Integration of telehealth services in the healthcare system: with emphasis on the experience of patients living with HIV

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Accepted 12 January 2019
Published Online First 2 March 2019

To cite: Dandachi D, Lee C, Morgan RO, *et al*. *J Investig Med* 2019;**67**:815–820.

ABSTRACT

The US Health Resources and Services Administration defines telehealth as the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education, public health and health administration. Many studies have supported the use of telehealth to increase convenience to patients, improve patient satisfaction, diminish healthcare disparities, and reduce cost that will ultimately lead to improvement in clinical outcomes and quality of care. However, guaranteeing confidentiality, educating patients and providers, and obtaining insurance reimbursement are some of the challenges that face the implementation of telehealth program. The use of telehealth has been investigated in acute infections, such as endocarditis and chronic infections as in hepatitis C, and HIV. The purpose of this review is to focus on the use of telehealth services for people living with HIV (PLWH). For PLWH, telehealth could be particularly useful by connecting specialty providers to an underserved population and addressing many of the factors identified as barriers to HIV care. To date, the literature supports the use of telehealth for the management of chronic diseases including HIV. Most of the studies showed a high acceptability and positive experience with telehealth services among PLWH. However, fewer studies have evaluated telemedicine for chronic direct care of PLWH. Well-designed studies are needed to show that the implementation of telehealth could improve the HIV care continuum. In addition, future research should focus on identifying the group of patients that could benefit the most from such intervention.

TELEMEDICINE AND TELEHEALTH

Telemedicine and telehealth are terms that have been used interchangeably to define the use of telecommunications to deliver a wide range of healthcare services.

The federal Health Resources and Services Administration defines telehealth as 'the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration'.[1] Telehealth includes four main domains: (1) Live video, which is a real-time interactive telecommunication that should include the use of an audio and video equipment by the patient and the healthcare provider to receive and deliver direct patient care, sometimes referred to as telemedicine; (2) store and forward is the use of electronic communication to transmit prerecorded patient's health information, such as an x-ray or image, to a specialist for consultation; (3) remote patient monitoring is used to collect health data, such as vital signs or ECG, and transmit it to a provider in a different location for interpretation; (4) mobile health encompasses healthcare, public health, health education delivered by mobile communications devices such as phones, tablets, and so on.

In research and clinical settings, telehealth programs have been implemented in different formats with combination or variation of these domains.[2 3]

In addition, there is a big variation on how states define telehealth that influences policies and regulations around its use across states. For example, some states use either terms telemedicine or telehealth to indicate services provided via information and telecommunication technologies. Other states use telemedicine only when clinical services are delivered, excluding store and forward, remote patient monitoring, and/or most commonly exclude phones, emails, and fax from the definition. Although, many Medicaid state programs do not reimburse for store and forward, teleradiology is usually reimbursed and not considered as telehealth. California, as an example, does not consider the technologies used in radiology, dermatology, and ophthalmology to fit into the typical telehealth store and forward definition and subsequently reimburse for these services not under telehealth program. Similarly, for remote patient monitoring, some states do not reimburse it, but they do not include tele- Intensive care unit (tele -ICU) in the definition of remote patient monitoring.[4]

The purpose of this article is to review the definition, benefits, and barriers of telehealth focusing on the clinical use of telehealth services for people living with HIV (PLWH) in the USA

as a way to improve access to HIV care and HIV care continuum. We conducted an electronic search for articles in PubMed, Cochrane Library, Google, and Google Scholar. We used different combinations of keywords including HIV, telehealth, telemedicine, e-health, mobile health and HIV continuum. We also used the Medical Subject Heading (MeSH) terms telecommunications and HIV. Systematic reviews were also included. The reference lists of articles were used to locate other studies. Our search was limited to published articles in the English language from January 2008 to December 2018. To help focus our search on the US experience, we included mostly studies conducted in the USA.

