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TELEMEDICINE

for Psoriatic Disease Care

Virtual Dermatology Care

Dermatology was one of the first medical specialties to adopt telemedicine as a mainstream approach to care – in fact, "teledermatology," as both a term and a concept, originated in 1995 alongside the global explosion of telecommunications technologies.[i] The telemedicine space as a whole addresses two critical components of care: real-time consultations with clinicians, and remote monitoring.[ii] Teledermatology is primarily concerned with this first telemedicine application: real-time consultations. Today, teledermatology is used by skin health professionals to consult, triage, follow-up with, and educate patients.[iii] Dermatologists, leveraging video-conferencing platforms and mobile imaging technologies, can examine potential skin abnormalities, advise on wound care, and more. Meaningfully, teledermatology has proven to be comparable in accuracy rates to in-person conventional care concerning diagnosis, management, and clinical outcomes.[iv]

In some cases, teledermatology technologies go one step further, and empower individuals with self-care platforms that allow people to self-check their symptoms. These technologies can be integrated into smartphone applications allowing people in need of care to upload their photos and then a smart algorithm and/or dermatologist offers tailored medical advice. This type of smartphone-powered mobile dermatology app expanded in prevalence by 80.8% between 2014 and 2018, alone.[v] Recent reviews on the accuracy and benefits of these applications have showed mixed results: the apps may not be reliable enough in identifying malignant skin cancer lesions,[vi],[vii] but have shown to reduce depressive symptoms in people living with psoriatic disease, if an application specifically tailored for the management of psoriatic disease is used.[viii] While research on long-term adherence to treatment and compliance with smartphone applications is sparse, studies do show that mobile application usage can improve adherence to treatment[ix] and the regularity of patient-reported outcomes in clinical trials.[x]

The WHO Defines Telemedicine:

"The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities." *(Source: WHO)*

COVID-19 and Explosion of Virtual Visits

People living with psoriatic disease suffered from lapses in care due to the COVID-19 pandemic. A postal survey of people living with psoriatic disease in Germany revealed that nearly 20 percent of respondents missed an appointment and 10 percent changed therapy due to the pandemic.[xi] Changes in treatment and appoints were associated with increased disease severity scores and more frequent flare-ups.[xii] In such an environment, teledermatology presents an especially valuable tool for ensuring care continuity and treatment stability.

The telemedicine industry reacted quickly to the COVID-19 pandemic. Indeed, while globally the telemedicine has been on the rise for years, the unforeseen COVID-19 pandemic fueled exponential growth in the sector worldwide. The industry is anticipated to reach an almost unfathomable market-size of $218 billion by 2026.[xiii] Analysis by McKinsey in the United States showed a 78 fold increase in telemedicine utilization during the peak of COVID-19-related lockdowns in April 2020; by July 2021, utilization stabilized at 38x that of pre-pandemic levels.[xiv] This represents a 4,347 percent increase in telehealth claims between March 2019 and March 2020.[xv] In tandem, investments in telemedicine ventures have soared, with investments in 2020 outpacing 2017 levels by 300 percent.[xvi]

Dermatologists, in an effort to combat the mal-effects of lapsed visits, quickly embraced virtual visits. Virtual consultations, or hybrid consultations where patients send pictures to the dermatologists ahead of a scheduled video call, were offered to people living with psoriatic disease to provide new diagnosis and follow-up to people with a known diagnosis of psoriatic disease. A global survey of dermatologists showed a three-fold increase in the practice of teledermatology as a result of the COVID-19 pandemic, with just 26 percent of respondents reporting practicing teledermatology prior to the pandemic, and a full 75 percent reporting practicing virtual visits during the pandemic.

The expansion of the offer for telemedermatology services was facilitated, at least in the United States, by temporary changes in legislation in terms of reimbursement, compensations for physicians, and privacy rules on patient information.[xvii] Perhaps even more significantly, more than two-thirds of respondents state that they expect to use teledermatology moving forward, even in a “post-pandemic” environment.[xviii] Reactions to the increase of virtual visits during the COVID-19 pandemic by people receiving treatment for psoriatic disease were mixed. A survey investigating preferences towards virtual visits or in-person visits distributed in a cohort of people receiving biological therapy showed that nearly 50 percent preferred telemedicine over an in-person visit for their next scheduled visit, with the most common reported reason for that preference being saving time and safety in relation to the risk presented by COVID-19.[xix] Conversely, the main reason to indicate a preference towards in-person visits were limited access to video-communications tools or lack of internet connection.

