Tele-Health Triumph: A Public Health Perspective

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Abstract:

A new telemedicine healthcare model has emerged as a result of the traditional healthcare model's evolution, the ongoing advancement of current network information technology, and people's desire for healthcare. The term "Telemedicine" describes the extensive use of information technology for long-distance communication and the exchange of medical data between several locations. Specialty care, patient consultations, remote patient monitoring, and medical education are all improved by telemedicine, which keeps patients in their homes. Telemedicine is paving the way for a new world of innovative approaches to medicine. The rapid adoption of real-time communications technology by treatment providers has enabled new Telemedicine applications. Telehealth services include treatment services, giving medical advice, follow-up medical services, and transmitting medical information. There are numerous uses for telemedicine in patient care, public health, education, research, and administration. Telehealth, also referred to as telemedicine or e-medicine, is the remote delivery of healthcare services over the telecommunications infrastructure. Telehealth allows healthcare providers to evaluate, diagnose, inform and treat patients without an in-person visit. This paper gives a brief overview of telemedicine's history, discusses a few instances of its use, telemedicine in public health, challenges, future of telemedicine in health care.

Keywords: Telemedicine or e-medicine, Telemedicine in Public Health, Future of Telemedicine

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TELEMEDICINE

"Tele" is a Greek word meaning "distance", and "mederi" is a Latin word meaning "to heal". It is often used as the umbrella term to encompass healthcare delivery in addition to other activities such as education, research, health surveillance, and public health promotion.[1]

The World Health Organization (WHO) has defined telemedicine as "the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information, for the 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. [2]

The evolution of telemedicine has been driven by technological advancements, initially serving the purpose of delivering medical services to individuals residing in rural areas. Over time, it has expanded to encompass diverse applications, including the provision of healthcare to soldiers in battlefield scenarios and the establishment of programs in urban medical centers, addressing the healthcare needs of underserved populations. Telemedicine initiatives offer a platform for off-site physicians to remotely connect with patients in distant and rural locations. The primary premise of telemedicine programs in remote areas is to grant patients access to specialized services and a level of healthcare quality that might otherwise be inaccessible. [3]

WHEN DID TELEMEDICINE START?

Healthcare has always been in high demand, from house calls to on-demand urgent care centers. Nobody plans ahead for strep throat or a twisted ankle, after all. Patients in the present day need round-the-clock access to their doctors, and doctors can now profit from providing remote care through telemedicine. Creating an online connection between patients and doctors may encourage patients to take a more active role in monitoring and recording their medical care, which could lead to better health outcomes. The diagnosis and treatment of illness constitute health care. The process of diagnosing a disease consists of two main steps: gathering patient history and current medical records, then analyzing the data to determine the illness's underlying cause. [4]

HISTORY OF TELEMEDICINE IN INDIA

Unlike the Western countries, telemedicine was introduced into the Indian healthcare system at a later stage. State government health departments and the Indian Space Research Organization (ISRO) have already initiated a telemedicine program in approximately 400 hospitals, more than 50 specialty hospitals, over 300 Community Health Centers (CHCs), district hospitals, and remote medical colleges. ISRO has enabled communication through satellite bandwidth in collaboration with the Department of Space (DOS). [5]

Several telemedicine initiatives in India have gained significant success, and a few noteworthy examples include:

(1) The initiation of mammography services by Sri Ganga Ram Hospital in Delhi,

(2) The implementation of tele-oncology services at the Regional Cancer Centre in Trivandrum,

(3) The provision of surgical services at the Sanjay Gandhi Postgraduate Institute of Medical Sciences in Lucknow.[6]

ELEMENTS FOR TELEMEDICINE IN INDIA [7]

Context:

In light of the circumstances, telemedicine should be suitable and sufficient.

RMP and patient identification:

For the purpose of openness, everyone should be aware of each other's names, email addresses, and addresses.

Mode of Communication:

Consider the context while evaluating the benefits and drawbacks of text, video, audio, etc.

Consent:

 If a mentally competent adult starts consultation, consent may be "implied." When a caregiver, RMP, or health professional initiates the consultation, it may be considered "Explicit." Patients can communicate their purpose to the RMP via text, email, or audio/video message for explicit content. This needs to be noted in the RMP's patient records.

Kind of advice:

1. *First consultation:* When a patient sees the RMP for the first time about their current medical condition, or if they have previously seen the RMP for the same problem more than six months ago, or if they have previously seen the RMP for a different medical issue
2. *Follow-up consultation:* When a patient sees the same RMP for the same health issue six months after their last in-person visit. Nevertheless, it won't be considered follow-up if there are new symptoms that fall outside the scope of the same medical condition or if the RMP is unable to recollect the details of the prior advise and treatment.

Patient assessment:

Before rendering any professional decisions, RMPs must take the necessary steps to gather all medical facts regarding the patient's condition.

