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Article Review

Telemedicine in India: Transforming Patient Access and Satisfaction through Digital Healthcare Solutions

Rahul E[1*], Nupur Sinha[2], Ankitha Gururaj Bhatt[3]
[1,2,3] Department of Medical Laboratory Technology, Acharya Institute of Allied Health Sciences, RGUHS, Bengaluru, India
***Corresponding Author:** rahulellur.mnv@gmail.com

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ABSTRACT

Telemedicine in India: A revolutionary model of healthcare delivery has emerged to break geographical and accessibility barriers by dint of digital innovations. Telemedicine uses telecommunications technologies that permit remote consultations, diagnostics, and treatments, bridging healthcare disparities between urban and rural populations. Some of the key initiatives undertaken under government bodies like ISRO and the Ministry of Health & Family Welfare for e-Sanjeevani reflect its vast potential in creating greater access to healthcare. The COVID-19 pandemic has fueled the adoption of telemedicine, underlining its potential in delivering not only cost-effective but also time-effective health care. Despite the impressive growth that telemedicine still faces many challenges related to large-scale implementation, especially in improving infrastructure, regulatory frameworks, and professional training. Telemedicine's success in India is a good sign and a direction towards sustainability, equity, and an equal healthcare system for diverse populations and underserved pockets.

INTRODUCTION

According to New England Journal of Medicine, it defined telehealth as "the delivery and facilitation of health and health-related services including medical care, provider and patient education, health information services, and selfcare via telecommunications and digital communication technologies".

Telemedicine genuinely refers to delivering health care services remotely via telecommunications technology. Therefore, it could be possible that patients are consulted, diagnosed, and treated by healthcare providers without necessarily being present physically before them, hence breaking geographical barriers created by distance and thereby improving access to medical care.(2)This is particularly important for India in terms of population size and significant differences in the way that healthcare is provided in rural and urban locations. The potential of telemedicine to fill the gaps within the existing delivery system of health care ensures quality health care available for all segments of population.(3)

The Indian government has considered telemedicine important and carried out various initiatives in support of the utilization of telemedicine services. These initiatives are supported by various governmental bodies with the Ministry of Health & Family Welfare developing central e-health plans that focus on enhancing healthcare delivery through telemedicine. Such is the case with

IT convergence with communication and healthcare sectors, under which the Indian telemedicine market has witnessed a remarkable growth wherein the reliance of people on a more digital solution to fulfil their healthcare needs is reflected.(1)

Telemedicine networks, paired with bodies such as the Indian Space Research Organization, have further eased the integration of these services across the entire country. It encompasses wide-ranging services that include virtual consultations, remote monitoring, and tele-diagnosis that could well be quite useful in emergency circumstances or for patients far from reach.(4)

In a nutshell, telemedicine represents the future of healthcare delivery with an integration of technology, providing service remotely, and thus greatly enhancing access to health care in such an enormous and heterogenic country like India.

Telemedicine utilizes telecommunication to provide any type of health care at a distance. It is one of the three mainly important types of telemedicine: consultative, diagnostic, and treatment. All of these falls within a mainly electronic framework. In short, telemedicine is mainly made to reach health care to a higher number of people as well as to bridge the gap between doctors and patients.(5,6)

In this regard, telemedicine has come as the saviour to bridge this developing country's healthcare access disparities between urban and rural areas. The Indian healthcare system is three-tiered, with responsibility being put mainly on the state government for delivering services. However, there still exists a notable differences in the accessibility and quality of health care services, particularly in rural locations. Telemedicine technology has the potential to obviate such disparities by integrating into the existing healthcare delivery system and thereby providing timely and efficient health services to those in need(5,6). In India, the government has been dynamically associated with private sector participation in tele-health programs. This initiative has gained momentum for a long time through the convergence of information technology, communication, and healthcare, which has brought about significant growth in the telemedicine market over the past few years. The Ministry of Health & Family Welfare initiated several central e-health schemes, including telemedicine, to improve healthcare delivery at various parts of the nation.(7)

In addition, with funds from various government institutions, some of these organizations, like the ISRO and Ministry of Health, initiated several projects that intended to create networks for telemedicine, promising a solid infrastructure that facilitates healthcare delivery to many across any geographical barrier.(5)

The idea, in essence, telemedicine is a transformative approach to healthcare delivery that makes use of technology to offer remote medical services; this can improve not just the access but also the quality of care in such a vast and populous country as India.