TELEHEALTH UTILIZATION

According to the US Census Bureau data from 2015, 78 per cent of all households had a desktop or laptop, 75 per cent had a handheld computer such as a smartphone or other handheld wireless computer, and 77 per cent had a broadband internet subscription.[5] With the increase in internet access and use, progressively telehealth services are also expanding. In an analysis published in 2016, about 60% of all healthcare institutions adopted some form of telehealth technology.[6] The Veterans Health Administration (VA) provides care at 1240 facilities and has already implemented telehealth in over 900 VA sites of care. Based on the VA data, 12% of veterans received elements of their care via telehealth in 2016, of whom 45% live in rural areas and have had limited access to VA healthcare. The aim of the telehealth program at the VA is to improve clinical outcomes and access to care for veterans with chronic diseases or veterans at risk for placement in long-term facilities. It connects the provider to the patient at a clinic in a different location or to the patient at home through the use of in-home and mobile monitoring, messaging and/or video technologies The VA also offers store-and-forward telehealth to cover teleconsultation between providers and ensure the documentation of the encounter and assessment in the patient medical record.[7]

ADVANTAGES

There are many suggested benefits for the integration of telehealth into the healthcare system. Many studies have supported the use of telehealth as a way to increase convenience to patients, improve patient satisfaction, diminish healthcare disparities, reduce cost, and travel-related barriers that will ultimately lead to improvement in clinical outcomes and quality of care.[8–10] Findings from a study on patient satisfaction regarding telehealth showed that care provided through telehealth met patient standards and that receptivity of telehealth grew increasingly with time.[11] Furthermore, increased patient-provider accessibility from telehealth encounters fostered higher compliance with medications and shorter hospital stays.[12] In addition, quality metrics have been developed and used for the purpose of valuing telehealth services, which may incentivize healthcare entities and providers to use telehealth in the face of a shift toward value-based reimbursement. As the US healthcare system shifts away from the traditional fee-for-service payment model, telehealth utilization may assist in transitioning and capturing key factors associated with value-based care. Some studies showed that telehealth utilization improved patient health outcomes and decreased average cost of care.[12] However, calculating the actual cost saving of providing telehealth services can be difficult. For example, it was projected that traveling to clinics would cost the VA about $1 billion dollars in 2015 and that figure could be reduced by implementation of telehealth services, but a retrospective analysis of the cost saving between 2005 and 2013 showed only a modest decrease in travel payments by substituting clinic visits with telemedicine.[13]

Telehealth services might have an additional benefit to rural communities where they often have difficulties in recruiting and retaining adequate health workforce to meet their healthcare needs. Telehealth has also been looked at as one option that has the potential to improve access to primary and specialty medical care in the USA and across the world.[14 15]

BARRIERS

Several barriers exist to building and sustaining a telemedicine program. Despite the widespread use of the internet and the rise in technology ownership among all households, gaps persist for some groups. Digital inequality, caused by unequal access to digital devices, lower internet connectivity, and digital literacy affects low-income households, households headed by a person 65 years and older, Hispanics and African-Americans, which could impact their access to telehealth services.[16 17]

Another concern is cybersecurity; guaranteeing a system that is confidential, safe, and compliant with the Health Insurance Portability and Accountability Act laws is also very important. Currently, in 30 states, Medicaid requires an informed consent for patients participating in telehealth-delivered medical services to let the patient be aware of the risks in regards to their personal information security, whereas, Medicare does not require a prior informed consent for the services.[18]

Other logistical challenges that may arise from the implementation of telemedicine services include incorporating a new program into an existing health system, educating patients and providers, identifying strategies to prevent a decline in usage over time, sustaining funding, and obtaining insurance reimbursement for services. Remuneration for services is an important barrier for telehealth delivery that has been partially addressed. There are specific telehealth-delivered services eligible for reimbursement under Medicare and Medicaid. For instance, Medicare only reimburses for telemedicine services if the use of telehealth service substitutes for an in-person encounter and if the encounter is conducted in an approved healthcare facility, not at home or other locations. As of November 2017, the Centers for Medicare & Medicaid Services augmented their list of reimbursed telehealth services in order to increase coverage and help facilitate billing for these provisions, particularly in rural regions.[17 19] Many of the private insurance plans now cover telehealth-delivered services. Many states also have already adopted telehealth parity laws that mandate third-party payers to provide coverage of telehealth services in a manner that equates that of face-to-face visits.[20] However, these laws contain ambiguous verbiage and insufficient specifications as to what is covered, which

