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Review Article

Advancement of existing healthcare setting through tele-medicine: the challenges faced in India

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ABSTRACT

Telemedicine is the mixed structure of tele-communication technologies and quality health care making it feasible for general populace to obtain superlative healthcare. Starting from video chat for medical services in 2000 to e-Sanjeevani OPD 2020, Indian healthcare reform has come a long way in achieving sustainable healthcare in which, the setting up of the National Telemedicine Taskforce by the Health Ministry of India, in 2005, played a huge role for various projects like the ICMR-AROGYASREE, NeHA and VRCs. Despite the lack of awareness among common public on Tele-medicine, it has a lot of benefits on existing health care settings which makes it to thrive and progress within a decade. Health systems and polices have a critical role in determining the manner in which health services are delivered, utilized and affect health outcomes. This article in brief discusses on the changes and advancement of traditional healthcare system, realizing the pace of timeline in bringing Tele-medicine into practice. As, international telemedicine initiatives are attaining quality healthcare, this article also describes the challenges of telemedicine in Indian healthcare settings.

Keywords: Challenges, Indian healthcare, Sustainable healthcare, Tele-medicine, Traditional healthcare system

INTRODUCTION

Telemedicine, a term coined in the 1970s, "Tele" is a Greek word meaning "distance" and "mederi" is a Latin word meaning "to heal", literally means "healing at a distance". The WHO defines telemedicine as the delivery of health-care services, where distance is a critical factor, by all health-care professionals using information and communications technologies (ICT's) for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and the continuing education of health-care workers, with the aim of advancing the health of individuals and communities.[1]

It is also observed that the term telemedicine has been used as new innovation since past three to four years, but surprisingly it has been put into action over thirty years in one or the other way.[2] Telemedicine technology first began as a form of healthcare delivery in the late 1960s due to the needs of the National Aeronautics and Space Administration (NASA) and the Nebraska Psychology Institute.[3] One of the earliest endeavours in telemedicine, Space Technology Applied to Rural Papago Advanced Health Care (STARPAHC) delivered medical care to the Papago Indian Reservation in Arizona. It ran from 1972-1975 and was conceived by the NASA. Its goals were to provide healthcare to astronauts in space and to provide general medical care to the Papago Reservation. The setting up of the National Telemedicine Taskforce by the Health Ministry of India, in 2005, paved way for the success of various projects like the ICMR-AROGYASREE, NeHA and VRCs.

Telemedicine uses ICT's to overcome geographical and economic barriers and increase outreach and engage more patients simultaneously increasing the access to

Healthcare services. These information and communication technologies help in accepting challenges faced by developing countries in providing accessibility, cost effective and high quality health services. Telemedicine over the past decades has created new possibilities for healthcare service and delivery.[4] Recent pandemic situation (corona virus outbreak) has enabled health care service without coming in contact with the infectious diseases. Even though the activities related to telemedicine in India started in 1999, the potential development of telemedicine into practical action took more than a decade to mark a descent scope in the market. The National Tele-consultation Service of Ministry of Health and Family Welfare launched their first kind of online OPD "e-Sanjeevani OPD 2020" services designed and developed by Centre for Development of Advanced Computing (C-DAC), Government of India to their citizens. This aims to provide video based clinical consultation to patients from their homes in safe and structured way. Considering the current scenario of e-Sanjeevani OPD launch by Government of India our current review narrates to provide the insights into the changes and challenges provided by telemedicine on existing Indian healthcare.

Health care settings in India

India is the second most populated country in the world with a population of 1.3 billion out of which only 34.5% consist of urban population. The public health management among rural population has deprived due to the lack of healthcare facilities in rural region which always makes it as a challenging for Indian Healthcare system. Health care systems are classified into 3 categories:

Primary system: constitutes of rural background.

Secondary system: constitutes and located in district level.

Tertiary system: constitutes the medical college hospitals located in the urban cities.

