Current Dermatology Reports (2023) 12:101–106
https://doi.org/10.1007/s13671-023-00396-7

REVIEW

An Integrated Teledermatology Model: Attacking Access to Skin Care in a Rural State

Maggie Holmes[1] · Ioachim Preda-Naumescu[2] · Ana Preda-Naumscu[3] · Thy Huynh[1] · Chelsea Mockbee[1] · Josh Clark[1,5] · Robert T. Brodell[1] · Vinayak K. Nahar[1,4]

Accepted: 14 July 2023 / Published online: 21 August 2023

Abstract

Purpose of Review Teledermatology has quickly evolved to become an indispensable tool in modern health care valued by both patients and primary care physicians. We compiled the most recent teledermatology research in this review, emphasizing the value of the integrated teledermatology health care paradigm used at the University of Mississippi Medical Center (UMMC).

Recent Findings There are two primary modalities of teledermatology: live synchronous and the store-and-forward (SAF). Store-and-forward systems have been demonstrated to be cost-effective, reliable approaches to provide rural access to care in areas where in-person consultations are unavailable or associated with long wait times. The UMMC developed a reliable, time-efficient program based on the collaboration of university-based dermatologists and rural primary care physicians within Mississippi using SAF teledermatology consultations. When needed, primary care physicians are able to refer patients to rapid access dermatology clinics when an "in person" visit is required for an examination or a procedure.

Summary The integrated teledermatology system at the UMMC is an essential part of efforts to provide medical treatment for patients in underserved, rural areas of Mississippi. While telemedicine's dependability, accuracy, and cost-effectiveness are still being studied, integrated models are starting to break down obstacles that would prevent the broad adoption of this technology.

Keywords Teledermatology · Telemedicine · Store-and-forward access · Barriers · Rural health care

Abbreviations

DTC	Direct-to-consumer
ECHO	Extension for Community Healthcare Outcomes
EHR	Electronic health record
PCP	Primary care provider
SAF	Store-and-forward
TD	Teledermatology
UMMC	University of Mississippi Medical Center

Introduction

Telemedicine, or telehealth, describes the distribution of health-related services and information via electronic services. Over the last century, as technology has become more widely accessible to the public, telemedicine has evolved to treat, monitor, and educate an increasingly diverse population and to benefit medically underserved areas [1, 2]. This represents amazing progress considering that teledermatology (TD) was first described in clinical practice in 1985 [3, 4].

The ability of TD to provide nontraditional skin care for patients is perhaps best illustrated in rural communities. As health care becomes less available in rural areas, the value of TD increases [5]. There is only 0.17 dermatologist per

✉ Vinayak K. Nahar
naharvinayak@gmail.com

1 Department of Dermatology, School of Medicine, University of Mississippi Medical Center, 2500 North State Street – L216, 39216 Jackson, MS, USA

2 Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

3 Department of Dermatology, Yale School of Medicine, New Haven, CT, USA

4 Department of Preventive Medicine, School of Medicine/John D. Bower School of Population Health, University of Mississippi Medical Center, Jackson, MS, USA

5 School of Health Related Professions, University of Mississippi Medical Center, Jackson, MS, USA

100,000 people in the three least densely populated cities in the USA. In addition, fewer appointments are available for urgent conditions, such as "changing" nevi that could represent melanoma (9–12.7-week wait time) when compared to cosmetic procedures (3-week wait time) [6, 7]. According to the Health Resources and Services Administration's 2020–2021 Area Health Resources Files, there are only 66 dermatologists in Mississippi representing 15 of the 82 counties [8]. TD is an important tool to close the care gap in rural communities; however, its utility extends to other settings such as hospitalized patients without in-person dermatology consultations, nursing homes, prisons, inner cities, and rural primary care residency training programs [9]. It plays an important role in continuing the medical education of primary care health care professionals and can be used as an observation tool for dermatology resident physicians [10].

Store-and-Forward Teledermatology in Rural Primary Care Offices

TD services are largely provided through two distinct modalities: live interaction (synchronous) and store-and-forward (SAF). In some cases, a hybrid model may be adopted [11]. Live, real-time interaction allows the provider to interact with the patient with or without their primary care provider (PCP) via audiovisual communication [12]. By contrast, SAF represents an asynchronous form of communication. In the direct-to-consumer (DTC) model, patients are asked to document their skin concerns via photography and send a picture, along with relevant clinical information, to their provider. In the hybrid model of TD, both the synchronous and asynchronous qualities of live interaction and SAF are utilized [11]. This form of TD may involve a patient discussing their concern with the dermatology provider via audiovisual technology, while also providing high-quality digital images of the affected skin [1•].