Opportunities & Challenges

Benefits

People living with psoriatic disease frequently experience long wait times and have difficulty maintaining access to dermatologists for follow-up care because of near-universal shortages of dermatologists. Without regular access to specialty care, people living with psoriatic disease experience increased medical and psychiatric comorbidities and reduced quality of life.[xx] Therefore, increased access to dermatologists is critical for improving both well-being and disease outcomes .

Teledermatology can help people in need of specialistic care by increasing access, which is certainly important. Moreover, virtual visits present a number of benefits for people living with psoriatic disease that go beyond access alone. Virtual visits require less – or in some cases, no – distance traveled and reduced in-office waiting time compared to in-person care,[xxi] increasing convenience for people living in rural areas and for those without ready access to transportation.

> "Teledermatology offered a convenient and effective way for me to see my doctor...in the past I waited weeks before securing an appointment with her, but I was able to get a telehealth appointment in a matter of days.
>
> The virtual check-up worked well for discussing my ongoing medication strategy and concerns regarding adverse effects of my treatments. I appreciated the relaxed atmosphere of the online visit.
>
> *– A U.S.-based person living with psoriatic disease*
>
> *Source: Everyday Health*

Teledermatology also opens the door for enhanced collaboration and communication between healthcare providers, helping to advance a holistic and person-centred approach to care. For example, in the United Kingdom, the "Consultant Connect" service enables GPs, paramedics, nurses, pharmacists, nurse prescribers, mental health clinicians, and social workers to immediately virtually connect with relevant specialists to request advice and guidance to meet a patient's unique care needs.[xxii] As people living with psoriatic disease often grapple with comorbidities such as depression and diabetes, increased virtual links between specialists is a promising benefit of embracing a telemedicine model.

Finally, and crucially, virtual visits offer people living with psoriatic disease the chance to improve their treatment outcomes in terms of clinical psoriatic disease condition, even beyond the improvements that could be seen through in-person care.[xxiii] Multiple studies have showed that people living with psoriatic disease using virtual care services report a reduction in depressive mood[xxiv] and an improvement in symptoms.[xxv] Clinicians attribute these improvements to the way that virtual visits can help people to better adhere to treatments, keep their appointments, and stay in closer contact with their physician.[xxvi] Across the field of skin health, teledermatology is now widely seen as a tool that can reduce care costs, increase efficiency, and improve both clinician and patient satisfaction.[xxvii]

Considerations

Even though the benefits of teledermatology are multifold, the evolving practice does present some potential pitfalls and limitations in

caring for people with psoriatic disease. For example, commonly reported reasons for people with psoriatic disease disliking telemedicine visits were lack of physical touch and feeling they received an inadequate assessment.[xxviii] Other known issues when opting for virtual visits, especially when sending pictures to the dermatologist to assess, are difficulties in showing psoriatic disease in areas difficult to visualize, such as the scalp, or in sensitive areas, such as the genital area. Dermatologists agree that assessments can be imperfect via virtual visits. Interviews conducted with dermatologists in France revealed diagnostic and therapeutic frustrations; for example, some body parts are difficult for patients to show on camera, and if a patient needs a biopsy, an in-person visit must be scheduled.[xxix] As one dermatologist reported to the National Psoriasis Foundation, "the technology hasn't improved to the degree where you can visualize things as well [through video] as you can in person. But with a fairly good connection and high-quality images, we can get a good sense of what their psoriasis plaques look like and the extent of the body surface that's involved."[xxx]

Outside of these limitations associated with patient experience, there are structural limitations of teledermatology that also require consideration. A teledermatology program cannot be fully effective in the absence of an adequate technology infrastructure and sufficient broadband internet coverage; an educated patient base able to act as true and informed partners in their own care journey; and, a policy and reimbursement framework that, at the very least, compensates providers for teledermatology work, and, at best, incentivizes its use. Progress across these three critical areas has been uneven across geographies, with low-resource settings at greatest risk of being left behind as the field of telemedicine, in general, and teledermatology, specifically, continue to grow in popularity.

