necessary to make an adequate diagnosis. The addition of still photography likely decreased the threshold for minimally acceptable video resolution for both patients and providers. In our current technologic epoch, the resolution of digital photography remains superior to video, and this maxim is demonstrable in teledermatology [12]. These results suggest that a hybrid approach to teledermatology may be beneficial until video resolution can rival that of digital photography on a consumer level. Other authors have noted that hybrid teledermatology blends the advantages of store-and-forward and synchronous teledermatology and should be considered for second opinions and difficult case [13].

Despite these challenges, our findings indicate that patients were satisfied with their teledermatology encounters during the COVID-19 pandemic with nine in ten patients reporting satisfaction. Prior study results have also reported high levels of patient satisfaction with synchronous teledermatology [14]. Despite overwhelming satisfaction, almost seven in ten patients prefer an in-person consult for their next visit. This finding is consistent with previously identified preferences among patients for in-person consultation over synchronous teledermatology [14].

This study is limited by the nature of a single-institution study. Additional surveys are necessary to establish the external validity of these findings. Some degree of selection bias is likely present given that only patients with sufficient technological capabilities engaged in teledermatology encounters and subsequently responded to the online study form. Similarly, surveys conducted through online platforms, such as e-mail, routinely demonstrate low patient participation rates, and this study is no exception.

Teledermatology technology is likely years from being perfected. Numerous technological barriers degrade the patient experience; however, most patients remain satisfied regardless of technical obstacles. Future studies should explore application of specific technologies and various platforms to help determine which of these is the best performing for both patients and providers.

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Compliance with ethical standards

Conflict of interest Robert T. Brodell discloses the following potential conflicts of interest: Multicenter Clinical Trials; Corona psoriasis biologic registry and Novartis Principal Investigator. Editorial Boards: American Medical Student Research Journal; Archives of Dermatological Research; Practice Update Dermatology; Practical Dermatology; Practical Dermatology; Journal of the Mississippi State Medical Society; SKIN: The Journal of Cutaneous Medicine; and, Journal of the American Academy of Dermatology. Advisory Boards: Bracco Diagnostics, Inc. (Gadolinium-based Contrast Agent Litigation) and Chairperson of REGN3500 AD independent monitoring committee (iDMC) (Sanofi Genzyme/Regeneron). Ross L. Pearlman, Phuong B. Le, and Vinayak K. Nahar have no conflicts of interest.

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