The purpose of this article is to explore the development and application of telemedicine in India, especially in the context of bridging the healthcare access gap between urban and rural areas. Telemedicine is seen as an innovative solution to improve healthcare delivery through remote communication technology, which allows patients to receive healthcare services without being physically present. This article aims to review the history, development, and implementation of telemedicine in India, focusing on government initiatives such as e-Sanjeevani and various technological innovations that support the transformation of healthcare in India.

RESEARCH METHODS

The research method used in this article is a literature review that collects and analyzes various relevant sources regarding telemedicine in India. The research included a review of various

policy documents, government reports, academic articles, and case studies on the implementation of telemedicine in India. The article also evaluates the technological developments, challenges faced, and successes and failures in the implementation of telemedicine in different parts of India.

RESULTS AND DISCUSSION

History and Evolution of Telemedicine in India:

ISRO took the lead for India, starting its telemedicine journey in 2001-the first step of the nation into this emerging healthcare model. While this technique of telemedicine has been practiced around the globe for nearly half a century, the situation in relation to the COVID-19 pandemic enforced the practice more rigidly with some emphasis on strict telemedicine guidelines to really establish it(8). Patient satisfaction reports have been found in various numbers in telemedicine programmes implemented across India and thus has become an essential indicator of the growing acceptance of this concept. This healthcare tool was further developed with the formation of a National Telemedicine Task Force in 2005. Corporate hospitals and government initiatives had developed telemedicine networks, telemedicine projects dating back to the early 1980s. Advances in technology and infrastructure have led to the resurgence of telemedicine in efforts to address the scarcity of specialists in rural areas. This growth of the IT sector has also supported the development of infrastructure in telecommunications, thus supporting access to healthcare in the remote regions. There are active developments in both government and private sectors in tele-health solutions to extend healthcare access and increase efficiency in India.(2,7)

Medical information can be transmitted from a place to another with telemedicine. The concept itself may date back to the early 1900's when ECGs were transmitted through telephone lines. What is known as modern telemedicine owes much to the discovery of the telegraph and the telephone. Only at this point in 1924 could telemedicine only be visualized. Actually, video consultations came into existence in the year 1959 at the University of Nebraska. Satellite telemedicine was a useful instrument in disaster management during the major earthquakes in Mexico. NASA's establishment of MITAC at Yale in 1997 led to private participation in telemedicine for public health.(1)

Importance of Telemedicine in Healthcare Delivery:

Telemedicine develops health care reach in the more remote and rural regions by connecting patients to experts. It eliminates the travelling time, which saves time in seeing the specialist in person.(9) The same service will bridge disparities in health care as it provides technologically advanced services and material resources even in backwater areas. With telemedicine, there is a reduction of quackery as patients are treated by qualified practitioners. It avails an opportunity to fill the gap created by a digital divide and to provide equitable access to health care, specifically in developing countries(2). With the development of telemedicine from simple video conferencing to a whole range of applications, it gives support to sustainable development within the health technology sector and increases the quality of care through its use of cutting-edge innovations.(9,10)

Current Landscape of Telemedicine in India:

E-Sanjeevani: The National Telemedicine Service:

e-Sanjeevani is India's National Telemedicine Service, the biggest telemedicine initiative in the world, that has reached more than 286 million patients through its Health & Wellness Centers, over 127,000+ in number. It was launched in 2019 and supports the Ayushman Bharat Scheme by providing remote healthcare services, mainly to those in the rural regions. There are two modes for

this service-one is eSanjeevaniAB-HWC, that is, provider-to-provider consultancy, and the other, eSanjeevaniOPD, for patient-to-provider consultancy. It has played an imperative role in COVID-19 and continues to bridge the digital health divide by providing free consultation services and accessing health care among vulnerable populations. In the year 2023, eSanjeevani2.0 brought telediagnosis with Point of Care Devices for rapid results.(9,10)

When the Centre for Development of Advanced Computing (CDAC) Noida setup the first indigenously created Hospital Information System software at the Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow, Uttar Pradesh, in 1996, telemedicine in India took off. In 1999, DeitY, as a department under the Ministry of Communications and Information Technology (MCIT), Government of India, initiated a leading effort in developing indigenous development technology in the areas of telemedicine. These institutions were major such as the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, the All-India Institute of Medical Sciences (AIIMS), New Delhi, and SGPGIMS, Lucknow. At Apollo Hospitals in Aragonda, the Indian Space Research Organisation, or ISRO, installed a satellite communication (SATCOM) telemedicine system in 2000. The most important landmark was achieved in 2001 when AIIMS, PGIMER, and SGPGIMS implemented the first telemedicine network. In the same year, the first National Conference on Telemedicine was held, and the Telemedicine Society of India came into existence, turning out to be the scientific body that would strive to propagate telemedicine in the country.(11)

