**TELEHEALTH TECHNOLOGY AND HEALTHCARE**

Authors

Dr. Jitu Das, Assistant Professor, Department of Community Medicine,

Lakhimpur Medical College & Hospital,

North Lakhimpur, Assam, India

Email id: jitu1977jd@gmail.com

Dr. Tridip Kutum, Assistant Professor, Department of Biochemistry,

Lakhimpur Medical College & Hospital,

North Lakhimpur, Assam, India

Dr. Chinmoyee Deori, Professor, Department of Pharmacology,

Lakhimpur Medical College & Hospital,

North Lakhimpur, Assam, India

Dr. Rumi Deori, Professor, Department of Biochemistry,

Lakhimpur Medical College & Hospital,

North Lakhimpur, Assam, India

**ABSTRACT**

Telehealth refers to the use of information and communication technology to provide health care services and medical education to the patient in distance rather than face-to face service. In telemedicine, clinical care to the patient is provided remotely using telecommunication and electronic technology. Use of information and communication technology to provide health care services have many advantages, including cost savings, convenience, provide care to patients with mobility limitations, or in remote areas who don’t have access to local physicians or clinic. The disadvantage of telehealth is that handling of emergency conditions, surgeries, lab investigations, ability to perform limited physical examination, and every type of visit is not possible remotely. Telehealth, has raised issues like conflicts between various aspects of technology usage, security breaches, inaccurate and obsolete data etc. The quality and accuracy of online information and patient’s medical information confidentiality also is of deep concern. The expansion of telehealth services is expected to grow and has potential to improve patient satisfaction by delivering high quality and value of care services

1. **INTRODUCTION:**

Telehealth is a system that uses internet and telecommunications technology to provide a wide range of healthcare services, as telemedicine, education, patient care management, and remote monitoring of vital signs. Telehealth offers patient feedback that is more immediate than a traditional appointment ([**1**](https://www.dictionary.com/browse/telehealth)). Telemedicine is the part of telehealth system that uses internet and telecommunications technology, as video calls, to provide clinical services as medical consultation, evaluation, and diagnosis, either in real time when the patient and the medical professional are in different locations or facilitated by remote monitoring and record sharing among healthcare providers. Rural patients may find that the only way for them to consult a specialist via telemedicine ([**2**](https://www.dictionary.com/browse/telemedicine)). The World Health Organization defines telemedicine as “the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technology for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities” (3). The people living in rural and hard to reach areas have to face financial as well as physical barriers for availing healthcare services in many parts of the world. It is not possible for an elderly person with multi-morbidity to visit clinics or hospitals at frequent interval for chronic diseases. There is also need of daily monitoring of parameters for non-communicable diseases. The clinician, nurse, counsellor and other health care provider are able to provide health care services from a distance by means of telehealth technology. Information and Communication Technology (ICT) are used in telehealth for providing healthcare services to the individuals living in rural and hard to reach areas with poor transportation facilities. In telemedicine, clinical care is provided remotely using teleconsultation, telediagnosis etc. Whereas in telehealth, services are provided beyond telemedicine like preventive health care services, health and medical education for general public and professionals respectively. The electronic health (eHealth) is the term used for healthcare services which are provided electronically via the internet (4). Mobile health (mHealth) is a form of electronic health and mobile devices are used for healthcare services. Digital health and care refers to tools and services that use ICT technology to improve prevention, diagnosis, treatment, monitoring and management of health related issues and also to monitor life-style habits. (5).

In 1876, Alexander Graham Bell, inventor of telephone used telephone to call his assistant for medical attention for management chemical burn which is considered to be the earliest telehealth encounter (6). Modern telemedicine began in the early 1900s in the Netherlands with the transmission of heart rhythms over the telephone which was followed by transmissions to radio consultation centers in Europe in the 1920s. In the 1940s, radiographic images were transmitted by telephone between cities in Pennsylvania (7-8) and subsequently formal recognition of telemedicine was started. In late 1950s and early 1960s first telemedicine was used to transmit video, images and complex medical data (9). In 1975, telecardiology system was established in Guwalior, India (10). Radiology fully adopted telemedicine in the 1980s. The Picture Archiving and Communication System (PACS) allowed instant access to radiological images at different location of the Hospitals. Now a days teleradiology is used to access report from anywhere across the globe. Tele-thethoscope, tele-ECG and tele-pathology are special tools used in telehealth. The term Telehealth was used over 40 years ago for delivery of health services. In telehealth there is use of technology such as radio, telephones, television, mobile devices and internet to provide healthcare services. The technology used in telehealth and innovative practices have changed dramatically with time. Teleconsultation is not as popular as the traditional face-to-face consultation in many parts of the world (11).