Spotlight on Broadband Connectivity by Region and Income-Level

(individuals using the internet by percentage of population)

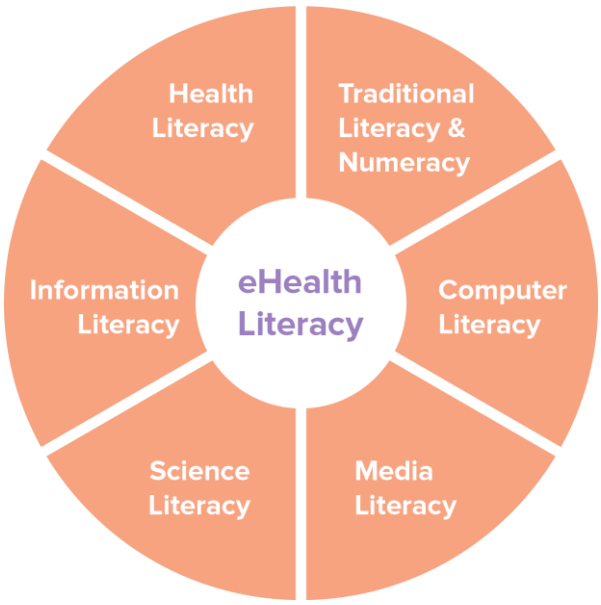
- Low- and middle-income countries: 50.4%
- High-income countries: 89.1%
- North America: 90.2%
- Sub-Saharan Africa: 29%
- European Union: 87.9%
- Latin America & Caribbean: 68.2%
- Middle East & North Africa: 71.8%
- East Asia & Pacific: 69.9%
- South Asia: 35.3%

Source: World Bank

At the most basic level, people cannot access teledermatology services if they do not have access to the internet. Globally, around 55% of households are connected to the internet; worryingly, growth in internet access has slowed in recent years, with internet adoption only increasing by an average of less than one percentage point per year in low-income settings. [xxxi] Internet access is also gendered, with women being less likely to have internet access than men.[xxxii] Even when people do have access to the internet, they need to be equipped with the digital literacy skills to navigate virtual health services. The importance of this digital literacy gap should not be understated: in fact, in low- and middle-income countries, the lack of literacy and digital skills is reported as the primary barrier to internet use, as opposed to barriers such as cost, or lack of infrastructure.[xxxiii] Digital literacy differs by

gender, as well, with women four times less likely than men to be digitally literate. [xxxiv]

Digital health literacy is defined by WHO as "the ability to seek, find, understand, and appraise health information from electronic sources and apply knowledge gained to addressing or solving a health problem."[xxxv] The degree of health literacy determines the success of virtual visits. Digital health literacy is complex, because it requires the ability to navigate new technologies alongside a baseline knowledge of health, science, and basic reading comprehension skills. The European Union has a program in place to try to boost its citizens digital health literacy and skills[xxxvi] – similar programs will need to be launched across geographies in order to ensure that telemedicine becomes a beneficial tool for all people, everywhere, regardless of current digital literacy status.



In addition to digital literacy, it is of utmost importance to take attitudes towards teledermatology into account when planning the upscale of digital health services. A recent study conducted in the US shows that there is a certain level of reluctance in sharing videos and pictures with health care providers linked to age, education, and socioeconomic factors.[xxxvii] Moreover, the few studies available from countries around the world, especially in developing settings, paint a complex picture and highlight obstacles such as lack of legal framework or technical infrastructures, and cultural barriers.[xxxviii]

One of the most significant health policy changes during the COVID-19 pandemic was the acceleration of emergency regulations and regulations to expand access to and reimbursement for telemedicine services, at least temporarily. [xxxix] Nonetheless, worldwide, the majority of teledermatology services are currently covered by private insurance (85%), with a full 73% of people self-paying for virtual visits. [xl] About 60% of teledermatology services are reimbursed by national health care systems. [xli] In general, countries in Northern & Western Europe, Central & South America, and Asia Pacific are more likely to be reimbursed through national health services--with countries like the United Kingdom leading in terms of incentivizing, and in some cases, requiring, virtual visits for dermatology for first-line interventions. [xlii] Countries in Sub-Saharan Africa and the Middle East are more likely to not offer reimbursement for teledermatology services through national insurance schemes, and virtual visits often must be paid for via private insurance or out-of-pocket payments.[xliii] Globally, there is much more work to be done in securing widespread insurance coverage for virtual visits in the dermatology space.