There are few medical institutes of national importance having many clinical and research facilities. In spite of this big chain of health care systems, the health care service to primary system i.e., the rural areas is not good enough. In general it is said that doctor: patient ratio should be 1:1000 but whereas we have 0.6:1000. An increase in the incidence of lifestyle diseases and rising healthcare costs, there's immense pressure on the traditional healthcare system.

Innovative technologies are allowing health organisations to enhance the access and reduce the burden on hospitals through real-time consultation with doctors through smart phones, tablets, laptops or PCs. As per section 27 of the Medical Council of India Act, 1956, any person who is enrolled in Indian Medical Register, can practice in any state of India. Hence inter-state telemedicine service was legal, though it was not formalized. Telemedicine services were governed by the IT Act, 2000, but there were no clear guidelines regarding privacy, security, the confidentiality of patient data, and misuse of electronic data records related to the healthcare industry. Startups such as Practo, DocPrime, mFine, CallHealth and Lybrate were operating telemedicine services in India under a regulatory grey area. Now India is one of the top 10 countries in the telemedicine market in the world. The early adoption of a regulatory framework will help the segment grow rapidly. The current telemedicine guidelines in India provides a more comprehensive framework for applications, mode of communication, medical ethics, data privacy and confidentiality, document requirements, fees, process, drug list, technological platforms and more. Figure 1 describes the pace of timeline in evolution of tele-medicine in India. The 2001 reform on "The Indian Space Research Organization deployed the first nation-wide SATCOMN-based tele-medicine network" played a vital role in bringing tele-medicine into practice and 2013 reform on "MoHFW set of electronic health records" created a standard confidentiality to patient data records. The recent Tele-medicine launch of e-Sanjeevani OPD is yet to make its changes. Adding the telemedicine to existing healthcare is going to make drastic changes among not only urban but also rural people thus making healthcare feasible to every citizen by providing sustainable healthcare.

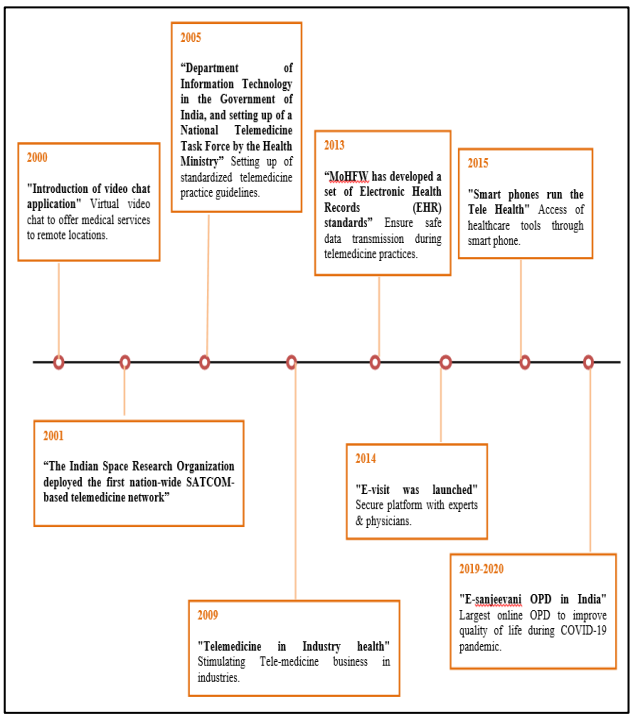

Figure 1: Delineating the timeline of tele-medicine evolution in India- Reporting various strides taken by Indian Government to implement tele-medicine for acceptability and affordability of healthcare to Indian residents.

Types of telemedicine

Tele-medicine can be categorized into 4 types depending upon communication mode, timing and information communicated, first and follow up consultations provided and the interaction between the individuals. Figure 2 shows the types of telemedicine along with its salient features.

The medical world is constantly changing. Technology now plays a big role in the medical domain. As doctors regularly look for better ways to treat people, technology has brought numerous great advances to the medical field.