Telehealth is the term for various clinical and non-clinical services provided from a distance. Telemedicine is a subset of telehealth. In telemedicine clinical services are delivered by the clinicians to the patients with the use of telehealth technology and software (12). The adoption of telehealth was very slow prior to the COVID-19 pandemic. But the COVID-19 pandemic had surged the use of telehealth for treatment and care of COVID positive cases, prevention of COVID-19 and training of service providers for the management of cases. Telehealth bridged the gap between people and healthcare settings during pandemic. People were able to communicate with health service providers through virtual channels while staying at home and overcome the physical and financial barriers (13-14).

At present there are four types of telehealth - live video-conferencing (synchronous), asynchronous meetings, remote patient monitoring, and mobile health monitoring (15). Telehealth enhances the access to health care services and facilitate patient-centered care. Telerehabilitation, telecare, teleconsultation, telemedicine and remote nonclinical services are provided in telehealth (16). Telehealth includes the history taking, modified physical examination, diagnostic testing, assessment, and management for patient care from a distance using telecommunication technology. Telehealth technology is also used for training and skill development of students, professionals, administrators and managers of healthcare delivery system (17-20). Medical care and active decision-making may be provided through real time interaction between the physician and patient or asynchronously using telehealth technology (21).

The significant changes in health care delivery are due the evolution of electronic communication. Even for basic care and monitoring of an elderly person with multiple chronic diseases adequate medical knowledge is required (22). Primary care physicians have to provide medical care to a large number of patients (23). Modern communication technology are used for telehealth services. The use of ICT technology for an advance clinical care from a distance has the potential to transform patient-centered care from a distance (24). Physicians are able to communicate with their patients through a multiple means of communication, including text, e-mail, and mobile-devices etc. Telemedicine can integrate remote monitoring, automated interactions and reminders for better patient care from a distance (25). The technology facilitates communications between members of the treatment care team for better treatment outcome. There are serious concerns about the impact health care with the adoption of telemedicine. The patient-doctor relationship and patient privacy may be affected with the use of telehealth (26).

1. **TELEHEALTH AND TELEMEDICINE**

TELEHEALTH

Telehealth is a healthiness services and information with the help of broadcasting and computerized technology. It refers to long distance patient and physician contact, care, advice, monitoring and remote admission. Telehealth is a extended range of work, like- patient consultations through electronic media, remote control, e-health nursing care, and distant physical and psychological recovery . It permit us superior health care option , increases emergency response , the time schedule for making diagnosis, and saves costs effective for both physician and patients by promoting clinical procedures and reducing travel cost to hospitals (27-28).

Telehealth has become increased achievable to outstanding healthcare provision. More customized to health care services will get by the patients. Patients can also adjoin the better medical facilities by utilizing software video requisition , physician consultations can be taken by video conference , and physician have superior -suited gadget for collaborating , digital data storage, outline management, and using on each other’s certain expertness. Telehealth ameliorate the quality of therapeutic application, permitting physician to consume minimum time on countryside allocation and giving better care to long- suffering. Telehealth also allow personal healthcare expert to practice and will amplify their patient involvement , Sufferer will no longer have to stand in long procession , and medical practitioner will be able to access patient details more competently and accessibly with computerized files and do away with overall stand by hours. Moreover, distant meeting permit physician to assign les time for everyone, permitting them to give treat a more notable number of patients (28-30).

1. **TELECARE**

We use the definition of telecare used by Barlow et al., ‘the use of communications technology to provide health and social care directly to the user (patient). This excludes the exchange of information solely between professionals, generally for diagnosis or referral’. Telecare is therefore a tool used by professionals to deliver support to individuals and should be employed to provide a user-centred service that complements – rather than replaces – existing models of care.