E-Sanjeevani is a flagship telemedicine service by the Ministry of Health and Family Welfare for remote healthcare consultations. It supports the Ayushman Bharat Scheme, with more than 286 million patients across over 127,000 Health & Wellness Centers (HWCs) across the country and has emerged as one of the largest telemedicine initiatives globally. It operates on two modes:

- e-SanjeevaniAB HWC (Provider-to-Provider): Enables the medical practitioner to discuss the problems arising in the OPD services with specialists from the hospital district.
- Patient-to-Provider: e-SanjeevaniOPD facilitates the access of patients directly to a provider for remote healthcare services, thereby making it accessible to rural and underserved populations.

The system gained huge significance during the Covid-19 pandemic as remote healthcare services were provided but with the least in-person interactions. So successful has it been that it is perceived to be a scalable model toward expansion of telemedicine services into developing regions .

Evolution of Telemedicine in India:

From 2001 to 2003, both government and corporate medical institutions became actively involved in telemedicine activities and started implementing hospital information systems. Between 2003 and 2004, ISRO had enhanced SATCOM-based telemedicine nodes all over the country, which proffered tele-education and tele-consultation services. In 2005, the Ministry of Health and Family Welfare, MoHFW constituted the Indian Task Force for Telemedicine.

The Planning Commission had a budget sanctioned in the 11th Five-Year Plan in 2006 for e-Health, including telemedicine.(12). The Public Health Foundation of India (PHFI) was granted to design the "Healthy India" website for health education, and the Uttar Pradesh government established the School of Telemedicine and Biomedical Informatics (STBI) at SGPGIMS. 2007: MoHFW supported tele-ophthalmology and onco-net programs in various locations; STBI at SGPGIMS was declared as a National Resource Centre for Telemedicine and Biomedical Informatics by DeitY. 2009: MoHFW is providing funding for prototype telemedicine initiatives in support of the National Rural Telemedicine Network.(13)

By 2010, NMCN project was envisaged; MoHFW formally declared SGPGIMS as the National Resource Centre for Telemedicine. The Ministry also implemented the Mother and Child Tracking System (MCTS) to monitor maternal and child health. In 2012, an expert group of the MoHFW established standards for EMR and EHR. This initiative to form NMCN began in 2013 through an open tender system. The National Optical Fibre Network, initiated back in 2011 by the Ministry of Communications and Information Technology (MCIT), planned for highspeed bandwidth connectivity for all Gram Panchayats in India. It aimed at connecting 250,000 Panchayats so that primary health centres, community health centres, and medical colleges could easily connect with each other to introduce telemedicine services, thus implementing more telemedicine activities throughout the country.(14)

Initiatives of Govt. of India providing Bandwidth Connectivity are seen as potential for envisaging E-Health activities, especially Telemedicine:

There is the National Knowledge Network (NKN) of India, a high-speed multi-gigabit pan-India network, with a unified backbone for knowledge-based institutions. It supports Overlay, Dedicated, and Virtual Networks and connects the global scientific community at multiple gigabits per second. It connects 831 institutions, such as 151 medical institutions which will enable applications like virtual classrooms, collaborative research, grid computing, and e-governance.(2)

With support from the government of India, State Wide Area Network (SWAN) provides scalable bandwidth from 2 Mbps to 100 Mbps. This network interconnects medical colleges with district hospitals, sub-district hospitals (SDHs), and community health centres (CHCs) up to block levels.(2)

In addition, the National Optical Fiber Network (NOFN) which has been approved in 2011 will connect 250,000 Gram Panchayats (GPs) with high-speed connectivity and thus bridge the connectivity gap between GPs and blocks. NOFN is also supporting ICT applications such as e-commerce, e-banking, e-governance, e-education, and telemedicine. The special purpose vehicle (SPV) for NOFN is Bharat Broadband Network Limited (BBNL). The SPV has conducted the pilot projects in three blocks across Rajasthan, Andhra Pradesh, and Tripura connecting one telemedicine centre per block to the nearest medical college.(7,13,14)

Innovative Tools Transforming Telemedicine:

Despite which there are still issues to be addressed for large-scale implementation, digital pathology is used for routine diagnoses that are growing very fast mainly due to recent advances in full-slide imaging technology. Telemedicine has remained a significant influence on the healthcare sector as it has recorded significant medical and value benefits. While the COVID-19 pandemic saw a noted decline in primary care usage for non-emergency conditions, teleconsultations, by and large, experienced an upsurge and primarily dealt with emergencies(5). Countries which have strong regulatory frameworks, well-supported primary care and public health services of telehealth interventions. In the near future, a lot more support should be given to telemedicine programs so they can be sustained and scaled up to strengthen the quality and equity of health services in the country while completing internet infrastructure to reach the smaller health facility to larger hospitals. Reviewing the current telemedicine programs is essential in light of legal and operational changes, and training of medical professionals on telemedicine will keep them abreast of the relevant technological, ethical, and legal issues. Many healthcare service providers were compelled to adopt telemedicine practices during the pandemic supported by changes in billing practices that nudged virtual consultations. Initiatives like the Chunampet Rural Diabetes Prevention Initiative are some

examples of the many organizations in India continuing efforts to promote telemedicine(10,15). Several key competitors include Apollo Telemedicine Enterprises and the Asia Heart Foundation, and the tele-oncology network in Kerala helps over 10,000 cancer patients every year. Direct-to-consumer telemedicine has also been significant in terms of help as patients can now be screened before attending emergency rooms. In all, patients have found telemedicine to be helpful in the pandemic and have a greater willingness to use these services post-COVID for economic and travel reasons.(5)

Guidelines for Telemedicine in India:

All telemedicine consultations should be guided by the professional judgement of a Registered Medical Practitioner: An RMP is in a good position to determine if an in-person assessment is required or if a technology-based consultation will suffice. The practitioner must use appropriate judgement and maintain the highest standard of care.

Telemedicine has to be appropriate and adequate for the situation. The professional judgment of the Registered medical practitioners (RMP) should determine whether a telemedicine consultation would be appropriate or whether it should best be done in person, for the benefit of the patient. They should review that the available technologies are enough to use for diagnosing before starting health education counselling or prescribing medication. Every patient has varying medical needs. Therefore, the RMP should provide equal attention that is given during onsite consultations, but with the factor of the constraint that the telemedicine presents. In telemedicine, both parties must know each other's identity. The RMP should ascertain the identification of the patient by details such as name, age, address, and contact information while providing mechanisms for verification of the same to the patients about the RMP. The RMP will include an age declaration on prescription forms, and if the patient is under the age of 16, the RMP must ensure that an adult accompanies the patient. The RMP should introduce themselves to say their name and qualifications, and display their registration number on prescriptions, electronic communications, and receipts.(6)

Patient consent:

Patient consent is a pre-requisite for any telemedicine consultation. Patient consent may be overt or implied. It is stated to be implied when the patient initiates the consultation. However, if the health worker, RMP or the caregiver initiates the consultation, then it needs explicit consent. Explicit consent can be recorded in some form, like an e-mail, text, audio or video message. A patient can give oral consent over a telephone or video using words such as the following: "Yes, I consent to use telemedicine to receive consultation." The explicit consent by the RMP must be recorded in the patient's records.(6)

The Ethical Framework for Telemedicine in The Document is as follows:
General Principles:

Professional Judgment: RMPs are to exercise judgment as to when a telemedicine consultation may be appropriate and when such a consultation requires in-person consultation. They must ensure that telemedicine is in the best interest of the patient. (1,5).

Patient Identification and Consent: The identity of the patient and the RMP should be known to each other. An RMP should confirm his patient's identity and also check if the patient has agreed to the telemedicine consultation. With regard to consent, this can be implied if the patient has initiated the consultation or explicit if initiated by a health worker, RMP, or caregiver. (16)

Confidentiality and Data Privacy: RMPs shall respect the principles of medical ethics, which include confidentiality as well as respect for the privacy of patients adhering to the Indian Medical

Council (IMC) Act and other data protection legislations applicable. They shall ensure that reasonable care is taken to protect patient data and privacy.(16). Documentation: The RMP shall maintain a digital record and documentation of the telemedicine consultation, which may include interaction logs, patient record, and prescriptions.(16)

Medical Ethics: The RMPs shall observe the ethics and code of professional conduct and etiquette as contemplated in the IMC Act. Do not misuse patient data; do not insist on telemedicine when the patient requests an in-person consultation; also, do not solicit through advertisements.(16)

Patient Management: RMPs should provide health education, counseling and prescribe drugs after proper assessment of the patient's disease. It must ensure that prescribed medication should be according to the guidelines of telemedicine consultation.(16)

Fee and Transparency: Fees for telemedicine consultations must be equivalent to face-to-face consultations. RMPs should provide receipt or invoice for the fee collected. (16)