TD provided through SAF systems has been demonstrated to be more efficient than synchronous interactions, due to the larger number of staff needed to seamlessly organize and execute the synchronous modality [13•]. This was best demonstrated during the COVID-19 pandemic when most dermatology offices were closed, and efforts were initiated to apply synchronous TD as a replacement for live office visits [13•]. Many patients found it difficult to navigate the available technology and experienced problems with connectivity, bandwidth, lighting, movement of the camera, and image quality [13•].

In addition to using SAF to provide DTC care, many academic dermatology departments and dermatology groups have chosen to provide SAF services to rural primary care physicians via a consultative model. Skin concerns account for 12.4% of primary care visits in the USA, and while there are not enough PCPs in rural areas, they far outnumber dermatologists [14]. As such, using TD to provide consultative care via primary care physicians not only assures increased access to care in rural communities but also ensures patients have the support of their local health care support to follow through with established care plans [15]. The use of TD in conjunction with PCP further circumvents issues that permeate DTC services. In a retrospective study by Resneck et al. [15], provider choice, transparency, and quality of DTC telemedicine websites and virtual applications treating skin diseases were assessed. Investigators found that of 62 clinical encounters analyzed, most encounters (42 (68%)) were assigned to a clinician without any choice, 16 (26%) disclosed information about clinician licensure, and only a few (14 (23%)) collected the name of an existing primary care physician to ensure treatment plan follow-up [15]. In addition, the DTC model requires that the dermatologist assumes responsibility for obtaining tests, prescribing medications from a cost-effective source, and scheduling follow-ups [16]. Though this model is most similar to a traditional in-person visit, it is difficult to provide high-quality service to patients spread over a large region or, perhaps, the whole country [16]. These findings and observations demonstrate that, while DTC telemedicine websites have the potential to provide high-value health care in low-resource areas, the use of consultative TD services ensures patients receive adequate follow-up with a trusted PCP in the rural setting.

The Importance of an Integrated Teledermatology Health Care Model

Patients residing in rural areas face numerous barriers to care when trying to obtain a dermatological consultation. In addition to the physical time constraint of visiting a distant physician, many patients lack the financial resources to afford adequate transportation. For instance, in the Mississippi Delta region, patients frequently have to travel more than 70 miles to reach the nearest dermatologist. Additionally, research suggests that only around 14% of patients who have scheduled appointments actually show up due to difficulties related to travel and time constraints [17•].

An integrated store-and-forward TD consultative model provides a solution to the problem of caring for and appropriately triaging care for rural patients. The Department of Dermatology at the University of Mississippi Medical Center (UMMC) has adopted a unique, integrated model to provide access to skin care throughout a rural state. Using this model at UMMC Dermatology, the PCP sends a store-and-forward TD consultation to university dermatologists. In most cases, the primary care physician can handle follow-up care for these SAF patients; however, in-person dermatology care is sometimes needed for diagnostic or therapeutic

procedures. Opportunities for follow-up include, but are not limited to, a once-per-month dermatology clinic in the Mississippi Delta (the poorest region of the state located 90–120 miles from the medical center), an academic office in rural Louisville, MS, and inner-city clinics at the Jackson Medical Mall and the Jackson Free Clinic. These clinics are available in conjunction to a rapid access clinic at the medical center for urgent and emergent dermatology patients that may be referred from the TD service.

An additional responsibility of an integrated system is to train primary care physicians to care for patients with common skin diseases. At the UMMC, the Department of Dermatology adopted the Extension for Community Healthcare Outcomes (ECHO) Project [18]. First adapted to dermatology by the University of Missouri in 2015 (Show Me ECHO), Project ECHO provides case-based dermatological education to PCPs to improve their ability to diagnose and treat skin conditions [18]. Each Dermatology ECHO session uses a web-based conferencing platform to share the history and clinical images provided by PCPs which are discussed by dermatologists on the ECHO team [18].