Handling patients:

The RMP may exercise professional judgment in prescribing medication through a duly signed electronic prescription and in providing health education and counseling if the ailment may be managed through telemedicine.

eHealth Success Stories:

The Department of Defense (DOD) and the Veterans Health Administration (VHA) under the Department of Veterans Affairs leverage telemedicine technologies to enable physicians and healthcare providers to deliver medical care, assistance, and education to traumatic brain injury (TBI) patients, both in active combat zones and within the United States. The prevalence of TBI in the military is notably high, predominantly stemming from injuries sustained during Operation Enduring Freedom and Operation Iraqi Freedom in Iraq and Afghanistan. Extensive efforts have been undertaken by the military and the VA to expedite the diagnosis and treatment of TBI in soldiers and veterans, aiming to prevent further decline in reaction time, memory, and mood. The Defense and Veterans Brain Injury Center (DVBIC) researchers have devised and implemented a remote cognitive assessment system for emergency care, addressing the urgent need for prompt diagnosis and treatment of TBI. The use of telemedicine technologies is indispensable in facilitating offsite physicians to efficiently contribute to the care of TBI patients.[8]

Chronic obstructive pulmonary disease (COPD) is a debilitating condition, often leading to emergency medical care, such as visits to the emergency room, during exacerbations. Approximately 64 million people worldwide are estimated to be affected by COPD. In a 2008 Danish study involving 57 COPD patients participating in the Home Telehealth, Chronic Patients, and the Integrated Healthcare System (TELEKAT project) for a four-month period, patients utilized a wireless telehealth monitoring device to transmit vital health metrics, including blood pressure, heart rate, weight, oxygen saturation, and lung function, to either a web-based portal or their electronic medical record. The study revealed that telemonitoring participants experienced a significant reduction in the use of antibiotics and steroids, a decrease in the number of clinical consultations, and a noteworthy increase in the proportion of patients with controlled blood pressure. In Northern Ontario, Canada, a study investigated the impact of a telehealth chronic disease self-management program (CDSMP) on the overall health, self-efficacy, and healthy behaviors of patients with chronic diseases. The aim was to enhance accessibility for individuals residing in rural and remote communities. Over the course of one year, from 2007 to 2008, 230 patients with conditions such as lung disease, heart disease, stroke, and arthritis took part in the study. The weekly telehealth sessions were centered around fostering self-management skills. When comparing baseline and four-month follow-up surveys, there were statistically significant improvements observed in various aspects, including self-efficacy, cognitive symptom management, communication with physicians, role function, psychological well-being, energy levels, health distress, and self-rated health. [9]

Telemedicine isn't limited to serving patients in remote rural areas; it also provides substantial benefits to patients in urban centers. Urban hospitals like Mercy Health System in Wisconsin and AtlantiCare in New Jersey have implemented comprehensive telemedicine programs offering a range of services. For instance, Mercy Health System initiated a home health project that enables remote treatment of patients with various chronic conditions in their residences. Leveraging telemedicine technology akin to other programs, Mercy Health employs diverse remote monitoring

services, including arrhythmia monitoring with electrocardiograms (ECG), PT/INR patient self-testing for those anticoagulated on warfarin, and health assessment surveys to address nearly any chronic disease. The program utilizes devices for collecting measurements like weight, blood oxygen saturation (SpO2), blood pressure, heart rate, blood glucose, hemoglobin A1c, lung function using peak flow, body temperature, and body fluid status (Zo). These devices securely transmit data through landlines or cellular networks. As a result, Mercy Health's home health program effectively manages various chronic diseases such as congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), hypertension, and diabetes. [10]

ADVANTAGES OF TELEMEDICINE [11]

1. *Addressing Resource Deficiency:* Telemedicine proves invaluable in countries like India, particularly rural areas, where healthcare resources are limited. It becomes a crucial asset for populations with poor access to specialized medical care.
2. *Mitigating Urban Concentration:* The disproportionate distribution of healthcare professionals in urban areas compounds the accessibility challenge. Telemedicine serves as a remedy by offering convenient options for individuals in remote locations who lack easy access to specialized hospitals.
3. *Enhancing Access to Super Specialty Care:* Especially beneficial for areas without nearby super specialty hospitals, telemedicine provides a lifeline by offering convenient healthcare options to residents who would otherwise struggle to access such services.
4. *Contributing to Universal Health Coverage (UHC):* Telemedicine plays a pivotal role in the journey towards achieving Universal Health Coverage, making healthcare services more inclusive and accessible to a broader population.
5. *Eliminating In-Person Visits:* A key advantage of telemedicine is its ability to replace the need for physical visits to healthcare facilities. This not only reduces the risk of exposure and cross-infection but also offers a more efficient and convenient healthcare delivery method.
6. *Reducing Travel-Related Burdens:* By eliminating the necessity for in-person visits, telemedicine significantly cuts down on travel time, expenses, and the fatigue associated with long journeys. This not only saves resources but also enhances the overall patient experience.