From Table 1, the main advantage of cost-effectiveness can easily bridge the gap between discriminated individuals against socio-economic status and can easily bring equality in Healthcare. The other advantages like motility to elderly patients and effective monitoring and follow up will bring about an equity and maintaining proper records will abide the confidentiality of the patient data in every step of consultation.

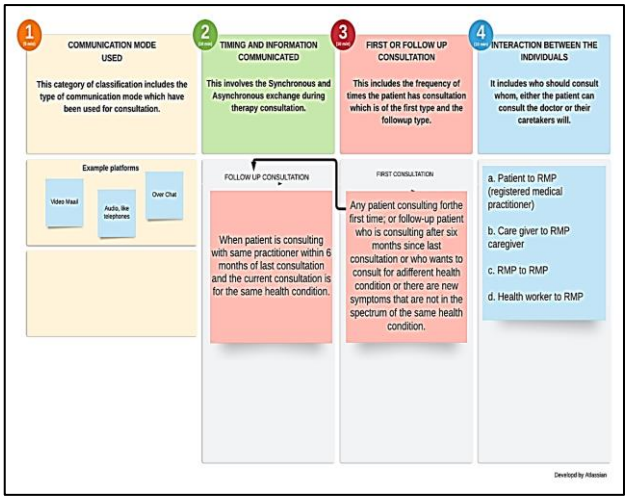

Figure 2: Describes the four different categories of telemedicine: Depending upon the communication mode, Timing and information communicated, First consultation and Follow up consultation and interaction between individuals.

Table 1: Tabulates the comparison between the advantages and disadvantages of telemedicine to patients: the out weighing advantages.

Advantages	Disadvantages
Cost-effective; saves money and time	Requires some extent of training and knowledge on equipment or network use
Maintaining proper records of the patient	Subtle vital signs may remain unrecognized which can only be diagnosed in physical presence of doctor
Immediate access to wide number of specialists in quick period of time	Payment of consultation fees prior to therapy sessions
Facilitates effective monitoring and treatment simultaneously by reducing the number of unnecessary outpatient visits	May reduce face to face consultations with the doctor
Boon to motility lacked elderly patients, so they need not restrain themselves from visiting hospital and consulting doctors.	-
Follow up is monitored accurately in chronic conditions like hypertension, diabetes and asthma	-

Applications of telemedicine

They are applied in various fields like educational, health care management, health care service, screening of diseases and disaster management.[5-7]

Educational

Tele-education, tele-conference and tele-proctoring provide excellent medical education at a distance to give training in recent update for effective treatment methods. Teleconference is an interactive type of learning, where various medical procedures are discussed among doctors and other professional consults using video conferencing apps and by conducting webinars and workshops. Tele-proctoring on the other hand is a super visionary approach, where medical staffs is present who trains and proctors throughout the program using the emerging technology via audio and video interactions giving a real time experience and providing education at distance. In 1999, the first rural telemedicine centre was set up in Aragonda (Andhra Pradesh) by Apollo Telemedicine Networking Foundation (ATNF). This is India's largest telemedicine service provider. It runs a E-intensive care ("Hospital with no beds") with a command centre in a tertiary care.[8,9]

Health care delivery

It enhances and ensures that medical services are easily accessible in emergency conditions. It runs 'mobile health clinics' to provide accurate medical services in rural areas. 'School based health centres' have been established to help in management of some chronic disorders like diabetes, obesity, hypertension, asthma etc. Transportation facilities are available to evacuate the site

in medical emergencies. Triage purpose advice is provided.

Health care management

Usage of ICT's and CTI (computer telephone integrated) systems for preventive and promote healthcare and 24 hours of vital monitoring respectively. They are known as Tele-health care and tele-home healthcare respectively.

