



Review Article

Telemedicine and Health Care

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Abstract

In India as well as around the world, telemedicine has paved the way for new developments in the medical field. The majority of physicians and administrators in India are still unsure about the medicolegal implications of telemedicine practice. It is regarded as the practice of treating patients via telecommunication, hence offering significant healthcare to areas with limited incomes. It is the process of disseminating several facets of health information via a virtual platform powered by technology. The goal of telemedicine is to provide more access to high-quality medical care.

Keywords: Telemedicine, Medical Health Care, Role and implementation of Telemedicine

1. Introduction

“Dr. Jay H Sander” Father of telemedicine and founder of American Telemedicine Association (ATA)

“Dr. K Ganapathy” Indian Father of telemedicine and Member of National Task Force on Telemedicine.

Telemedicine refers to the utilization of electronic communication technologies to deliver healthcare services from a distance. It allows collaboration between providers and patient across spatial boundaries.

Telemedicine includes physical therapy, consultation and diagnosis.

According to American Telemedicine Association “Telemedicine is the natural evolution of

healthcare in the digital world”[1]. Telemedicine includes

1. Primary Care: Utilize technology to deliver healthcare services.

2. Medical Specialties: Cardiology, Mental health, Dermatology.

3. Intensive Care Services: Also known as tele-ICU, technology used for critical ill patient.

4. Emergency Department: Telemedicine offers significant potential to improve emergency department triage and patient care.

Types of Telemedicine

- **Interactive Telemedicine:** Engages in utilizing technology to link patients with healthcare providers.
- **Remote Monitoring:** That uses digital devices to monitor a patient health outside of a traditional clinic.
- **Store and Forward:** Type of asynchronous telemedicine that allow patient to send clinical information to a practitioner.

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Value Chain of Telemedicine

Includes all the stages from product development to patient services. It involves the integration of various health technologies to create value for patient and stakeholders. The telemedicine market ecosystem includes many stakeholders, such as: -

1. Augmented Consultation Services
2. Connected Health (target use of IOMT)
3. Integrated Platform (EMR/EHR in compliance to standards)
4. Comprehensive Diagnosis Services (Pathology and Radiology)
5. Health Counselling and Coaching
6. Pharmacy Management and Tools
7. Connected Mobile Application
8. Learning Environment (Use of LMS)

Pros of Telemedicine

- ✓ Helps rural areas
- ✓ Cuts costs
- ✓ Remove geographical barriers
- ✓ Decrease time in emergency
- ✓ Better way to save medical information
- ✓ Reach more patient

Cons of Telemedicine

- ✓ Generational differences
- ✓ Limit assessment
- ✓ Less clinical information
- ✓ May miss microscopic examination
- ✓ Replies on internet

History Of Telemedicine

500BC: Telehealth in ancient Greece and Rome where the patient received medical advice from doctors using representatives.

19th Century: The development of the electric telegraph and telephone enables doctors and patients to communicate from a distance.

1925: Luxembourg-born inventor Hugo Gernsback suggest teledoctyl and predicts the telemedicine could video and robotics arms by 1975.

1948: The initial teleradiology application involved the transmission of radiographs via telephone in Philadelphia.

1959: University of Nebraska uses two-way interactive television to transmit of neurological examination of students

1960s: NASA's role in telemedicine begins by sending biometric data from animals to scientists on Earth through a telemetric connection.

1980s: Standards for the digital storage of medical images allow radiology images to be transmitted via a dedicated cable.

1993: The American Telemedicine Association is established, aiming to promote access to medical care via telecommunication technology

2010s: The extended use of internet allows telemedicine to evolve along with regulations and standards.

2020: Covid-19 pandemic put spotlight on telemedicine and increase utilization 50%.

March 2020: The CARES Act facilitates the rapid implementation of telemedicine services by healthcare providers.

2021: The use of telemedicine declines as individuals revert to their pre-pandemic way of life.

- The use of telemedicine has increased in the recent years, specially during the pandemic. According to medical economics, 83% patients say they will continue to use telemedicine after the pandemics.

Telemedicine devices

Are used in a variety of setting, including Hospitals, clinics, medical offices and home. They are portable and can be used by patient or within the help of another person.

Telemedicine devices are the tools that allow healthcare providers to deliver remote healthcare services. They can include:-

- **Diagnostic tool:** Digital thermometer, stethoscope, blood pressure monitor, pulse oximeter, glucose meter and ultrasound devices.
- **Communication devices:** Webcams, microphones and speakers.
- **Visual and Auditory assessment devices:** Otoscope and ophthalmoscope.
- **Software:** That transmits medical data between the patient and healthcare providers.
- **Mobile health apps:** Allow patient to monitor their health, track symptoms and communicate with healthcare providers.

Impact of Telemedicine

Telemedicine can have a positive impact on healthcare by improving access, reducing cost, and enhancing the patient experience.