1. **TELEHEALTH**

Telehealth equipment is used as a tool in the management of long-term conditions in the community to proactively monitor patients and respond promptly to indicators of acute exacerbations. ‘Vital signs’ monitoring is believed to reduce hospital admissions and uses equipment in patients’ homes to identify trends and alert when preset parameters are breached.

Users are trained to operate a machine which measures physiological indices such as blood pressure, oxygen saturations, pulse rate and rhythm etc.

1. **TELEMEDICINE: HEALING AT A DISTANCE**

The WHO definition of telemedicine or e-health is ‘the practice of medical care using interactive audiovisual and data communications. This includes the delivery of medical care, diagnosis, consultation and treatment, as well as health education and the transfer of medical data’. The first recorded use of telemedicine was by Wilhelm Einthoven, inventor of the ECG. He experimented with transmitting early ECG recordings by telephone in 1906. Since then, telemedicine has become routine (31).

1. **ADVANTAGES OF TELEHEALTH**

Using technology to deliver health care service has several advantages, including cost effective, comfort and convenience, and also ability to provide care to people with mobility limitations, or those in rural areas who don’t have access to a local physician or clinic. For these reasons, the use of telehealth has grown significantly over the last decade. The telemedicine can help to increase efficiency in the delivery of care by reducing waiting times and appointments. Telehealth has become even more essential during the coronavirus (COVID-19) pandemic. Fears of spreading and catching the virus during in-person medical visits have led to a greater interest in, and use of, technology to provide and receive health care.

1. **DISADVANTAGES TO TELEHEALTH**

Telehealth offers a convenient and cost-effective way to see your doctor without having to leave your home, but it does have a few downsides.

* It isn’t possible to do every type of visit remotely. You still have to go into the office for things like imaging test and blood work, as well as for diagnoses that require a more hands-on approach.
* The security of personal health data transmitted electronically is a concern.
* While insurance companies are increasingly covering the cost of telehealth visits during the COVID-19 pandemic, some services may not be fully covered, leading to out-of-pocket costs.
* Limited evidence. There is limited evidence to support the efficiency of telemedicine (32).

1. **NEED OF TELEHEALTH IN TODAY’S WORLD**

Hard to reach and remote areas exist in almost every country. In addition to this poor transport network and poor health care infrastructure and inadequate number of trained health care service providers are challenges for health care delivery to individuals in many parts of the world. Individuals with poor socioeconomic background are unable to bear the cost of transportation to the health facilities. Challenges in health care are due to variations in environment, economic capability, infrastructures, human resources etc. The burdens of chronic non communicable diseases are increasing day by day with improved life span. The travel to a health facility is difficult for a patient with immobility due to various medical conditions and there is lack of trained health care providers in the nearby health facility in many areas of a country. Astronauts, ship passengers, air passengers etc. often need telehealth services. Frequent visits are required for many chronic diseases which not possible for the patients. Based on report or parameters of these patients treatment can be modified using telehealth technology. In case of infectious diseases there is risk transmission of diseases to the treating physicians, nurses and other service providers in the Hospital. There is also risk of transmission to the other patients attending health facility. Telehealth can provide faster, efficient and cheaper health care to the patients. The service providers including professionals and students can have instant access to knowledge and skills for better management of cases using telehealth technology.

Telemedicine plays a vital role in improving access to treatment in geographic areas with poor healthcare infrastructure and inadequate trained manpower. Individuals are more comfortable with electronic communication and with raising dependence on investigation for diagnosis and moreover not touching a patient for diagnosis is considered as normal by most of the individuals (33).

Telehealth technology is used by the physicians to provide healthcare services to individuals. Telehealth technology has several advantages for both patients and healthcare providers (25, 34-36). The students, professionals, healthcare managers, patients and caretaker can avail the benefits of telehealth for knowledge and skill development for better healthcare services to the individual, family and community. Telehealth has the potential to address accessibility, accountability, cost and quality, exchange of information and utilization of services for the health and well being of the individuals, family and society (37). The American Medical Association (AMA) has suggested that Telemedicine should still be used as a supplement to live visits (38).