Emergency Situations: In the event of emergency conditions, RMPs should administer first aid, counsel, and assist with referral for in-person care as early as possible.(16)

CONCLUSION

The telemedicine, thus being considered a health care delivery revolution tool in India, has solutions linking patients across the geographical barriers to an effective alleviation of their problem. Still, the potential of telemedicine has not been achieved as much as desired. Instead, there are numerous challenges identified in such a product; some of them have been noted by the author's project also, dealing with obstructive concerns at almost every juncture of the journey. Solutions evoked from these experiences can help future startups avoid some of the pitfalls and ensure success in their operations.(8)

A key benefit arising from the COVID-19 pandemic was saving time and cost for patients, which telemedicine services were quick to prove, and also helping to decongest hospitals. Telemedicine centers have also been proven to greatly improve the rate of visits by new patients, and they significantly contribute to this growth. Improving access to eye care does not raise direct costs but instead lowers indirect costs for patients by about 30%. Of course, the effects of telemedicine greatly depend on the distance that the patients have to be moved to the facilities. These results are hence crucial for guiding the design of the telemedicine networks and the eventual future service provision.(5)

REFERENCES

1. Chellaiyan V, Nirupama A, Taneja N. Telemedicine in India: Where do we stand? J Family Med Prim Care. 2019;8(6):1872.
2. Mishra SK, Singh IP, Chand ED. Current Status of Telemedicine Network in India and Future Perspective. Proceedings of the Asia-Pacific Advanced Network. 2011 Dec 13;32(0):151.
3. Yadav SK, Mishra A, Mishra SK. Telemedicine: History and Success Story of Remote Surgical Education in India. Indian Journal of Surgery. 2022 Apr 1;84:172–6.
4. Dorairaj L. The AmbuPod Project: Learnings of a Government-Certified, Telemedicine-Enabled, Rural Healthcare Startup in India. Telehealth and Medicine Today. 2021 Apr 23;
5. Maroju RG, Choudhari SG, Shaikh MK, Borkar SK, Mendhe H. Role of Telemedicine and Digital Technology in Public Health in India: A Narrative Review. Cureus. 2023 Mar 10;
6. Joint Secretary : Dr. Vishwas Mehta I. TELEMEDICINE DIVISION, MOHFW, GOVT. OF INDIA Joint Secretary : Dr. Vishwas Mehta, IAS.

7. Dash S, Aarthy R, Mohan V. Telemedicine during COVID-19 in India—a new policy and its challenges. Vol. 42, Journal of Public Health Policy. Palgrave Macmillan; 2021. p. 501–9.
8. Rajkumar E, Gopi A, Joshi A, Thomas AE, Arunima NM, Ramya GS, et al. Applications, benefits and challenges of telehealth in India during COVID-19 pandemic and beyond: a systematic review. BMC Health Serv Res. 2023 Dec 1;23(1).
9. Whitten P, Holtz B, LaPlante C. Telemedicine: What have we learned? Vol. 1, Applied Clinical Informatics. 2010. p. 132–41.
10. Kumar M, Rani P, Joshi B, Soni RK, Kumari A, Rohilla KK. Telemedicine as an unexpected catalyst during and beyond the COVID-19 Pandemic. Nepal J Epidemiol. 2022 Mar 31;12(1):1171–4.
11. Kim JS, Oh SH. Challenges and improvement opportunities in a telemedicine pilot project. Journal of the Korean Medical Association. 2024;67(6):423–8.
12. Jain D. Regulation of Digital Healthcare in India: Ethical and Legal Challenges. Healthcare (Switzerland). 2023 Mar 1;11(6).
13. Masood I, Baneen U, Nivedita . Telemedicine in Covid-19: Challenges and Opportunities. Asian Journal of Research in Medical and Pharmaceutical Sciences. 2021 Apr 6;32–5.
14. Delana K, Deo S, Ramdas K, Subburaman GBB, Ravilla T. Multichannel Delivery in Healthcare: The Impact of Telemedicine Centers in Southern India. Manage Sci. 2023 May 1;69(5):2568–86.
15. Sageena G, Sharma M, Kapur A. Evolution of Smart Healthcare: Telemedicine During COVID-19 Pandemic. Vol. 102, Journal of The Institution of Engineers (India): Series B. Springer; 2021. p. 1319–24.
16. NITI Aayog. BOARD OF GOVERNORS In supersession of the Medical Council of India Telemedicine Practice Guidelines Enabling Registered Medical Practitioners to Provide Healthcare Using Telemedicine. 2020.