Important Technical Components of an Effective Teledermatology System: the Electronic Health Record

An effective integrated TD system requires appropriate staff training and handling of patient electronic health records (EHRs). At the UMMC, a designated telehealth department aids in the intake and integration of patient referral forms from outside providers into the EHR, while trained "schedulers" manage the virtual appointment templates in order to prevent work overload of the clinic staff. In addition, the use of TD workflows is integral to maximize the TD experience effectively. Workflows, located within the EHR, are used to communicate with patients directly, or while they are still in their primary care office. Ultimately, they allow for fewer in-office referrals, save time, and reduce co-payments while allowing dermatologists to use in-clinic time for conditions requiring in-person management [19].

While the choice of TD workflow technology is clinic and provider-dependent, providers must become informed about options to determine which approach is best suited to their practice needs. In 2020, an observational longitudinal cohort study sought to compare four workflows (i.e., Cortext™, Haiku™, Stentor™, and Secure™ message) [19]. Investigators demonstrated that Cortext resulted in a 57% fewer follow-up dermatology office visits compared to other workflows. In addition, the design of Cortex™ was found to promote ease of mobility and a high level of synchronicity, enabling physicians to request additional photographs and to ask for follow-up information while the patient was still present in the primary care clinic. The workflow Stentor™, by contrast, provides a dermoscopy tool that effectively aids in providing quality skin cancer detection and decreases biopsy rates [19]. Specific workflows may be more suited for a particular patient mix. For instance, image quality was found to be acceptable in 96% of images through Cortext™, Haiku™, and Stentor™ but only 86% of images through Secure™ messages [25]. Workflows that offer a high level of synchronicity in communication are most highly rated by dermatologists, PCPs, and patients.

Overcoming Barriers of Teledermatology

Store-and-forward TD requires adequate training on the part of referring physician. Proper use requires learning the correct technique for obtaining high-resolution clinical digital photographs, appropriately completing the patient intake form, and uploading acquired information into a secure telehealth center. In addition, a large secure browser is required to ensure patient confidentiality, especially when using mobile devices [13•].

The Department of Dermatology, UMMC, conducted a survey to determine the primary challenge in submitting teledermatology consults by PCPs: the lengthy time (usually around 20 min) that PCPs or medical assistants required to create a consult. In response, a new system was created that employs a Smart Bot™ platform, reducing the time necessary to produce a consult to only 5 min [37]. Digital photographs of the patient's digital or paper cover sheet, brief history including allergies, and clinical image are quickly obtained and uploaded along with the submitting provider's primary question about the patient. The analysts at the UMMC Center for Telehealth then generate an EPIC encounter so that the consultative dermatologist can review the information submitted and generate a consultative report efficiently.

The quality of clinical images is critically important in generating useful consultations with the SAF method [20]. During the COVID-19 pandemic, a study analyzing the DTC model of teledermatology found that 52.1% of submitted images were of sufficient quality. In contrast, up to 10% of images were poor quality or did not pertain to the chief complaint [21]. In order to circumvent these issues, it is critical to establish a technical infrastructure through which SAF clinical images may be received and transferred to dermatologists [22]. The UMMC is fortunate to have a national telehealth center to provide such support services.

Inadequate reimbursement of TD is another significant barrier to the provision of these services [23]. Mississippi Code Ann. § 83–9-351 requires insurance companies to pay for TD at the rates paid for in-person services, and Medicaid also covers telehealth services provided by the university

[24]. Unfortunately, each state has its own laws impacting the reimbursement of TD by insurance companies. As of February 2020, all 50 states and Washington, D.C. provided Medicaid reimbursement for some form of live video, whereas only 16 states reimbursed SAF visits [25]. Outside of Medicaid, the majority of third-party payers cover only synchronous visits as they are viewed as equivalent to in-office evaluations. During the COVID-19 pandemic, the federal government required reimbursement for telehealth visits [26]. It is not clear when this will "snap back" to existing state laws limiting investment in SAF systems. In the Netherlands, TD is fully integrated in the health care system and patients are offered complete reimbursement of services rendered [27].

A final barrier is the provision of local in-person dermatologic care when follow-up is required after TD. The UMMC is opening academic dermatology offices in rural areas and has a once-per-month clinic at a university primary care clinic in the poorest area of the state, the Mississippi Delta. Urgent access to these facilities is provided to TD patients requiring in-person consultation and follow-up.