1. **TELEHEALTH TOOLS AND TECHNOLOGY**

The main goal of telehealth are to develop high definition telehealth tools and technology to enhance easy access to healthcare delivery by using telecommunication technology to remote areas, to provide medical speciality services while decreasing healthcare costs, provide training of healthcare workers, clinicians, and students in healthcare. These tools and technology are required to collaborate among telehealth stakeholder that includes patients, patient communities, researchers funding offices, researchers, healthcare service providers, professional societies, industry, healthcare management/economists, and healthcare policy makers. In the development, marketing, adoption, and implementation of these tools and technology, communication, training, cultural sensitivity, and end-user customization are important consideration that has to be taken to account.

A list of the most beneficial tools for clinicians at any health care facility or organization is listed below.

1. **Online patient portals**
2. **Patient Relationship Management platforms**
3. **Webcams**
4. **Microphone**
5. **Internet connection**

**A. Online patient portals**

Online patient portals enable patients to access their secure personal health history and reach out to providers 24 X 7. These portals eases patients for search for a doctor’s multiple locations during office hours, or wait for a return call about a basic care plan question. These healthcare tools allow patients to:

* specialist referral requests
* Schedule appointments (if not an emergency)
* Refill prescriptions
* Access to test results
* Go through their telehealth visit summaries
* Take reference to their medical history
* Learn the Do’s and Don’ts from patient education libraries
* Helps to understand their insurance or Medicare benefits
* Can update insurance or contact information
* Pay bills of their healthcare providers online

Last and not the least, a critical service for busy or forgetful patient populations is when it’s time for a follow-up appointment, vaccination, or prescription refill, these portals can also send automated reminders via text or email.

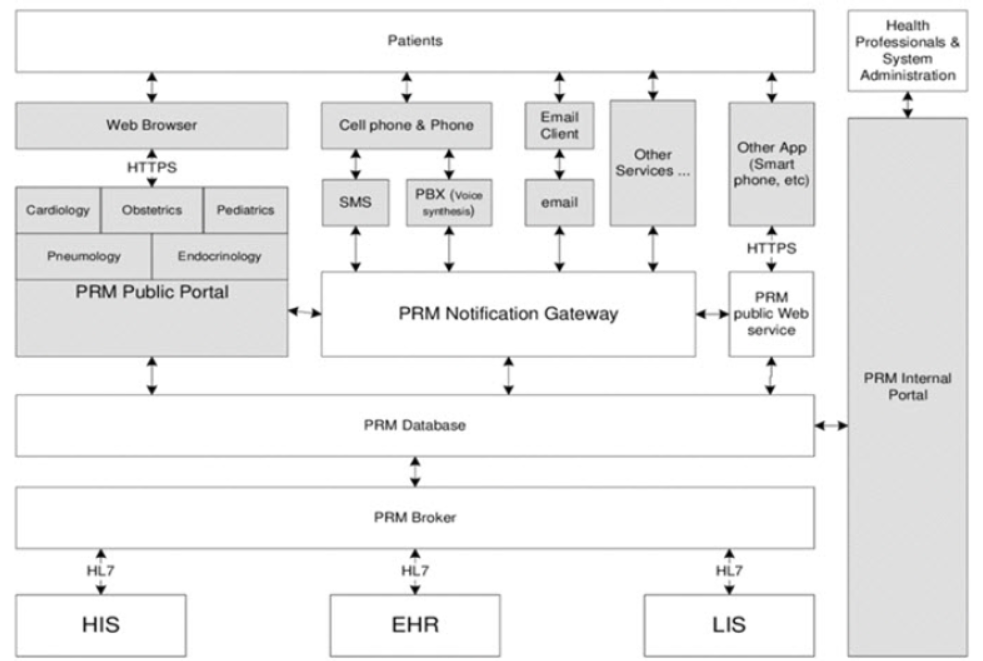
**B. Patient Relationship Management platforms**

Patient Relationship Management for healthcare is a system design intended to increase patient satisfaction and reduce healthcare costs. A Convenient, effective telehealth tools for clinicians are so important to patients that they might switch providers in order to get it. Therefore, if a clinician want to maintain current patients and attract new ones, he must improve healthcare delivery and consider implementing a Patient Relationship Management platform. Managing team’s workflow and enhancing reporting systems should not require juggling spreadsheets—which can cause clinicians to misplace patient data, miscommunicate instructions, or miss clues that a patient is becoming disengaged, CRMs (customer relationship management), and EHRs (electronic health record) on the other hand has proved to be helpful and easy.

