Implementation and evaluation of Stanford Health Care direct-care teledermatology program

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Abstract

Introduction: Teledermatology has proven to be an effective means of providing dermatologic care. The existing research has primarily evaluated its usefulness in a consultative model. Few academic centers have evaluated a patient-initiated model, and direct-to-consumer services remain the subject of controversy. Stanford Health Care recently launched a direct-care, patient-initiated teledermatology pilot program. This article evaluates the viability and patient satisfaction with this service.

Materials and Methods: During the pilot period, patients were able to seek remote dermatologic care using an eVisit tool in their MyHealth account. Patients initiated the consultation, answered questions regarding their complaint, and uploaded a picture if relevant. A Stanford dermatologist reviewed each eVisit and responded with an assessment and plan. The dermatologist noted whether they were able to make a diagnosis and their level of confidence in it. After the study, 10 patients participated in a focus group to provide feedback on the service.

Results: In all, 38 patients sought care during the pilot period. A dermatologist was able to make a diagnosis in 36 of 38 (95%) cases, with an average confidence level of 7.9 of 10. The average time to consultation was 0.8 days. Patients indicated high levels of satisfaction with the service although they had suggestions for improvement.

Discussion: Patients provided clinically useful images and information in a direct-care teledermatology model. Such services allow dermatology providers to increase access while maintaining high-quality care in an academic medical center. Further research is needed on standalone services that cannot integrate encounters with the patient's existing medical record.

Introduction

Telemedicine refers to the remote delivery of medical care using communications technology.[1] Dermatology is widely recognized as a specialty that is well suited to telemedicine because of its highly visual nature.[2] As a result, much of the research and activity in telemedicine is in the context of teledermatology.

Studies suggest that teledermatology has successful outcomes in terms of diagnostic accuracy and reliability, access to care, clinical outcomes, and satisfaction.[2–6] Teledermatology is also cost-effective, especially when approached from a societal perspective (which accounts for the time savings and convenience of a virtual visit).[7,8]

The existing research efforts have focused primarily on a consultative delivery model of teledermatology.[9] Under this model, patients go to a primary care provider (PCP), who assesses the patient's condition and subsequently refers the patient to a dermatologist. Notably, the PCP remains as a middleman in the interaction between the patient and the dermatologist.

However, patient-initiated, direct-care teledermatology has become increasingly popular over the last few years. Under this delivery model, the patient can seek dermatologic

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care and interact directly with a dermatologist. For example, when patients notice a skin condition, they may take a picture of the lesion using their own digital camera or mobile device and then send the image to a dermatologist using a secure online connection. A provider does not offer guidance on where and how to take the picture. A dermatologist can then evaluate the image and provide clinical guidance directly to the patient. If the patient's condition requires further investigation or more intensive treatment, the dermatologist can ask the patient to come into the clinic.

Trends in technology and patient interest have led to a proliferation of services oriented toward patient-initiated teledermatology. The majority of American adults own a smartphone,[10] and surveys have found that patients are open to corresponding with their physicians via a secure Internet connection.[11] Brewer et al.[12] report a recent proliferation of dermatologic mobile apps (they found 229 apps), and Peart and Kovarik[13] were able to identify 29 direct-to-patient teledermatology practices. These teledermatology practices tend to be standalone services from which patients can obtain one-off consultations.

Despite its growing popularity, research on direct-to-patient services remains sparse and the validity of such services is controversial. Mehrotra et al.[14] compared e-visits and in-person visits for sinusitis and urinary tract infections. Although treatment outcomes were similar, e-visits that took place without a prior in-person appointment had higher rates of antibiotic prescription, which may not have been optimal therapy.

Within the realm of dermatology, a few studies have assessed the technological capacity of cell phones to transmit high-quality images and have found that smartphone cameras provide images of adequate resolution to make clinical management recommendations.[15–17] Rimner et al. researched the quality of images submitted by patients who sought dermatologic care at the Swiss Centre for Telemedicine. Patients ($N=46$) received an oral and electronic tutorial before sending in their images. The authors found that a specific diagnosis was possible in 67% of cases, while developing therapeutic recommendations was possible in 70% of cases.[18]

Other studies have looked at the use of direct-care dermatology in follow-up care after an initial dermatology visit. Watson et al.[19] found that acne patients who took follow-up pictures of their skin and sent them to dermatologists via an online portal had equal clinical outcomes to those patients who had in-person follow-up visits. Fruhauf et al. followed the progress of 10 patients with severe psoriasis over 12 weeks. Patients transmitted images and clinical information via mobile phone to two dermatologists. The authors report high levels of acceptance for both patients and physicians, with neither group feeling that additional in-person follow-up was necessary.[20]

The evidence to date suggests that teledermatology is an effective means of providing care, but little has been published about the patient-initiated model. Stanford Health Care recently piloted one of the first direct-care teledermatology programs (eCare Direct) at an academic medical center in the United States. In this article, we aim to evaluate the viability of such services, specifically evaluating the clinical value of images taken and submitted by patients, its role in providing care, patient satisfaction, and financial viability.