Engaging Primary Care Providers to Participate in Teledermatology

An analysis of PCP perception of TD is essential to ensure continued engagement. In a 2015 article published in the *Dermatology Online Journal*, Barbieri et al. [28] sought to analyze PCP's perceptions of SAF teledermatology to better understand optimal approaches to integration in a telehealth system. PCPs were asked to identify perceived strengths and weaknesses of SAF TD. Their findings demonstrated that 100% of PCPs unanimously agreed that TD is worthwhile and provides an additional service for patients and educational value for PCPs. In addition, 89% believed it provides access to cost-effective and timely care especially for patients in rural communities [28]. Overall, 93% reported that they would recommend the service to their colleagues [28]. Another study conducted assessed PCP and imaging technician satisfaction with TD [29]. When PCPs were asked to choose between TD or an in-clinic consult, 57% preferred TD [29]. Ultimately, they reported PCPs and imaging technicians found the virtual consultation time-efficient and efficacious when compared to in-person visits [29]. In a third study, PCPs' viewpoints about TD were assessed using three criteria: questions answered (97%), level of satisfaction (97%), and avoidance of patient referral (81%) [30]. When comparing urban versus rural TD use, rural physicians report a higher level of satisfaction, which demonstrates that the availability of care influences the attitudes of PCPs [31].

Patient Experience with Teledermatology

The patient experience with virtual consultations is perhaps the most important factor when considering the implementation of TD. Patient satisfaction is generally higher for SAF modalities when compared to live-interaction TD [32]. Studies are conflicting with regard to a preference for in-person visits and TD, though there is a comparable rate of satisfaction [33, 34].

In addition, SAF modalities are well received by those with chronic skin conditions such as psoriasis or those who required post-op follow-up appointments [35]. Limitations to the use of TD for chronic diseases include embarrassment with taking photos and other concerns related to privacy [18, 33]. The patient experience with live-interaction TD has demonstrated reduced travel times, reduced cost, and shorter waiting times compared to that with traditional in-clinic appointments [36].

Teledermatology in the Time of COVID-19

The COVID-19 pandemic expanded the use of TD to deliver dermatologic care to patients during a time when in-person contact was limited. A survey of American Academy of Dermatology members found that while 14.1% of board-certified dermatologists used telehealth prior to the appearance of COVID-19, this percentage rose to 96.9% during the pandemic [36]. The vast majority of dermatologists used SAF, or a hybrid model, of TD, and 58% of dermatologists reported they expect to continue TD in their daily practice [36]. While the COVID-19 pandemic led to a rapid and widespread adoption of telemedicine services, the use of telemedicine has declined significantly as the pandemic wanes. It is not entirely clear whether this decline is due to issues with the efficiency and effectiveness of teledermatology or other factors.

Conclusion

Teledermatology has revolutionized the delivery of dermatology services by allowing equitable and affordable care to be delivered through a virtual format. In addition to providing care to patients in rural communities, integrated models allow primary care physicians to refer patients to dermatology centers at any distance. At the UMMC, the integrated teledermatology system has proven to be a key component in the efforts to take care of patients in underserved areas of Mississippi, especially those residing in rural areas. While the reliability, accuracy, and cost-effectiveness of telemedicine continue to be explored, integrated models are beginning to break down barriers that could lead to the widespread implementation of this technology.

Funding Drs. Mockbee and Nahar are supported by the University of Mississippi Medical Center's Telehealth Center of Excellence: Project ECHO—Dermatology, funded by the Health Resources and Services Administration (6 U66RH31459-04-02).

Compliance with Ethical Standards

Conflict of Interest Robert T. Brodell has participated in the multicenter clinical trials with: CorEvitas (formerly Corrona) Psoriasis Registry and Novartis (Stock: Veradermics, Inc.). He is also an associate editor of the *Journal of the American Academy of Dermatology*, a faculty advisor for the *American Medical Student Research Journal*, and an editor-in-chief of *Practice Update: Dermatology* and serves as a staff dermatologist at the G.V. (Sonny) Montgomery VA Hospital in Jackson, MS. Maggie Holmes, Ioachim Preda-Naumescu, Ana Preda-Naumscu, Thy Huynh, Chelsea Mockbee, Josh Clark, and Vinayak K. Nahar have no conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

References

Papers of particular interest, published recently, have been highlighted as:
• Of importance