Patient Relationship Management platforms allow healthcare provider bind their healthcare tools together, including telehealth technology tools, to allow the organization to scale without having to figure out how to restore fragmented records. They provide a total view of a patient’s health history at one fingertip away for all stakeholders. When health care workers including primary care physicians, specialists, physical therapists, and mental health practitioners are all on the same page and regularly checking in with each other, quality of care improves and patient relationships thrive (39).



Fig: 1. Customer Relationship Management Solutions for Patient Care (Source: Enterprise IT Solutions - Qatar HQ)



Laboratory information system

Electronic health records

Hospital information system

Fig:.2. Patient relationship management (PRM) system architecture (40)

The above chart shows different modalities of web portals accessed by patients via web browsers- computer, mobiles, smartphones etc. where patients can access to specialist and super specialist via internal PRM where data base of specialist and administration are already present and they can book an appointment with the specialist of their choice and then treatment and further management can be provided by physicians through video conferencing. These information of patient, their appointment with specialist and treatment modalities are processed at PRM portal. Than PRM database are made and stored at Hospital information system, electronic health records and laboratory information system via a PRM broker.

**C. Webcams**

Physicians are expected to deliver a professional online experience as close to a live office visit as possible, with telehealth becoming the norm for many patient populations, who cannot make out time during office hours and wait for long queue. We have to make sure the healthcare platform webcams should offer high-definition video with a simple setup. If possible webcams should be able to plug it into any available USB port on a laptop, desktop, or mobile phone with Windows, Mac OS, Chrome, or Android operating system. For more comfortable interactions, ideally the camera should be mounted to a tripod. It should be designed to work with social media platforms like whatsapp, telegram, Skype, Google Hangouts, and Face Time for Mac—whatever platform the patient finds comfortable. Before installation of a webcam a good deal of research needs to be done to ensure that it provides premium technical performance, user-friendly design, and operational ease in any collaborative environment. Video conference infact is the most common means of telehealth services. Nowadays webcams with microphone, Smartphones with high end camera are also available, laptops with webcams are also available making it easy for telehealth services to execute and reach common people.

**D. Microphone**

The next-generation conferencing platforms, network-based cameras, and quality microphones are all highly valuable tools for clinicians. They make it possible to install collaborative systems in hospital rooms and doctor’s offices to facilitate more efficient telehealth visits. Microphones can be installed permanently either in a room or on roll-in carts. We are to make sure these microphones should have a long pick up range—approximately 30 feet—which enables voice capture of patients as well as all clinicians in the room. One can also invest in systems that extract voice input from ambient noise via telephones, speech recognition systems, or hearing aids. Surround sound produces a crisp, intimate listening experience. Other technology automatically steer a “listening beam” to the active talker, reducing background noise.

**E. Internet connection**

The most critical aspect of any successful telehealth needs a secure broadband internet, 4G, 5G or fibre optic connection. The speed of the internet connection will determine the video quality and the speed of data transfer. A basic business broadband connection—at about 50-100 megabits per second should be sufficient but higher the speed better will be the clarity of audio visual conferencing. Telehealth are the means toward individualized medicine, leading the telemedicine model to include cell phones and Internet-based telecommunications tools for remote as well as health management with video assessment, remote bedside monitoring, and patient-specific care tools with event logs, patient electronic profile, and physician note-writing capability. Telehealth is in short a series of systems and programs clubbed together to execute patient care which is cost effective and patient friendly. The right tools ensure that both providers and patients are getting the most out of a fully realized telehealth implementation (41).