Specialities of telemedicine

Onconet-Kerala is one of the most successful projects of Telemedicine in India. The online sharing of all medical results, histopathological slides, radiology images between the regional and nodal cancer centres is facilitated through internet-based hospital information system 'TEJHAS' (telemedicine enabled java based hospital automation system). This provides remote follow up of patients with best oncologists. There are many emergent but as far as now there are no certain studies regarding treatment of severe cardiac conditions but the patients can be constantly monitored at distance with new advancements made in technology like smart watches and fit bands, they track the cardiac and electrical activity of heart. This information can be recorded and transmitted electronically to the tele-cardiology centre via a device kept at GP's practice.[10] There are many websites, touch screen technologies, apps that are designed for online consultation. These are used to monitor chronic health conditions like hypertension, diabetes, etc. They monitor the vitals like blood pressure, heart rate, glucose levels, record them and maintain record of them and keep an eye on the patient profile and keep them noted for any medical advice if there are any abnormalities in their medical reports, all at a distance.

Disaster management

In 1985 during Mexico City Earthquake and 1988 Soviet Armenia earthquake- NASA provided the telemedicine services. In 2004 during Tsunami attack, Amrita Telemedicine Services has done an impeccable work in disaster management and was selected one of the five centres for Pan- African project by Minister of external affairs by Government of India.[11] During any disaster, the network connectivity is completely lost hence any portable device with satellite connectivity and well-designed telemedicine software is best suitable in disaster management.

Challenges of telemedicine in India[12-14]

In the developing country like India where both youth and adult literacy rates have been sluggishly developing, the challenges of adopting to new technologies are immense. The diverse languages and Inter-operability makes this function even more stretching resulting in a very slow and steady process of development. Thus the challenges of Tele-medicine in India make it sedate and undemanding.

Lack of reimbursements

People resist changing due to high cost of technology and equipment's. Both patients and doctors resist accepting prior as it needs time investment and training new work flow and technique. The investors who invest in telemedicine are concerned with money reimbursements. Hence WHO has recommended for particularly low income settings and affordable solutions economically and fundamentally.

Lack of infrastructure

The infrastructure is underdeveloped in rural setup and some of the infrastructure challenges are insufficient communication networks, unstable power supplies, inadequate or unreliable internet connectivity with limited bandwidth as well as lack of human resources with necessary technical expertise.

Confidentiality and privacy of patient's information

There are many chances of breaching of personal health information which can occur through unsecured/unprotected networks. Authorities should make sure that there is an end to end inscription between all the chats and video conferences to avoid third party interference and ensure patient's information is private, secured and recorded well.

Malpractice

Malpractice liability is an important barrier in the practice of telemedicine. There is a lack of standard guidelines for telemedicine practice and it lacks proper information regarding where and to what degree telemedicine initiatives can be applied. So Legal issues like medical malpractice should be identified and addressed to ensure smooth function of this health care system.

Resistance to adopt to the new technology

Patients lack confident regarding this new health care service, if there would be accuracy in treatment with the help of online consult and technology without visiting the physician face to face.

Language and interoperability

People are not technically challenged and may face many issues regarding online consultancy services. The Geriatrics and the paediatric patients might have difficulty in consulting for their own issues and they need some local health care person to look after their needs. The software and the technology and the usage of the application might be difficult and the rural people lack the technology and equipment's and faces certain issues like internet connectivity and operation of the online consultancy apps which has to be resolved. The language proficiency is usually limited to English but the rural

people find it difficult to communicate because of the illiteracy. Hence the language barriers should be resolved or involve various languages according to convenience.

CONCLUSION

India has been focusing on providing comprehensive and sustainable healthcare with affordability and acceptability to all Indian residents in case of public health. It is clear that international telemedicine initiatives are bringing the world closer and distance is no longer a barrier in attainment of quality healthcare. Despite of telemedicine evolution from late 2000 in India, it still hasn't reached the accomplishment it meant to create; this can be due to the fact of lack of awareness and acceptance of new technology. Considering the strides of achievement in Indian healthcare and the future perspectives, it needs to focus more on policy regulations. Governments are now starting to take a keen interest in developing telemedicine practices resulting in a slow but steady rise in its utilization of resources. However, we can see that the solutions are not too complicated either; a bit of regulation, change in policies and a hint of higher spending on healthcare by the government can easily go a long way, making it affordable and bringing about equity and equality.

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