1. • Doo C, Petruzzelli C, Dowling K, Brown AS, Brodell RT. Overcoming barriers to implementation of teledermatology in rural America. In: Brodell RT, Byrd AC, Firkins Smith C, Nahar VK (eds) Dermatology in rural settings. Sustainable Development Goals Series. Springer, Cham; 2021. **This article provided barriers to the routine use of telehealth and identified solutions to improve access to care in rural areas.**
2. Coates SJ, Kvedar J, Granstein RD. Teledermatology: from historical perspective to emerging techniques of the modern era: part I: History, rationale, and current practice. J Am Acad Dermatol . 2015;72(4):563–74; quiz 575–6.
3. Perednia DA, Brown NA. Teledermatology: one application of telemedicine. Bull Med Libr Assoc. 1995;83(1):42–7.
4. Brinker T, Hekler A, von Kalle C, Schadendorf D, Esser S, Berking C, Zacher M, Sondermann W, Grabe N, Steeb T, Utikal J, French L, Enk A. Teledermatology: comparison of store-and-forward versus live interactive video conferencing. J Med Internet Res. 2018;20(10):e11871–e11871.
5. Yoo JY, Rigel DS. Trends in dermatology: geographic density of US dermatologists. Arch Dermatol. 2010;146(7):779.
6. Tsang MW, Resneck JS Jr. Even patients with changing moles face long dermatology appointment wait-times: a study of simulated patient calls to dermatologists. J Am Acad Dermatol. 2006;55(1):54–8.
7. Yadav G, Goldberg HR, Barense MD, Bell CM. A cross-sectional survey of population-wide wait times for patients seeking medical vs. cosmetic dermatologic care. PLoS One. 2016;11(9):e0162767. Published 2016 Sep 15.
8. Health Resources and Services Administration. 2021. Area Health Resource Files. https://data.hrsa.gov/topics/health-workforce/ahrf
9. Barbieri JS, Nelson CA, James WD, et al. The reliability of teledermatology to triage inpatient dermatology consultations. JAMA Dermatol. 2014;150(4):419–24.
10. van der Heijden JP, Spuls PI, Voorbraak FP, de Keizer NF, Witkamp L, Bos JD. Tertiary teledermatology: a systematic review. Telemed J E Health. 2010;16(1):56–62.
11. Coates SJ, Kvedar J, Granstein RD. Teledermatology: from historical perspective to emerging techniques of the modern era: part I: History, rationale, and current practice. J Am Acad Dermatol. 2015;72(4):563–74.
12. Roman M, Jacob SE. Teledermatology. J Dermatol Nurs Assoc. 2014;6(6):285–7.
13. • Wang RH, Barbieri JS, Kovarik CL, Lipoff JB. Synchronous and asynchronous teledermatology: a narrative review of strengths and limitations. J Telemed Telecare. 2022. **This study provided strengths and limitations of synchronous and asynchronous teledermatology in terms of clinical utility, accessibility, and cost-effectiveness.**
14. Verhoeven EW, Kraaimaat FW, van Weel C, et al. Skin diseases in family medicine: prevalence and health care use. Ann Fam Med. 2008;6(4):349–54. https://doi.org/10.1370/afm.861.
15. Resneck JS, Abrouk M, Steuer M, Tam A, Yen A, Lee I, Kovarik CL, Edison KE. Choice, transparency, coordination, and quality among direct-to-consumer telemedicine websites and apps treating skin disease. JAMA Dermatol (Chicago, IL). 2016;152(7):768–75.
16. Pathipati AS, Lee L, Armstrong AW. Health-care delivery methods in teledermatology: consultative, triage and direct-care models. J Telemed Telecare. 2011;17(4):214–6.
17. • Morrissette S, Pearlman RL, Kovar M, Sisson WT, Brodell RT, Nahar VK. Attitudes and perceived barriers toward store-and-forward teledermatology among primary care providers of rural Mississippi. Arch Dermatol Res. 2022;314(1):37–40. **This original research assessed perceived obstacles and attitudes about store-and-forward teledermatology among primary care providers in Mississippi's rural areas.**
18. Gloss CC, Grisham E, Rosenfeld A, Martin KL. Project ECHO: improving rural dermatology through digital primary care education. In: Brodell R.T., Byrd A.C., Firkins Smith C., Nahar V.K. (eds) Dermatology in rural settings. Sustainable Development Goals Series. Springer, Cham. 2021.
19. Dusendang JR, Marwaha S, Alexeeff SE, et al. Association of teledermatology workflows with standardising co-management of rashes by primary care physicians and dermatologists. J Telemed Telecare. 2022;28(3):182–7.
20. Lasierra N, Alesanco A, Gilaberte Y, Magallón R, García J. Lessons learned after a three-year store and forward teledermatology experience using internet: strengths and limitations. Int J Med Inform. 2012;81(5):332–43.
21. Sendagorta E, Servera G, Nuño A, Gil R, Pérez-España L, Herranz P. Direct-to-patient teledermatology during COVID-19 lockdown in a health district in Madrid, Spain: the EVIDE-19 pilot study. Actas Dermosifiliogr. 2020.
22. Bhargava S, Sarkar R, Kroumpouzos G. Mental distress in dermatologists during COVID-19 pandemic: assessment and risk factors in a global, cross-sectional study. Dermatol Ther. 2020;33(6):e14161. Center for Medicare and Medicaid Services. 2020.
23. Wang RH, Barbieri JS, Nguyen HP, et al. Clinical effectiveness and cost-effectiveness of teledermatology: where are we now, and what are the barriers to adoption? J Am Acad Dermatol. 2020;83(1):299–307.
24. MS CODE 83–9–351 (2) Health insurance plans in Mississippi to provide coverage for telemedicine services. All health insurance and employee benefit plans in this state must provide coverage for telemedicine services to the same extent that the services would be covered if they were provided through in-person consultation. https://www.mshealthpolicy.com/wp-content/uploads/2017/01/Telemedicine-Issue-Brief-Jan-2017.pdf