BARRIERS TO TELEMEDICINE [11]

1. *Infrastructure Deficiency as a Primary Barrier:* The absence of suitable infrastructure stands out as the primary challenge impeding the widespread acceptance of telemedicine in India.
2. Rural Areas' Digitalization Gap: Despite strides in telecommunication, rural areas, comprising a significant portion of the country, still lack digital services.
3. *Internet Penetration Challenges:* India's internet penetration rate remains low, with 53% of the population offline as of early 2022.
4. *Broadband Infrastructure Deficiency:* Absence of broadband infrastructure poses a major obstacle to the implementation of high-demand video and store-and-forward telemedicine services.
5. *Limitations in Diagnosis and Treatment:* Diagnosis and treatment decisions may be limited without a hands-on approach in certain cases.
6. *Challenges of Remote Consultations:* Remote consultations face challenges due to the absence of direct interaction between healthcare providers and patients.
7. *Training Healthcare Personnel:* The broader application of telemedicine in India faces challenges in training healthcare professionals effectively in digital communication and 'web-side' skills.

APPLICATION OF TELEMEDICINE:

1. *Remote Consultations:* Telemedicine enables healthcare professionals to conduct remote consultations with patients, providing medical advice, and discussing symptoms without the need for physical presence.[12]
2. *Telemonitoring of Patients:* Patients with chronic conditions can be remotely monitored using telemedicine technologies, allowing healthcare providers to track vital signs and make timely interventions .[13]
3. *Diagnostic Imaging and Test Interpretation:* Telemedicine facilitates the sharing of diagnostic images and test results electronically, enabling specialists to interpret and provide recommendations remotely. [14]
4. *Prescription and Medication Management:* Healthcare providers can electronically prescribe medications, and patients can manage their prescriptions through telemedicine platforms, improving accessibility and adherence. [15]
5. *Specialist Consultations:* Telemedicine breaks down geographical barriers, allowing patients in remote areas to access specialists who may not be physically present in their region. [16]
6. *Follow-up Care:* Post-treatment or surgery, patients can receive follow-up care through telemedicine, reducing the need for in-person visits and associated travel burdens. [17]
7. *Mental Health Support:* Telemedicine is instrumental in providing mental health services, including counseling and therapy sessions, making mental health support more accessible to a wider population.[18]
8. *Chronic Disease Management:* Patients with chronic diseases, such as diabetes or hypertension, can benefit from regular telehealth check-ins, facilitating ongoing disease management and reducing the risk of complications.[19]

9. *Health Education and Promotion:* Telemedicine platforms can be utilized for health education initiatives, promoting preventive care, healthy lifestyles, and disseminating information to the general public. [20]
10. *Emergency Medical Consultations:* In emergency situations, telemedicine allows for quick medical assessments and advice, guiding individuals on necessary actions before reaching a healthcare facility. [21]

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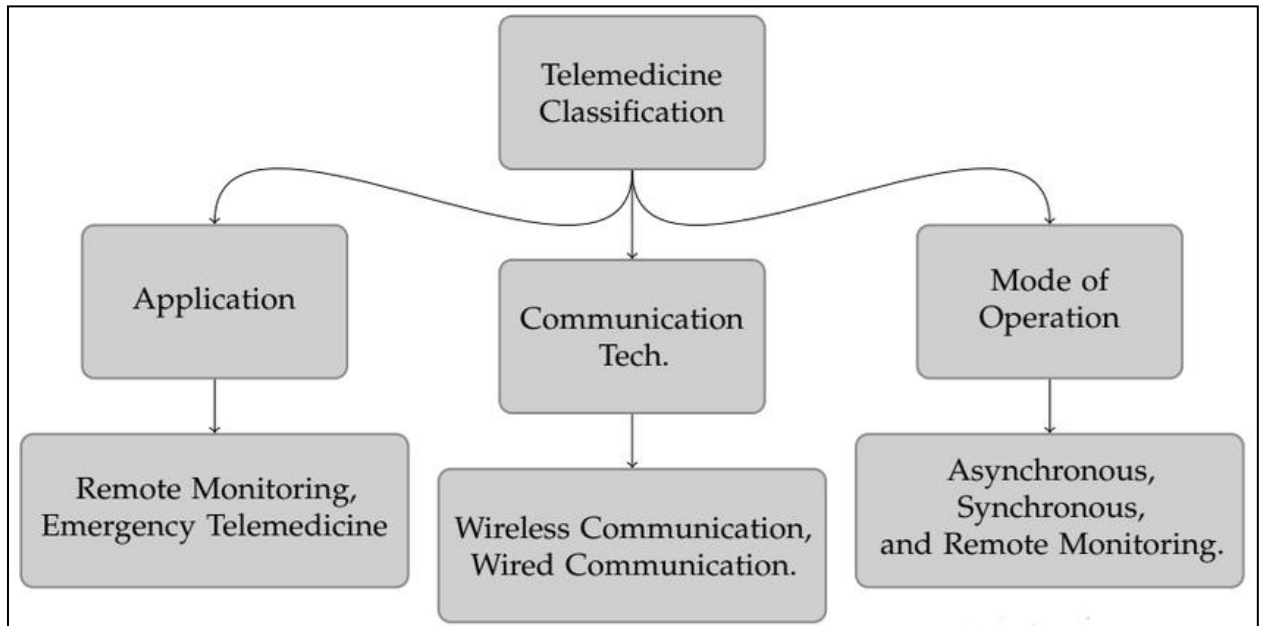
Figure 1 – Classification of Telemedicine