



# Telemedicine : Integrating ICT and Health Care System

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## ABSTRACT

*Health is always considered as one of the strong pillars of sustainable development. Healthy citizens are regarded as the greatest asset of any nation. In a country like India where more than 70 percent of population still lives in rural and remote areas, accessibility to quality healthcare infrastructure as well as healthcare personnel is a big challenge for policy makers. Among the various alternative strategies available, the integration of ICT and healthcare system in the form of telemedicine is regarded as one of the most revolutionary innovation in healthcare management that can enhance the quality of delivery of healthcare services. Considering the significance of telemedicine, the present paper examines the various initiatives taken by the Indian Government along with other organizations to utilize expertise of India in ICT in the healthcare sector. Further, the paper also highlights the various challenges to successful implementation of telemedicine network in India as well as its future prospects.*

Keywords : *Healthcare, Telemedicine, Telehealth, India.*

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Telemedicine



Healthcare devices



Health monitoring



Mobile health

## INTRODUCTION

Health is always considered as one of the strong pillars of sustainable development. It is well said that healthy citizens are the greatest asset of any nation. The importance of health is also reflected in Indian Government's series of five year plans where healthcare sector is considered as one of the priority sectors. In the Union budget 2017-18, ₹489 billion has been allocated to health sector as compared to ₹399 billion in the previous year's budget. Though healthcare system is universal in India, there exists discrepancy in quality of delivery of healthcare services between rural and urban areas. In a country like India where more than 70 percent of population still lives in rural and remote areas, accessibility to quality healthcare infrastructure as well as healthcare personnel is a big challenge for policy makers. In such a scenario, Information and Communication Technologies (ICTs) can prove to be a beneficial tool in effectively dealing with such issues. The role of ICT in transforming the shape of healthcare sector cannot be ignored. The various ICT tools and services like internet, video conferencing etc. have brought revolution in the delivery of healthcare services throughout the world. Among the various alternative strategies available, the integration of ICT and healthcare system in the form of telemedicine can be considered as one of the most revolutionary innovation in healthcare management that can enhance the quality of delivery of healthcare services among individuals and communities. Telemedicine is a type of electronic health that can help in improving the clinical health status of patients by allowing medical information to be exchanged from one place to another with the help of various electronic communication tools like smart phones, email, two-way video and other wireless tools.



## REVIEW OF LITERATURE

According to WHO (2010), telemedicine means “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 diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities”. The roots of organised telemedicine programmes lie in United States of America. In 1993, the first survey on telemedicine programmes was conducted which reported only 10 such active programmes in USA. However, this number started growing rapidly during the period of 1930-1970s (Kim, 2004). In 2010, Hill et al. conducted a review of nineteen articles based on the performance of telemedicine in various healthcare outcomes. In the field of mental health diseases and chronic health issues, telemedicine was reported to be an effective health care delivery tool. American Well (2015), a telehealth company in USA, conducted an online survey to determine consumer perceptions and desires related to telehealth and telemedicine services. The findings showed that 64 percent of consumers were willing to have video visit with a doctor.

Amongst developing nations, Brazil is considered to be one of the most advanced countries in the field of telemedicine in Latin America and the Caribbean. Telemedicine units have been increasing in Brazil on a large scale. In Rio Grande do Sul, a telehealth platform was introduced by using TelessaúdeRS/UFRGS in 2010. Since 2010, teleconsultations, teleeducation and telediagnosis activities have benefitted more than 15000 healthcare professionals through such program (Harzheim et al., 2016). Telemedicine can also prove to be beneficial in antimicrobial stewardship programmes as determined by study in community hospital in Southern Brazil. Healthcare expertise was provided to cardiology patients who were located at a distance of 575 km from the hospital. A secured website was used to complete antimicrobial prescriptions. Email and SMS were used to send a written reply to the prescriber. Overall compliance with the recommendations of the infectious diseases specialist was 100 per cent (Santos et al., 2013).

Like Brazil, telemedicine practices have also gained momentum in India. National Cancer Network (Onco-Net), National Rural Telemedicine Network and National Tele-ophthalmology Network are the main national projects of telemedicine being implemented in India. A number of studies have been conducted in India that address various issues related to successful adoption of telemedicine practices such as its awareness, feasibility, clinical effectiveness etc. In 2002, Deodhar carried out a study for 18 months to determine the effectiveness of telemedicine consultations provided by email. Such email consultations were found to be successful in the diagnosis as well as treatment of 38 babies. Meher et al. (2009) conducted a study to determine the level of awareness and opinion of both doctors and patients towards telemedicine in New Delhi. Findings of the study revealed that most of the doctors were aware of telemedicine application and also hold positive attitude towards its use in the treatment of patients. However, most of the patients were found to be unaware of the concept of telemedicine.