25. Kichloo A, Albosta M, Dettloff K, Wani F, El-Amir Z, Singh J, Chugh S. Telemedicine, the current COVID-19 pandemic and the future: a narrative review and perspectives moving forward in the USA. Fam Med Commun Health. 2020;8(3).
26. Medicare telemedicine health care provider sheet.https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet
27. Tensen E, Van Der Heijden JP, Jaspers MWM, Witkamp L. Two decades of teledermatology: current status and integration in national healthcare systems. Current Dermatology Reports. 2016;5(2):96–104.
28. Barbieri JS, Nelson CA, Bream KD, Kovarik CL. Primary care providers' perceptions of mobile store-and-forward teledermatology. Dermatol Online J. 2015;21(8):13030/qt2jt0h05w. Published 2015 Aug 15.
29. McFarland LV, Raugi GJ, Reiber GE. Primary care provider and imaging technician satisfaction with a teledermatology project in rural Veterans Health Administration clinics. Telemed J E Health. 2013;19(11):815–25.
30. Assis TG, Palhares DM, Alkmim MB, Marcolino MS. Teledermatology for primary care in remote areas in Brazil. J Telemed Telecare. 2013;19(8):494–5.
31. Whited JD, Hall RP, Foy ME, et al. Patient and clinician satisfaction with a store-and-forward teledermatology consult system. Telemed J E Health. 2004;10(4):422–31. https://doi.org/10.1089/tmj.2004.10.422.
32. Nicholson P, Macedo C, Fuller C, Thomas L. Patient satisfaction with a new skin cancer teledermatology service. Clin Exp Dermatol. 2020;45(6):691–8.
33. Klaz I, Wohl Y, Nathansohn N, et al. Teledermatology: quality assessment by user satisfaction and clinical efficiency. Isr Med Assoc J. 2005;7(8):487–90.
34. Chee SN, Lowe P, Lim A. Smartphone patient monitoring post-laser resurfacing. Australas J Dermatol. 2017;58(4):e216–22.
35. Al Quran HA, Khader YS, Ellauzi ZM, Shdaifat A. Effect of real-time teledermatology on diagnosis, treatment and clinical improvement. J Telemed Telecare. 2015;21(2):93–9.
36. Kennedy J, Arey S, Hopkins Z, et al. Dermatologist perceptions of teledermatology implementation and future use after COVID-19: demographics, barriers, and insights. JAMA Dermatol. 2021;157(5):595–7.
37. Brodell RT, Byrd AC, Smith CF, Nahar VK (Eds.) (2021). Dermatology in rural settings: organizational, clinical, and Socio-economic Perspectives. Springer Nature