Our findings will help clarify the clinical and cost-effectiveness of direct-care teledermatology and can also provide a programmatic model for the expansion of direct-care telemedicine services to other hospitals and specialties.

Materials and methods

From October 2014 to March 2015, patients enrolled in Stanford Care Alliance Health Plans were given the opportunity to seek remote dermatologic care from Stanford Dermatology. Patients submitted an eVisit through their online MyHealth accounts. In the online portal, they were able to initiate a consultation, answer questions pertaining to their chief complaint and medical history, and upload images of the area(s) of concern. MyHealth already offered patients the opportunity to send messages and photographs to their physicians. This service formalized the functionality for dermatologic complaints and created an Epic encounter that was routed to a dermatology "eConsult" inbox. There was no charge for this service.

A Stanford Dermatology physician reviewed the medical information and clinical photographs provided and responded to the patient with assessment, plan, and recommendations. For each encounter, the physician reported ability to make a diagnosis (yes or no) and confidence level in the diagnosis (scale of 1–10). We also recorded the time to consultation.

At the completion of the pilot period, we invited patients who used eCare Direct to participate in one-on-one discussions regarding their experience. A total of 10 patients participated. We focused these discussions on five topics: (1) what patients liked most about the service, (2) when they would be most likely to use it, (3) ease of use, (4) willingness to pay, and (5) how the service could be improved.

Results

Patient demographics

In all, 38 patients sought care through eCare Direct during the pilot period. Patients were an average of 39.3 years old (± 12.2 years) and were 84% female. The most common chief complaint was a "rash" (28%), while the second most common was "acne" (19%).

Physician-reported data

A dermatologist was able to make a diagnosis for 36 of the 38 encounters (95%), with an average confidence level of

7.9 of 10 (±1.8). The two cases in which a diagnosis was not made were deemed to be non-specific, low acuity conditions. In all, 27 of the 38 encounters (71%) were new issues, while 11 of 38 were questions regarding the management of chronic conditions (29%). The average time to initial consultation was 0.8 days (±1). The dermatologist was able to manage the patient remotely in 75% of cases and requested an in-person follow-up visit for 25%.

Patient-reported feedback

The patients we interviewed about eCare Direct offered a range of responses, with the most common feedback reflected here. First, patients reported that convenience is the greatest benefit of the service. One patient reported, "It was better for me based on my schedule, I got resolution a lot quicker." Another stated, "I was absolutely happy with it. Me being anywhere in the world and being so connected to my healthcare team speaks volumes." Such comments were a common theme in our patient interviews.

Second, patients reported that they would be most likely to use the service for minor complaints. As one patient puts it, "I think it's great for things that won't immediately drive you to the doctor but that could probably be fixed by someone." Another commonly suggested use was for the management of chronic conditions: "Because the doctor knew what the issue was already and the plan we'd come up with wasn't working well, it was easy for him to move onto the next [treatment] step without needing an actual appointment."

Third, patients found the service easy to use. The most cumbersome element was uploading photographs. Three patients specifically commented that they would have liked to be able to directly upload pictures from their phone rather than transferring the picture to their computer.

Fourth, patients expressed a willingness to pay for the service. However, patients believed that the cost should be lower than that of an in-person visit.

Finally, patients offered a variety of comments on how to improve the service. The most frequent suggestions were to provide additional information about how the service would work: for instance, "It would be helpful if you were offering that as a service to have the whole procedure explained. Use simple terms so patients can understand and decide. Also something about reimbursement, what it'll cost." Another patient suggested, "It probably would have been better if expectations had been set: here's the turnaround time, here's what you'll get, here's what happens if you don't like the outcome."

Discussion

This study represents one of the first attempts to evaluate direct-care teledermatology services in an academic setting. Our findings indicate that patient-initiated eVisits can lead to informed clinical decisions, increase access to care, and are well liked by patients.

Clinically, the most relevant takeaway may be that patient-initiated teledermatology has similar potential to traditional consultative models of teledermatology. Images and medical history provided by patients through an online portal are typically good enough for a dermatologist to make a diagnosis and treatment recommendations with a high level of confidence.

