



Original Research

Telemedicine's Crucial Role in Managing Health During the Ongoing COVID-19 Pandemic

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ARTICLE INFO

Article History:

Received: 05 January 2024

Accepted: 02 April 2024

Online: 03 April 2024

Keywords

Telemedicine,
telehealth, COVID-
19, Healthcare,
Remote patient care,
Crisis management.

ABSTRACT

Recent innovations have further improved the ability of Telehealth (TH) to connect healthcare services in remote places. In the middle of the COVID-19 epidemic, Telehealth (TH) has become an essential tool, transforming the way healthcare is provided. It has proven critical in providing patient care, enabling easy access while adhering to social distance and quarantine protocols. By implementing healthcare services directly in patients' homes, TH improves the safety of both patients and healthcare professionals. Amidst the epidemic, TH has facilitated the optimal allocation of healthcare resources, prioritizing COVID-19 treatment while simultaneously addressing non-COVID health needs through remote means. Medical professionals have quickly adapted, utilizing telehealth for activities such as initial assessment, reducing the need for unnecessary visits to the emergency room. This transition signifies a shift in TH's conventional function in primary care to include specialist and urgent treatment, thereby significantly broadening its usefulness. Nevertheless, TH does have certain limitations, such as difficulties performing thorough physical examinations and restrictions on obtaining diagnostic testing and imaging. These deficiencies underscore the continuous need for enhancement and originality in the field of telemedicine. The 2020 pandemic has had a profound effect on telemedicine, leading to substantial advancements and setting the stage for the future of healthcare delivery. In order to fully harness the promise of TH in modern healthcare, it is imperative for healthcare professionals to address the constraints and ongoing obstacles associated with its utilization.

1. Introduction

Telemedicine, a healthcare delivery system that utilizes technology, has gone through tremendous breakthroughs, particularly in recent years due to improvements in live video and text messaging capabilities. Telehealth, which initially involved basic phone consultations between patients and

doctors, has now evolved to include a diverse variety of services. It has demonstrated its significance during critical situations like as the COVID-19 pandemic (Lurie and Carr, 2018).

Prior to the COVID-19 pandemic, telemedicine was employed by several healthcare practitioners worldwide, mostly in times of calamities and crises (Lurie and Carr, 2018). Nevertheless, the outbreak of the pandemic in 2020 led to a significant increase in its usage. In response to the requirement for social distance and the preservation of personal protective equipment (CDC, 2020; Centers for Medicare and Medicaid Services, 2020), healthcare institutions quickly adopted telemedicine as the main method of providing healthcare services. This transition was crucial in order to maintain the provision of healthcare services while decreasing the potential for viral transmission. During this period, synchronous telehealth, which refers to real-time interactions between healthcare practitioners (HCPs) and patients, became the prevailing method (Koraisly and Rohatgi, 2020). This method facilitated continuous outpatient treatment and consultations for non-urgent medical illnesses by utilizing pre-existing hardware infrastructure including smartphones, tablets, and wearables (Islam., 2023; Moniruzzaman et al., 2023; Ting et al., 2020). The advantages were numerous: enhanced patient results, high rates of satisfaction, and less exposure to busy clinical environments (Sunny et al., 2017; Bashshur et al., 2020).

According to a practical standpoint, telemedicine consultations closely resemble regular face-to-face visits in terms of clinical thoroughness and documentation obligations. Thorough documentation is essential not just for legal and financial reasons but also to guarantee adherence to healthcare laws such as the Health Insurance Portability and Accountability Act (HIPAA). Every telemedicine session requires careful documentation of the evaluation, diagnosis, treatment plans, and any recommended drugs or tests, using the Current Procedural Terminology (CPT) codes (Bashshur et al., 2020; Kuddus et., 2020). The shift to telemedicine has emphasized the significance of strong electronic health records (EHRs), enabling smooth integration of diagnostic tests and pharmaceutical orders. The digital infrastructure facilitated the uninterrupted provision of healthcare and allowed healthcare providers to remotely monitor the progress of patients (Kuddus et., 2021; Bashshur et al., 2020).

In the decades to come, telemedicine is expected to continue and grow beyond the epidemic. The demonstrated effectiveness of telemedicine in sustaining healthcare provision during emergencies has underscored its potential as a supplementary approach to conventional face-to-face treatment. As healthcare systems incorporate telemedicine into their service models, it is essential to make continuous advancements in technology and regulatory frameworks. This will help to optimize the advantages of telemedicine while maintaining patient safety and guaranteeing high-quality treatment (Kuddus et al., 2022; Ting et al., 2020). Telemedicine is turning into a powerful and influential factor in healthcare, greatly expedited by the COVID-19 pandemic. The capacity to provide prompt and efficient healthcare from a distance highlights its significance in contemporary healthcare delivery systems. Ensuring regulatory compliance and embracing technical improvements are crucial for maximizing the effectiveness and worldwide impact of telemedicine

on patient outcomes (Koraishy and Rohatgi, 2020; Sunny et al., 2020b). The vital role of telemedicine in revolutionizing healthcare delivery, especially during times of crisis, highlights the necessity for continuous improvement to ensure it adheres to the utmost standards of care.