Best Practices

AI-Powered Teledermatology in Brazil

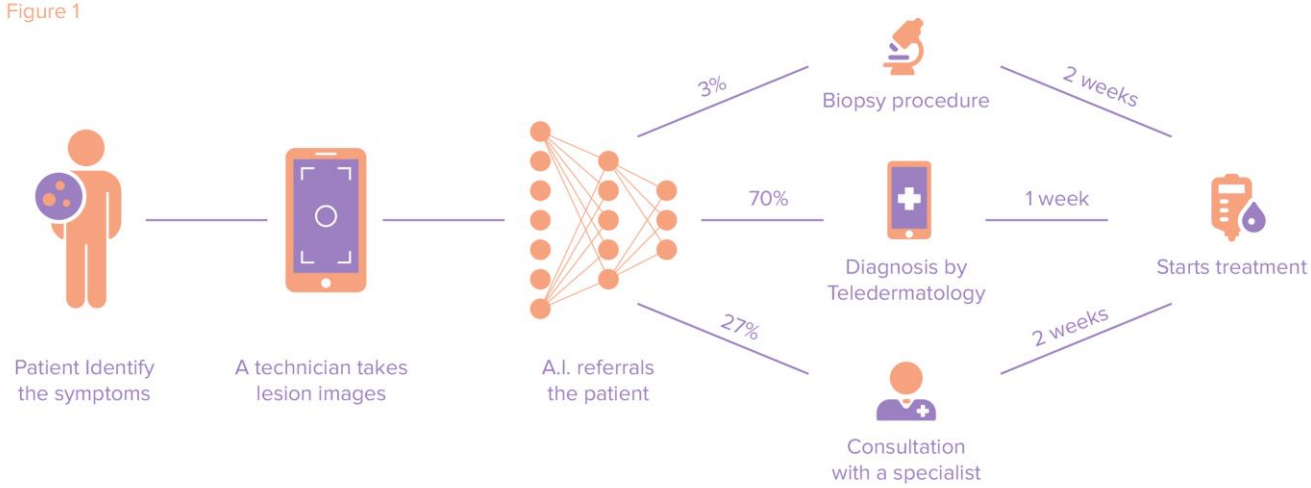
According to an International Teledermatology Review conducted in 2021, Brazil has the most developed teledermatology practice in Latin America.[xliv] Dermatologist shortages are acute in Brazil – less than 10 percent of Brazilian cities have even one practicing dermatologist; and, despite being the specialty with the second-highest percentage of referrals, average wait-times to see a dermatologist top 130 days.[xlv] To address these access barriers, the city of São Paulo launched an artificial intelligence (AI)-powered program for evaluating skin lesions. While the program was not targeted specifically at people living with psoriatic disease, it did address and benefit them. Through the teledermatology programs, people with skin-related concerns would see a medical technician at the community level who would photograph their lesions. [xlvi] The photographs are then uploaded to a software application that uses AI to evaluate and triage the lesions – people then either begin treatment, proceed to a biopsy, or are referred along for a specialist in-person visit *(see Figure 1).*

The program has experienced remarkable uptake: 30,916 people participated in the project, with 55,012 lesions photographed, resulting in nearly 165,000 images evaluated by 13 dermatologists over 12 months. [xlvii] Within 8 months of implementation, the program made over 12,000 unique diagnoses.[xlviii]

Remote Biologic Treatment Management in Austria[xlix]

Biologic treatment for psoriatic disease requires thorough ongoing monitoring. A teledermatology program in Austria leveraged a mobile phone-based system for providing intensive monitoring for people living with psoriatic disease on biologic therapy over a six-month period. Participants in the program were tasked with: 1) answering a series of yes/no questions on their health 2-3 days prior to the biologic injection, with the option of also reporting on the Self Administered Psoriasis Area and Severity Index; and, 2) taking photographs with the mobile phone camera of up to five predefined body regions that are affected by skin lesions. Physicians regularly examine these data-sets as transmitted by the patient via a web-browser and then send a feedback message.

Figure 1



The program was well accepted by participants because it saved time and enabled them to rapidly receive feedback from their physicians – 88 percent of participants said the system was a “very good idea,” and 94 percent stated they would recommend the service to other people living with psoriatic disease.