Table 1 Ten points to consider for telehealth implementation

Vision and goals for implementing telehealth services	Improving access to care in remote areas. Cost-saving. Expanding patient pool.
Type of telehealth intervention	Live video replacing face-face clinic. Store and forward, teleconsultation. Telemonitoring. Mobile health.
Services and timeline	Services and sites where telehealth services to be implemented. Patient selection and exclusion criteria. Clear timeline for services implementation.
Telehealth technology and selecting vendors	Videoconferencing software, devices such as stethoscopes, otoscopes and so on, patient monitory devices such as glucometers, blood pressure machines, scales and so on.
Financial plan	Market and self-assessment. Reimbursement. Revenue, cost-saving and long-term sustainability analysis.
Legal aspects	Licensing. Liability. Malpractice. Privacy and security, Health Insurance Portability and Accountability Act compliance.
Training and equipment management	Training providers, identifying leader team, and key roles. Technical assistance.
Marketing	Marketing tools and marketing representatives.
Outcome measures	Setting clinical performance measures and periodic evaluation.
Patient engagement and satisfaction	Effect on patient satisfaction, long-term clinician–patient relationship and ways to maintain patient engagement.

has resulted in dissimilar provisions and confusion from both the provider and patient perspective.[21]

Another consideration for practicing physicians who wish to provide telehealth services is related to regulations for licensure and credentialing, as well as medical liability and responsibility. Physicians are still required to be licensed in the state in which the patient is physically located, and some states prohibit physicians from prescribing medications without a prior face-to-face encounter.[4] Medical malpractice insurance policy might or might not cover for medical services rendered through telehealth or across state lines. A summary of important points to consider for telehealth startup is included in table 1.

CLINICAL USE

Telehealth has been applied in different contexts and to many medical, psychiatric, and surgical fields. It has been evaluated for providing acute, specific, and limited acute interventions, management of chronic diseases, or reducing hospitalization and emergency visits in acute illnesses.[22–25] In addition, the lack of access to psychiatric services and the national shortage of psychiatrists led to an increased interest in the use of telemedicine to provide behavioral and mental health services. Many studies showed successful and comparable outcomes in managing psychiatric illnesses through telehealth or face-to-face encounters.[10] In a meta-analysis, there was no difference between the internet-delivered and in-person treatment of depression.[26] In a series of randomized controlled trials conducted at the VA, standard care was compared with collaborative virtual care via videoconferencing. Patients in the intervention group showed a decline in post-traumatic stress disorder severity and depression severity scales.[3]

In the management of infectious diseases, the use of telehealth has been investigated in acute infections, such as pneumonia, endocarditis and other acute infections, and chronic infections as in tuberculosis, chronic hepatitis C, and HIV.[22] In 2017, the Infectious Diseases Society of America published a position statement supporting the use of evidence-based, cost-effective telehealth technologies for the treatment of infectious diseases.[27] To assess treatment outcomes of patients in rural Western Australia with hepatitis C virus (HCV) infection treated using videoconferencing, investigators compared the sustained virologic response rate of patients treated using videoconferencing to that of patients treated in in-person clinics and found no significant difference.[15] These results were similar to those of other studies conducted in underserved communities and in the custodial setting.[28] Project Extension for Community Healthcare Outcomes (ECHO), which was developed at the University of New Mexico Health Sciences Center, is a combination of store and forward and live video. However, patients receive direct in-person care from their primary care providers, who in turn interact with distant specialist teams for education and clinical support using videoconferencing and shared medical records.[29] This model was implemented in New Mexico for the treatment of hepatitis C and found that patients could be treated locally in the primary care setting, with outcomes similar to those in the specialty clinic.[29]

Telehealth for delivery of care for patients living with HIV

PLWH experience unique anxiety, vulnerability, and challenges that may be different compared with other population groups. Delivering healthcare for PLWH requires a high sensitivity and awareness of the issues of stigma, safety, and privacy. In addition, previous studies showed that patients develop their impressions of providers early and that initial care experiences with the HIV clinical care provider and clinic have a significant impact on retention in HIV care.[30 31] Thus, to make telehealth services acceptable to patients, issues related to communication and provider–patient rapport must be addressed.