1. **ROLE OF TELEHEALTH IN HEALTHCARE**

Access to healthcare providers is difficult in rural areas as compared to that in urban city. Moreover rural population is economically weaker to go faraway places and seek better treatment which sometimes leads to loss of property to meet the travelling cost itself. Poverty can priortize economy than health, so it becomes important to work than consultations at a healthcare facility and they may never be able to get treatment for their injury or illness. Lack of health insurance may restrict a patient to visit a healthcare provider altogether—incredibly high medical bills could put them in debt. So telehealth may be the only solution until the health infrastructure reaches their doorstep and keep them away from quacks. [Telehealth](https://welkinhealth.com/product/telehealth/) can bridge the remote healthcare services with medical information and healthcare education through telecommunications and audio visual systems.

If a health care provider has to come to a remote place he will have to bear travelling cost, staying cost and the visiting cost also likewise increases. On the other hand video conferencing is economical than in-person visits. Thus telehealth provides economical solution to patient care while addressing the social determinants of health.

#### Healthcare provider benefits

While every healthcare provider’s primary goal is to deliver high-quality care, there are a lot of administrative tasks that siphon some of their focus and energy. Telehealth technology enables care teams to increase workflow efficiency so that they can focus on improving their patients’ health.

* **Higher efficiency:** Telehealth technology drastically improves workflow and streamlines efficiency across care teams. Telecommunications systems that feature automated messaging, comprehensive patient databases, and virtual consultations allow providers to spend time productively and reach more patients.
* **Lower costs:**  telehealth systems are inexpensive to implement and virtual visits are vastly cheaper than traditional office visits.
* **Easier scalability:** As the practice grows, one should be able to grow with it without sacrificing quality of care. Using telehealth technology allows a clinician to automate clinical services—appointment reminders, office visit follow-up calls, billing, and prescription ordering—as you expand your healthcare services and take on more patients.
* **Higher revenue:** Implementing telehealth technology will increase your practice’s profits. Healthcare systems that implement this solution reduce overhead costs, decrease appointment times, and improve workflows to save valuable time and funds.

Telemedicine offers a massive opportunity to drastically improve the way care teams provide patient-centered healthcare. Regardless of a patient’s condition or circumstance, there is bound to be a digital healthcare tool out there that can help them better manage their symptoms.

#### Telehealth technology for addiction

The management of treatment for substance misuse takes frequent check-ins and communication through a variety of channels. Telehealth technology offer people struggling with addiction more accessibility to their coach or therapist.Increasing access to your care team through a customized telecommunications system—including video conferencing, as well as smartphone texts, chats, and emails—helps you better support patients who are recovering from addiction and, subsequently, increases positive outcomes. Ongoing management can lead to improved health and happiness, enabling these individuals to regain control over their lives.

#### Telehealth technology for behavioral health

Telehealth addresses the issue of maldistribution among behavioural health providers in the U.S. Around 43.8 million American adults experience a type of mental illness in any given year—and yet; nearly 60% don’t receive proper mental health services. Many factors can hinder an individual’s ability to receive behavioral health services—including location, lack of anonymity, or simply the stigma that sometimes accompanies mental healthcare.Delivering healthcare services via telehealth technology—such as with video conferencing and patient portals—helps patients get the care they need, when they need it.

#### Telehealth technology for diabetes

Care teams coaching people through diabetes can help them lead healthy, normal lives—but they need to educate these patients on how to self-manage their chronic disease most effectively. Telehealth allows healthcare providers to meet with patients who might not be able to come into the health system facility as frequently as they need. This can be incredibly helpful for diabetes patients living in rural areas who must commute into larger cities in order to meet with specialists—like endocrinologists and nutritionists. Real-time telemedicine appointments via video conferencing or Smartphone can save patients time and relieve them of the stress that comes with commuting long distances for a single office visit.

Telehealth technology allow clinicians to take virtual care a step further by well-monitoring their patient’s glucose levels. Wearable devices—for instance, insulin pumps and continuous glucose monitors—apply digital technology to help patients with diabetes easily track and adjust their blood glucose levels. This can empower them to absorb the medical information they need to effectively self-manage their chronic illness and live healthier lives.