The general advantages of teledermatology therefore apply to this delivery model as well. These include increased access to care without compromising quality and potentially decreased healthcare costs.[1–8] These benefits have been widely discussed in previous studies so we will not dwell on them here. Instead, we will focus this discussion on the unique elements of our model, compared to both traditional consultative teledermatology and other patient-initiated services.

Comparison to consultative teledermatology

As mentioned, consultative teledermatology can increase healthcare access, especially for patients in underserved areas. Patient-initiated teledermatology has the potential to increase access even more for three reasons. First, it allows patients to shorten the time between their initial concern and consultation with a dermatologist by eliminating the need for a referral. Consequently, a dermatologist is able to provide recommendations to the patient much more quickly; in this case, less than 1 day from the time of their complaint. After an initial visit, electronic or otherwise, patient-initiated teledermatology can also improve the accessibility of follow-up care.

Second, a direct-care service allows patients to avoid an appointment with a PCP. This frees up time for the PCP to focus on other patients. One of the most frequently discussed problems in healthcare is a potential physician shortage, and specifically a primary care shortage. Direct-care teledermatology for skin complaints can help alleviate that burden.

Third, the availability of remote, patient-initiated services makes patients more likely to seek dermatologic care. Our discussions with patients showed that many patients may have deferred seeking care if this service was not available. Without it, they may not have sought care until their condition was more serious.

Comparison to other patient-initiated teledermatology services

Many patient-initiated teledermatology programs can help address these concerns, but Stanford's program offers some advantages over standalone teledermatology applications. Most importantly, eCare Direct incorporates online encounters into patients' electronic medical records (EMRs). This allows the dermatologist to review the patient's history,

potentially improving diagnostic ability. Additionally, the eConsult will remain in the patient's EMR, which ensures that the patient's PCP will be aware of the encounter. If the patient uses a standalone teledermatology service, his or her PCP may not ever hear about it, thereby limiting effective follow-up. This could interrupt future continuity of care.

Standalone services also face questions regarding quality control. For instance, several independent teledermatology services have been noted to use international physicians who are not board certified in the United States to provide care.[21] Schoenfeld et al.[22] reported considerable variation in quality of care among standalone telemedicine services, with commercial companies providing guideline-adherent care in just 34%–66% of virtual visits. Further research is therefore needed on standalone patient-initiated teledermatology services.

Patient satisfaction and financial viability

Patient feedback suggests that patients were satisfied with eCare Direct. Patients reported high levels of satisfaction and found the service easy to use. While only 38 patients used the service during the pilot period, we expect more interest in the program as it becomes more well known and better established.

Moreover, patients indicated a willingness to pay for the service. Determining rates would require further analysis and would depend on the provider's payment model. Regardless, the willingness to pay suggests that the program is financially viable.

Despite the positive feedback, patients did offer suggestions for improvement. These were primarily related to increased support and expectation-setting for what the service could provide. While these concerns would likely be less prevalent as the service became more familiar, this feedback can help direct the user interface and customer service elements of the program.

Limitations

This study did have several limitations. First, we only interviewed 10 patients, which may have influenced our impression of patient satisfaction. The low response rate does limit the conclusions that can be drawn regarding the patient perspective of our service. While further follow-up is needed to confirm our findings, we do not anticipate any changes to satisfaction rates with a higher response rate in light of the consistent patterns of feedback and the depth of conversation in the one-on-one sessions.

Second, we did not have a control group for the study. While a dermatologist was able to make a diagnosis for the vast majority of patients, we do not know how that compares to the confidence level for patients seen in clinic. Once again, we do not believe this impacts our conclusions to a great extent, given the high level of confidence in remote diagnoses.

Third, the patients who used the service were mostly female. It is unclear how this would influence our results, but the study population was not necessarily representative of the general population.

More generally speaking, one limitation of a teledermatology program is that it cannot work in every context. For instance, we would not treat emergent conditions using an online service. Some conditions require in-person assessment and laboratory testing for confirmation; diagnosis cannot always be made based on a history and pictures alone. And of course, procedural treatment requires the patient to physically be present in the clinic. For these reasons, we should continue to view teledermatology as a supplement to traditional in-person care, not as a replacement. Further research into patient-initiated services can help characterize the role of teledermatology for different types of encounters.[23]

Our findings show that a patient-initiated teledermatology service is an effective way to supplement dermatologic care in a medical center. Stanford's direct-care teledermatology program can hopefully serve as an intellectual foundation for the expansion of telemedicine services to other hospitals and specialties.

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