Nevertheless, telehealth could be particularly useful for PLWH for connecting specialty providers to an underserved population and addressing many of the factors identified as barriers for retention to HIV care.[32 33] Patients who are not retained in care report more transportation-related challenges such as transportation costs, unreliable public transportation, and travel distance, as compared with PLWH who are retained in care.[34] One study among US Veterans with HIV showed that longer travel time to HIV specialty clinics was associated with decreased use of these clinics.[14] PLWH who are out of care face difficulties with scheduling appointments and struggle to consistently attend regular clinic visits. Non-retained patients often cited competing life events that hindered them from effectively managing their HIV infection. Stigma remains a concern and a barrier

for retention in care, as the fear of disclosure of their status discourages some from regular clinic visits.[34 35]

Developing criteria to identify eligible patients to receive their care through telehealth will be extremely important. A qualitative study evaluated clinicians' selection criteria for video visits in an outpatient setting in non-HIV patients. The study listed many factors that contributed to the selection process, including patient's attitude toward telehealth, patient's access and ability to handle the technology, patient's well-being and disease status, whether the patient had an established relationship with the patient by prior face-to-face visits, and the providers' assessment of added benefit from video visits.[36] Hence, unless selection of participants in telehealth is by a randomized process and/or strictly defined criteria, studies evaluating telehealth programs will vary in the patient population included, biased by patients and providers own biases, and may not be generalizable to other settings.

Various telehealth interventions have been used to improve HIV continuum of care and to promote HIV prevention including behavioral interventions, facilitator-led videoconferencing groups, text messaging to increase HIV testing, medication counseling sessions with pharmacists through videoconferencing, and telehealth collaborative approaches to address mental health needs for PLWH. Most of these studies showed promising results and high patient satisfaction rates.[37–41] However, some studies could not demonstrate an added benefit to the standard of care. A recent study examined the use of videoconference between incarcerated PLWH and case managers prior to their release, in the addition to the standard prerelease reentry services offered, and could not demonstrate an improvement in linkage to care rates within 90 days.[42]

Fewer studies have evaluated telemedicine for chronic direct care of PLWH. A small open-label randomized study compared standard follow-ups with a 'virtual hospital' that included an internet-based care model covering the entire management of PLWH, which had no negative impact on HIV clinical parameters, antiretroviral compliance, and psychological measures. Patients were satisfied and expressed a wish to continue with the virtual hospital model. Although this study showed that telemedicine could be a safe, feasible, and cost-effective alternative to in-clinic visits to manage HIV, the study only included patients who were virally suppressed with a CD4 count of more than 250 and was limited by the small sample size.[43] Another study that examined the veteran population in rural Iowa and Illinois evaluated a collaborative approach where the patient would have a visit with his primary care provider at community-based outpatient clinics followed by telehealth visit with an HIV specialty clinic. The feasibility of implementing telehealth collaborative approach in a rural setting within the VA was established through this study; however, the generalizability of the results outside the VA healthcare system is uncertain. The study was also limited by the small sample size and did not measure HIV care outcomes.[44] A study evaluating the implementation of the ECHO model of telehealth for the care of veterans with HIV showed limited uptake of HIV ECHO telemedicine programs. The findings were attributed partly to a sense of 'HIV exceptionalism', as described by the authors, and a reluctance from specialty and primary clinics to share ownership of care.[45] In contrast, a retrospective study evaluating an HIV ECHO program that connected a multidisciplinary team of specialist from the University of Washington to community providers offering HIV care in five states showed positive results. The study demonstrated that community providers frequently requested guidance; it improved their knowledge and decreased their sense of isolation.[46] In the above-mentioned study from the VA ECHO model,[44] the HIV care was shifted from a central HIV clinic that used to provide care for the veterans to nearby primary care clinic. The format used in the study from the University of Washington did not require a change in providers but made it possible for community providers to provide HIV care and connect and seek consultation when needed, which could have explained the different outcomes of these two studies.[45 46]