- ✓ 90% of the top healthcare firms are either developing or putting into practice telemedicine technology.
- ✓ 64% of telemedicine programme offer remote monitoring.
- ✓ 35% of employers that provide on-site health facilities also offer telemedicine services, while an additional 12% intend to implement such services within the next two years.
- ✓ 91% of health outcomes were as good or better via telehealth.
- ✓ 50% of the top healthcare firms indicate that enhancing the quality of care is their primary motivation for adopting telemedicine services.

64% of American are willing to have a video visit with a doctor

Emerging Role (2)

Prehabilitation: Optimizing of functional status/capacity

- Deep breathing and exercises/spirometry/smoking cessation.
- Remote monitoring; wearable sensors.
- Medication management.
- Weight/diet/fluid status.

Intra-operative:

- Remote anaesthesia monitoring.
- Tele-air management system.
- Remote Intra-operative consultation.
- Remote drug delivery.

Post-operative:

- Virtual surveillance to detect early complications.

Wearable wireless sensors.

Automatic notification system.

Telemedicine In India

ISRO initiated its telemedicine efforts in India with a pilot project in 2001, connecting Chennai's Apollo Hospital to a rural Apollo Hospital located in Aragonda village, situated in the Chittoor district of Andhra Pradesh. The initiative undertaken by the ISRO, the

Department of Information Technology, the Ministry of External Affairs, the Ministry of Health and Family Welfare, along with the state government, has been instrumental in advancing telemedicine services in India.[3]

Over the last few years, the ISRO telemedicine network has made significant progress. It has grown to link 45 remote and rural hospitals with 15 super-specialist hospitals, including those in the hilly areas of Jammu and Kashmir, Medical College Hospitals in Orissa, and various rural or district hospitals across other states.[4]

Law of Telemedicine

The TGP explicitly states that a Registered Medical Practitioner (RMP) is authorized to offer telemedicine consultations from any location within India. This formal legal acknowledgment clarifies any legal uncertainties regarding whether RMPs are allowed to provide medical consultations via telephone.[5]

There is no law regarding telemedicine in India. In March 2020, Government of India released the Telemedicine Practice Guidelines.

Some of the salient features of guidelines are as follows:

Identification of RMP, Patient

Mode of telemedicine to be used

Content

Prescribing medicine

Ethics and confidentiality

Misconduct

Documentation

Fees

Emergencies

Results

In the preceding year, the telemedicine market size within the country has steadily expanded and is projected to experience a Compound Annual Growth Rate (CAGR) of 31% from 2022 to 2024.

Increased accessibility underserved populations, enhanced medication adherence, and improve patient outcomes.

In 2021 both white (39.2%) and American Indian and Alaska Native (40.6%) adults were more likely to use telemedicine than Asian (33.0%), Black (33.1%) and Hispanic (32.8%) adults.[6]

Application

Educational: Tele-education, Tele-conferencing, Tele-procutoring.

Healthcare Delivery: School based health centre, Correctional facilities, Mobile health clinics, Shopping and Transportation, Industrial Health.

Healthcare Management: Tele-healthcare, Tele-home HealthCare, Specialist and Diagnosis services.

Specialist

Tele-dermatology: Provide remote diagnosis and monitoring of skin conditions.

Tele-nephrology: Enables Family doctors to share data with specialist remotely for better consultation.

Tele-psychiatry: Improved access for patients to mental healthcare.

Tele-opthalmology: Improves access to screening and early treatment of ocular condition.

Tele-oncology: Provides systematic and effective communication between oncology centres and also improve cancer care.

Tele-pathology: Pathology are able to collaborate remotely for the purposes of diagnosis, study and instructions.

Diagnosis

Tele-radiology: Faster diagnosis, improve consultations, no shortage of radiologists etc.

Tele-endoscopy: Remotely observe and supervise and endoscopic procedure performance by another person.

Screening of disease.

Diabetic screening project by MDRF: The Chunampet Rural diabetes prevention projects.

Ophthalmology Screening by Aravind Hospitals at Andipatti village.

Disaster Management:

NASA's telemedicine services were offered during the 1985 earthquake in Mexico City and the 1988 earthquake in Soviet Armenia. [8]

Amrita Hospital tele-medicine services provided during 2004 Tsunami disaster. [9]

Conclusion

Telemedicine must be implemented with care and managed effectively. The influence of telemedicine on healthcare systems can be substantial. In this context, telemedicine can be regarded as a tool that is utilized to establish new horizons in healthcare. [10]

Such provisions must be established to enhance the accessibility of healthcare in rural and remote regions that have a limited number of entrepreneurs to take the lead. [11]

It is important to security and privacy of patient data when using telemedicine.

It can also be beneficial for people with chronic conditions who may need regular monitoring follow-up care

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