What can these examples teach us about providing exemplary virtual care for people living with psoriatic disease?

- The strength of telecommunications infrastructure, and the ability to take high-quality, detailed photos or videos is critical to the success of virtual visits

- Virtual visits ought to be understood as another link or layer of the health care continuum, as opposed to a *replacement for care within* the health care continuum. That is, virtual visits work best when they are complementary to in-person care. Ideal use-cases for virtual visits include: triage and screening; building physician-patient relationships in between in-person appointments; providing closer treatment monitoring; giving individuals at high-risk of COVID-19 or in remote areas with a more easily accessible options for seeking specialist care.

Envisioning the Psoriatic Disease Care Continuum of the Future

Teledermatology and virtual visits for psoriatic disease care are here to stay and telemedicine utilization rates are set to grow exponentially over the next several years. Despite this, as of yet, there are no recognized international practice guidelines for managing people living with psoriatic disease via virtual visits.[I] This presents a challenge for the psoriatic disease community – that is, variable utilization and standards for teledermatology across geographies – and a major opportunity. The global health community has a foundational responsibility to ensure quality care for people living with psoriatic disease, regardless of how it is delivered.

Understood this way, it may make the most sense to think of virtual visits in the context of the broader care landscape for people living with psoriatic disease. That is, instead of developing guidelines for psoriatic disease management via teledermatology, specifically, the community may be better served by establishing a holistic care framework for people living with psoriatic disease that seamlessly incorporates virtual visits into the care continuum. Indeed, dermatologists recommend considering teledermatology and dermatology as complementary and not competitive,[Ii] with virtual visits being just one tool for improving quality of life for people living with psoriatic disease.

Virtual visits should be offered when appropriate and feasible within the scope of a patient's disease progression and as it meets patient and physician preferences. Virtual visits have proven to be especially valuable for overseeing ongoing treatment for psoriatic disease. Telemedicine also affords clinicians with the opportunity to more seamlessly expand a psoriatic disease care team outside the scope of dermatology, alone.

By utilizing telemedicine technologies, dermatologists can help to facilitate an integrated, person-centered approach to psoriatic disease care, bringing care providers from other relevant specialties into disease management planning conversations. People living with psoriatic disease are often affected by co-morbidities such as depression, hypertension, diabetes, and Crohn's disease. A new psoriatic disease care continuum could help to advance an integrated care approach by incorporating cardiology, endocrinology, immunology, and mental health experts as virtual consultants within a the care team.

Change will be necessary outside the psoriatic disease community, as well. The adoption of virtual visits as a core care approach for psoriatic disease will require shifts in health policies – particularly in those countries where reimbursement for telemedicine visits is not yet the norm. Policymakers ought to think of virtual visits as a necessary link in the dermatological care continuum, as opposed to a "luxury" or "convenience" service. Further, policymakers and health educators need to develop strategies for bridging the digital divide and boosting digital health literacy amongst the most vulnerable and hard to reach individuals.

Conclusion: A Call to Action from the Psoriatic Disease Community

Teledermatology promises increased convenience and access, along with improved symptom management, to people living with psoriatic disease. Virtual visits are becoming increasingly commonplace for the management of psoriatic disease, especially in the ongoing management and treatment oversight phase of the care journey. Nonetheless, limitations remain in terms of broadband connectivity, digital health literacy, and reimbursement for virtual services. These are all complicated barriers that will require the focused attention of policymakers, psoriatic disease advocates, and healthcare providers alike. Such an undertaking is absolutely worth the effort: the potential upside of fully realized teledermatology services for people living with psoriatic disease is immense.

Patient perspectives must be considered when health systems scale up virtual visits. A dialogue with the patient community needs to be established from the early stages of building these services, to ensure that people receive the type of consultation they are most comfortable with, to accommodate preferences and address cultural or socioeconomical barriers.

A new virtually connected and collaborative health care model is needed for psoriatic disease care. As virtual visits explode in popularity, and are increasingly embraced by necessity and preference, the psoriatic disease community needs an innovative care continuum that leverages the promise of telemedicine to increase collaboration, quality, and efficiency both within the field of dermatology and across disease areas. By incorporating virtual visits as a central component of the psoriatic disease care continuum, the global health community could finally formalize people-centered, integrated care for psoriatic disease and improve lives.

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