In a retrospective cohort study at a correctional facility, where the prevalence of HIV infection is higher than that of the general population and access to subspecialty care is limited, a study assessed and compared the efficacy of HIV subspecialty management through a telemedicine clinic with that of an on-site correctional physician without subspecialty training. The study found that the mean CD4 count and the proportion of subjects who achieved virologic suppression were significantly higher when managed by a multidisciplinary team of subspecialists via telemedicine clinics. However, there are several limitations for this study, including the possible overlap of study subjects in each group and the bias from the use of historical controls that could influence the intervention effect.[47]

Most of the published studies showed a high acceptability and positive experience with telehealth services among PLWH. The major advantages cited were convenience, comfort, and fewer transportation requirements. In one study, more than half stated that they were less intimidated and more open to disclosure because they were not talking to someone face to face.[48] However, participants expressed multiple concerns. Privacy was a major concern among participants, but they had different views on the ideal setting that provided more privacy. For some participants, home offered more privacy and less risk for stigma since healthcare centers may be recognized in the community as serving PLWH. However, for patients who did not disclose their HIV status to other household members, especially their children, the potential invasion of privacy at home was a greater concern.[49] Other concerns included the safety of their personal information and confidentiality using the internet, possible distraction at home, and the availability of necessary technology to conduct the encounter from home.[50]

Few studies have explored the physician perspective on the use of telemedicine to provide medical care to PLWH. Providers were most concerned about the inability to adequately assess the patient, potential to overlook details, medicolegal affairs, reimbursement of services, longer duration of time required to conduct the encounter, confidentiality, potential abuse of the telemedicine services by the patients, and possible feelings of disconnect between the patient and provider. However, participants agreed that PLWH would benefit from the use of telemedicine and that telemedicine would reduce travel time, possibly reduce patients' exposure to the stigma of having HIV, increase patient privacy, and improve access and timeliness of care.[51]

To improve the acceptability and effectiveness of the telemedicine program, providers suggested that initial visits with patients should be face to face and also emphasized the importance of continuity of care on follow-up visits, as well as the need for information technology support to deal with technical difficulties and ensure reliable, high-quality internet connection.[8]

Telehealth use for HIV pre-exposure prophylaxis (PreP)

PreP is effective in reducing HIV transmission.[52] However, PreP is only reaching less than 10% of those who have a substantial risk of HIV acquisition consistent with PreP indications, according to a national analysis released by the Centers for Disease Control and Prevention.[53 54] Besides, commercially available entities that provide PreP through telehealth in the USA, a TelePreP program has been implemented at a state level in Iowa. Two studies have examined the feasibility of providing PreP through telehealth.[55 56] Another study investigated incorporating PreP training into an established ECHO project to educate and support community medical providers to prescribe PreP.[2] These studies have a small sample size that limits the ability to draw any conclusions but provide a framework that could be replicated in larger studies.

CONCLUSION

It is uncertain whether telehealth will substitute face-to-face clinical interaction in the future. Currently, it is used to complement the standard care. To date, the literature supports the use of telehealth for the promotion of population health and management of chronic diseases including HIV. For PLWH, using telemedicine for scheduled clinical appointments could provide an efficient alternative to following up with patients who are clinically stable or have difficulty attending their clinic visits and reaching patients in underserved areas with no access to specialty care. However, not all patients with HIV are suitable for care through telehealth. Future research should focus on identifying the group of patients that could benefit the most from such intervention. Well-designed studies are needed to show that the implementation of telehealth improves the HIV care continuum and clinical outcomes in PLWH.

Contributors All the authors have read and approved this manuscript. Idea and concept: DD and MCR-B. Drafting of the manuscript: DD and CL. Critical revision of the manuscript for important intellectual content: DD, CL, ROM, TPG and MCR-B. General support: ST-T. Approval of the manuscript: DD, CL, ROM, TPG and MCR-B.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

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