Throughout the pandemic, people were increasingly using telehealth and smart technologies to check their health on a daily or hourly basis. Multiple publications and research have emphasized the efficacy of telemedicine in the management of chronic illnesses, especially in nephrology clinics (Sunny et al., 2021c; Lea and Tannenbaum, 2020). Since the 1980s, Canadian doctors have been using telemedicine to provide distant treatment for patients undergoing dialysis (Bernstein et al., 2010). Telemedicine has played a crucial role in the management of renal illness and dialysis for patients residing on remote Pacific Islands (Sazzad et al., 2023; Michel et al., 2020). A recent study conducted by Singh et al. (2019) found that the use of smartphone apps in individuals with chronic renal disease resulted in decreased systolic and diastolic blood pressure levels.

Healthcare providers (HCPs), especially cardiologists, are knowledgeable with the functionalities of devices like as the Apple Watch for monitoring heart rate and Mobile for detecting rhythm irregularities. These devices give valuable data that contribute to healthcare outcomes (Sunny et al., 2023d; Li et al., 2019). Amidst the COVID-19 epidemic, medical professionals across the globe widely employed telemedicine to provide healthcare services to patients during periods of enforced confinement. An Italian cardiology group effectively addressed heart failure symptoms with telemedicine, employing phone conversations, video conferencing, and emails to maintain patients on goal-directed therapy when in-person consultations were not possible (Salzano et al., 2020). Among the 103 patients included in the study, 58% of them utilized telemedicine services. Out of these patients, 51% had their treatment decisions modified. It is worth mentioning that none of these patients contracted COVID-19 throughout the three-month duration of the study.

2. Previous Telehealth Experience

Although the pandemic, people were increasingly using telehealth and smart technologies to check their health on a daily or hourly basis. Telemedicine has been extensively documented and researched, demonstrating its efficacy in the management of chronic illnesses, particularly in nephrology clinics (Lea and Tannenbaum, 2020). Since the 1980s, Canadian doctors have utilized telemedicine to provide distant treatment for patients undergoing dialysis (Bernstein et al., 2010). Telemedicine has played a crucial role in the management of renal illness and dialysis for patients residing on remote Pacific Islands (Michel et al., 2020). A recent study conducted by Singh et al. (2019) found that using smartphone applications to intervene in the treatment of chronic renal disease patients resulted in significant decreases in both systolic and diastolic blood pressure.

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telemedicine to provide healthcare services to patients during periods of lockdown. An Italian cardiology group effectively addressed heart failure symptoms with telemedicine, employing phone conversations, video conferencing, and emails to ensure patients adhered to goal-directed therapy when in-person consultations were not possible (Salzano et al., 2020). Out of the 103 patients in the research, 58% used telemedicine services. Among these patients, 51% had their treatment decisions adjusted. It is important to note that none of these patients contracted COVID-19 throughout the three-month trial period.



Figure 1: Timeline highlighting the history of telemedicine from its inception to widespread implementation during the COVID-19 pandemic (Zundel, 1997).

3. Emergency Use of Telehealth

Providing the continuous provision of emergency services for patients is vital in contemporary society. In order to ensure effective and streamlined delivery of emergency care, it is crucial to have mechanisms in place for promptly assessing and prioritizing patients upon their arrival. An effective approach is "forward triage," which entails categorizing patients prior to their arrival at the emergency room (Cervino and Oteri, 2020). Telemedicine has become a key tool in this process, allowing for initial screening of patients before they physically get to hospitals. This helps to decrease the chances of being exposed to infectious diseases like COVID-19 for both patients and healthcare workers.

Approximately 52 health systems in the USA have already adopted telemedicine triage programs, utilizing virtual care to initially assess and decide whether in-person hospital consultations are necessary (Hollander and Carr, 2020). Smaller healthcare systems with limited resources might profit from outsourcing these services, since it helps to manage expenses and make the most efficient use of resources. Telehealth companies such as Teladoc Health and American Well have played a significant role in remotely assessing patients' symptoms and delivering appropriate care, hence improving the efficiency of healthcare delivery. Jefferson Health in Pennsylvania made substantial use of telemedicine during the COVID-19 pandemic to assess patients with symptoms, therefore reducing the risk of transmission inside healthcare institutions (Hollander and Carr, 2020). Existing patients receiving outpatient care were advised to participate in virtual assessments using telemedicine to see if COVID-19 testing or other types of treatment were necessary. This allowed healthcare providers to remotely monitor non-COVID-19 cases and avoid needless exposure.

The use of telemedicine into emergency healthcare environments facilitates efficient patient categorization, improves healthcare accessibility, and reduces the hazards linked to contagious illnesses such as COVID-19. This strategy not only enhances the efficiency of patient care but also ensures the well-being of both patients and healthcare professionals.