#### Telehealth technology for home health

Remote patient monitoring and virtual visits allow care teams to connect with their patients [at home](https://welkinhealth.com/solutions/home-health/) and continue care online. Managing an injury or illness can take a lot of check-ins and patient-provider communication. Telehealth technology allow healthcare providers to check in with patients between visits.Implementing healthcare processes that utilize these services can even reduce the rate of hospital readmissions and emergency department visits. A 2016 study revealed that remote patient monitoring of vital signs using wireless peripherals reduced patient readmission rates by 5.2% over 30 days,   and by 14% over three years.While technology is by no means a replacement for home health, it does complement at-home care by making it more convenient to detect problems as they arise and help your patients when they are in need.

#### Telehealth technology for hospice

When it comes to hospice care, telehealth can be utilized for patients receiving care at home. Remote patient monitoring (RPM) allows healthcare providers to track patients’ biometrics from afar.RPM will not only increase timely response and intervention as a patient’s condition changes, but also eliminate the burden of travel to an office visit, urgent care clinic, or emergency department for patients and their families. This virtual connection and remote patient monitoring bring peace of mind for the patient, the family, and the healthcare providers.

#### Telehealth technology for hypertension

Remote patient monitoring helps hypertension patients improve their blood pressure numbers by learning better control. When used regularly, home blood pressure telemonitoring (HBPT) may result in a significant BP reduction, improving the person’s quality of life and independence.HBPT is a great tool for patients who have a large network of healthcare providers—including doctors, nurses, pharmacists, nutritionists, and acupuncturists—that are collaborating to help manage comorbidities and hypertension. When executed well, this approach even has the potential to result in the prevention of cardiovascular disease.

#### Telehealth technology for musculoskeletal disorders

Recent studies have shown that real-time tele-rehabilitation services for musculoskeletal disorders are “effective and comparable” to standard practice. Video conferencing consultations can be used to replace or supplement in-person care as a means to reduce the cost and time associated with office visits. This can prevent patients from having to leave work in order to attend appointments and from traveling more than is comfortable—or possible.

#### Telehealth technology for value-based care

Telehealth solutions empower care teams to deliver value-based care. Virtual visits, Smartphone consultations, and other real-time telemedicine make it convenient for patients to receive quality care—without leaving their home or workplace. Whether a team treats patients with chronic illnesses that make going out difficult, or patients who live in rural areas and have lengthy commutes to the nearest healthcare system office, telehealth makes your services more accessible. Similarly, software programs that include telehealth technology like RPM(remote patient monitoring) ensure that crucial patient-generated medical information and lab results are available to every healthcare provider that treats a patient. Teams can streamline care between clinicians and across practices to make sure each patient is receiving whole-person care.

Increasing healthcare costs and a need for efficient treatment are motivating more hospitals to investigate the benefits of telemedicine. They want improved contact between physicians and far-off patients and better usage of healthcare facilities. Here telemedicine also promotes better connectivity, which has resulted in fewer hospital re-admissions and patients entirely adhering to their prescription care plans. Telemedicine’s increased contact advantage extends to doctor-to-doctor communication as well. Physician may use telemedicine to build support networks to interchange their skills and provide better healthcare services. Telemedicine is a way of delivering medical treatment through video chat. Telemedicine has several advantages for both patients and healthcare providers. Though there are still technical hurdles and critics, telemedicine can supplement and enhance the overall patient experience (30, 34-36).

1. **LIMITATIONS OF TELEHEALTH**

Overall, end-user adoption is challenged by the need for the integration of new technology in clinical practice workflow and daily activities. Adoption requires cultural and behavioural changes for use and reliance on telehealth technology. The lack of standard metrics for quality of service assessment obstruct the evaluation and mysterious the progress of technology adoption and utility. (42-43). The usability and ease-of-access to technology are obstructed by the lack of technology integration, connectivity, and standardization. For example, though telecommunication vendors and vendor resources could provide low-cost solutions as data are transmitted through their omnipresent networks, they might also limit expansion of applications and affordability for cell phone text and data transmission for economic reasons (44). From the providers’ perspective, there is limited time available to respond to the multitude of telecommunications from patients and to enter data into HER/EMR systems. A pervasive barrier for these end-users to secure new tools and technology is the limited financing available for implementation, maintenance, and sustainability (41, 43-46).

When compared to conventional treatment approaches, telemedicine has lots of feasible drawbacks to using telemedicine. It is no substitute for the conventional healthcare system; it complements the healthcare system for minimal functions. There is a serious issue of hacking patient’s medical data, especially if the patient connects to telemedicine from a public network or an unencrypted channel. In this technology can cause the medication to be delayed when a person requires emergency care, mainly because a doctor cannot deliver life-saving care or laboratory tests remotely. State rules differ, and physicians will be unable to practise medicine across state boundaries based on the state in which they are licensed and the state in which the patient resides. Clinicians must also ensure that the telemedicine service they use is safe and severe and compliant with privacy laws.

During telemedicine sessions, providers must focus on patient self-reports and necessitate physicians asking further questions to get a complete patient history. If a patient fails to report an important symptom that should have been detected during in-person care, medication could be jeopardised. One of the most significant drawbacks is being lack of availability and affordability. It can be costly for the supplier to set up and manage. Telemedicine can be prohibitively expensive for smaller healthcare facilities though a valuable and worthwhile facilities. Poor communication will also make it impossible to provide reliable care (30).

1. **ETHICAL IISUES IN TELEHEALTH**

In telehealth, the information of the patient is available on various devices and computers, which increases the potential for security breaches. Patient is unaware of who will be responding and sharing their personal medical information’s. There is involvement of various disciplines and problem may involve from these various disciplines – like Bioengineers, computer experts, software technicians, web programmers, insurance providers, physicians and nurses. The patients should be informed of the limitations and functionality of telemedicine services. Provision of obtaining informed consent should be available from the patient and there should be option to avail or refuse telemedicine visits opportunity by the patients, to ensure that the patients are not forced into unwanted modes of healthcare delivery (47, 48).

Telehealth, has raised issues like conflicts between various aspects of technology usage, security breaches, inaccurate and obsolete data, information overload; usability and user-friendliness; data standards and integration for linking patient and personal information to achieve interoperability for individual records, personal health management, and public health. The quality and accuracy of online information also is of deep concern. Patient autonomy should also be respected regardless of the mode of delivery (49- 51).

1. **LOOKING FORWARD**

Telehealth saw a surged in its use during COVID-19 pandemic. Although there are limitations and drawbacks of telehealth, the proper development and implementation of telemedicine with various updated technical telehealth app and Smartphone will be helpful for the patients in respect to cost effective for selective conditions like follow up and non-emergency conditions, schedule appointments, access to medical records, physician directories, etc. Newer technology should ensure patients confidentiality.

In future, patient can schedule an appointment with the physician of their choice, upload medical history, verification documents, investigations reports and past prescriptions. The patient interfaces functioning properly allow the doctor to overview the Patient’s physical & personal records and outline an urgent care plan. Local healthcare resources can be mobilized for emergent and non-emergent services. This will allow the physicians to handle low level, non-emergent conditions to handle remotely and concentrate more on high-demand and complicated cases in person (30). Telehealth bridges the gap between a patient and provider, creating a new avenue to experience better. The future of telemedicine will depend on human factors, economics and technology (52).

1. **CONCLUSION:**

The telemedicine and telehealth services have taken a surge in its use, during COVID-19 pandemic. Telemedicine is a valuable technology, where a patient from a remote area can take the benefit of medical care by the physician, in absence of a local doctor or clinics. Although it has limitations, like emergencies, surgeries and lab investigations, inability to do direct physical examinations, but telemedicine is beneficial to both patients and physicians in respect to economy, health care services, convenience with the use of telehealth technology tools (information technology, online patient portals, videoconferencing, Smartphone apps, etc). Local healthcare resources can be mobilized from emergent and non-emergent services. This will allow the physicians to handle low level, non-emergent conditions be telemedicine remotely and can concentrate more on high-level and complicated cases physically in person. Newer and updated telehealth tools and technology that utilize the internet and its robust computational resources have great promise in improving healthcare services for medically underserved populations, in relation to economics, and delivering medical services and education and training.

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