4. Critical Care Use of Telehealth

COVID-19 positive patients in ward units or ICUs are increasingly utilizing inpatient telemedicine services. Electronic intensive care unit (e-ICU) monitoring programs allow for the remote monitoring and communication of patients. This includes two-way communication, monitoring of vital signs, and direct viewing of ventilator and dialysis devices. This strategy decreases the amount of face-to-face interaction between patients and caregivers, therefore reducing the risk of viral transmission in both directions. Tele-critical care (TCC) became more widely recognized and important with the early increase of COVID-19 patients in 2020 (Singh et al., 2020). Several healthcare organizations have implemented intensive care unit (ICU) rooms that are outfitted with video and audio capabilities. This allows physicians, nurses, and other healthcare personnel to give remote care. Efficient execution necessitates collaboration and immediate communication to

achieve the best possible feedback. Nevertheless, a significant monetary investment in technology and training is necessary to uphold care standards that are equivalent to those of in-person therapy.

5. Benefits of Telehealth

Telemedicine provides a multitude of advantages for patients and healthcare practitioners in non-emergency situations, apart from pandemics. Patients have the ability to connect with healthcare providers regardless of their geographical location or the time of day. This is especially beneficial for persons residing in remote places with limited healthcare provider availability, or for those with hectic schedules that make it difficult to attend in-person appointments. In addition, telemedicine decreases expenses related to transportation, limits time spent away from employment, and perhaps saves childcare costs. Privacy is heightened when people have the ability to seek advice from healthcare professionals without being in crowded waiting areas or vast hospital environments, therefore diminishing the likelihood of spreading contagious diseases. Telemedicine also provides advantages for healthcare providers. They have the ability to conduct training by utilizing online modules and acquaint themselves with the software employed for patient consultations. The schedule flexibility enables a more effective use of time, reducing delays resulting from patient arrivals or rescheduling. Furthermore, healthcare professionals have the ability to expand their services beyond their typical geographical boundaries or regular office hours.

The Centers for Medicare and Medicaid Services (CMS) have substantially broadened its payment rules to include reimbursement for telehealth consultations at rates that are comparable to in-person care. This shift was first motivated by the COVID-19 pandemic. It is uncertain if this policy change will continue to exist in healthcare after the pandemic as a permanent feature (Hollander and Carr, 2020).

6. Limitations

There are constraints in delivering exceptional and medically precise treatment via telemedicine. Relying only on a patient's self-report may result in incomplete full data and medical histories. A patient's spoken account of their condition may not effectively transmit all essential data as accurately as an in-person contact, which facilitates non-verbal communication. The physical examination is limited in scope without the ability to consult with a skilled doctor, and it may not be possible to conduct quick diagnostic tests or imaging. Some medical issues, such as stomach discomfort or changes in eyesight, may not always be completely diagnosable using telemedicine. Individuals with mental illnesses or cognitive impairments may encounter communication obstacles that render telemedicine less appropriate (López Reboiro et al., 2020). Ultimately, the responsibility is with the healthcare professional to use their medical judgment and knowledge to decide whether an in-person visit is required.

A recent examination of 28 smartphone applications specifically created to track chronic renal disease has brought attention to ongoing deficiencies and unfulfilled requirements (Singh et al., 2019). Healthcare practitioners, as trusted authority, bear the obligation for accountability and safety, since patients seek them out for medical counsel. Furthermore, telemedicine encounters challenges such as privacy apprehensions, data protection, restricted assimilation into healthcare systems, and harmonization with current care delivery models, including pharmacies. Telemonitoring should preferably be used in conjunction with initial consultations for chronic diseases, although later follow-ups may be more beneficial when conducted in person, if feasible. When it is not possible to have in-person visits, it is necessary to have access to precise health data monitoring, laboratory examinations, and vital sign monitoring.

Although several obstacles remain unresolved, the continued interest and investment in telemedicine are anticipated to result in the resolution of these concerns as we progress beyond 2021.

7. Conclusion

The COVID-19 pandemic has exerted significant strain on healthcare systems, delivery networks, and patient care. Nevertheless, in the midst of these difficulties, telemedicine has arisen as a revolutionary influence in the field of healthcare. It provides unparalleled potential to rapidly and safely treat both COVID-19 patients and deliver regular care. In 2020, there was a significant shift in healthcare delivery as digital technology gained widespread acceptance among the public and governments. This acceptance has facilitated the continuous progress and wider incorporation of virtual care into regular medical procedures. Telemedicine's advancement improves healthcare practitioners' capacity to give effective treatment from a distance, guaranteeing uninterrupted high-quality care for patients. This era represents not only a reaction to a crisis, but also a significant advancement in the provision of healthcare. It enables medical professionals to efficiently address the requirements of patients by utilizing virtual methods.

Funding

This work had no outside funding.

Author Contribution

All authors contributed equally to the research, writing, and editing of this manuscript.

Acknowledgments

The authors gratefully acknowledge and thank all front-line healthcare workers who have courageously risked their lives and personal health to care for so many during the COVID-19 pandemic.

A statement of conflicting interests

The authors declare that none of the work reported in this study could have been impacted by any known competing financial interests or personal relationships.

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