Literature also highlighted the studies related to clinical applications of telemedicine across the nation. Desai et al. (2004) analysed the effectiveness of telepathology consultations between Nargis Dutt Memorial Cancer hospital Barshi and Tata Memorial Centre, Maharashtra. Such teleconsultations were found to be successful in all the ninety three cases. Kaliyadan and Venkitakrishnan (2009) examined the case profile of 120 teledermatology consultations provided at Amrita Institute of Medical sciences, Kochi. The study reported that an ideal system of teledermatology consultation requires the combination of store and forward (SAF) and real time consultations (RTC). Nagarajappa et al. (2013) conducted a survey in Udaipur to assess the knowledge as well as attitude of dentists towards application of telemedicine in the field of dentistry. Study reported that dentists with less than ten years of work experience had more knowledge of teledentistry than those with more than ten years of experience. In addition, the study found that lack of training programmes was the main reason of less favourable attitude amongst dentists towards teledentistry.



## NEED AND OBJECTIVE OF STUDY

A careful inspection of literature review highlights that although numerous studies on different aspects of telemedicine have been conducted in developed nations and in a few developing nations, but limited studies have been conducted in India in this regard. Thus, considering the significance of telemedicine for uplifting the future of healthcare in India, the present paper attempts to examine the application of this concept in India. The main objectives of the study are as follows:

- (a) To examine government as well as non-government initiatives in the field of telemedicine in India.
- (b) To identify key challenges to successful implementation of telemedicine in India.
- (c) To suggest suitable measures to combat the challenges to telemedicine applications.



## METHODOLOGY

The paper is based on secondary data obtained from various national and international journals, Government and private websites. The paper is divided into three sections. Section I discusses the types of telemedicine along with its significance. Section II highlights various initiatives taken by Government of India along with other organizations to expand telemedicine network in India. Section III mentions the main challenges in the successful implementation of telemedicine network in India as well as some measures to overcome such challenges. This section also throws light on the future prospects of telemedicine in India.

### Section-I

#### Types of Telemedicine

Telemedicine can be classified mainly into three categories, which are as follows:

**1. Store-and-Forward:** It means there is no need for the physician to meet the patient in person. Patients' entire information including medical history, reports, images etc are stored by using telemedicine software. When such type of information is required, it can be send to healthcare professional or physician. Teleradiology is one of the extensively used applications of telemedicine based on store-and-forward approach that involves the transfer of medical images of patients from one location to another with the help of telecommunication system. Such application allows radiologists to provide consultation to patients without being physically present with them. Teleradiology Solutions, launched in 2002, is the first teleradiology company in India. Manipal group of hospitals and Wipro Technologies are among the companies who supported 3D reconstructions in the field of teleradiology. Factors such as low monetary costs, cheap labour, skilled support staff has contributed to the growth of teleradiology services in India to some extent

(Burute & Jankharia, 2009).

**2. Remote Monitoring:** Also known as self-testing or self-monitoring, this approach allows patients to test their health themselves at their home by using various technological devices. The devices then send the data back to telemedicine system. Thus doctors can monitor health of their patients remotely. Telecardiology is one such application of telemedicine that involves remote transmission of electrocardiographic data between healthcare professionals and doctors for the diagnosis and treatment of heart diseases of patients with the help of ICT tools.

**3. Real-Time Interactive Services:** In such services doctors can provide immediate advice to patients with the help of various mediums such as phone, home visits, online etc. Teleneurology is an example of such type of telemedicine that allows a neurological doctor to provide consultations at a distance with the help of various telecommunication devices. The number of qualified trained neurologists in India is around 1100 which are too few to treat such a large population in the nation (Khadilkar, 2012). In such a scenario, teleneurology can prove to be a useful tool to deliver healthcare services in neurology to patients suffering from stroke, dementia or multiple sclerosis.

#### Significance of Telemedicine

Telemedicine applications have the potential to improve the accessibility of medical care by enabling the physicians to diagnose and treat the patients earlier and improve the quality of healthcare. The following points highlight the significance of telemedicine in detail.

**1. Patient's access:** Telemedicine increases patient's access to care. Many companies permit patients to access medical care with an on-call doctor. Various hospitals and health centres allow their physicians to interact with their patients virtually by using telemedicine platform. With the advancement of technology in health care, it has become easy for the patients to use various consumer friendly mobile health applications to keep a track of their own health. Patients can also keep a record of their medical information by using various home-use medical devices. In this way telemedicine allows various healthcare providers to expand their reach.

**2. Deals with shortage of healthcare professionals:** Another important aspect of telemedicine is its ability to deal with problem of shortage of healthcare professionals and staff. Telemedicine services and applications such as teledentistry, telecardiology, teledermatology allows better utilization of available staff.

**3. Improved patient outcomes:** Telemedicine has the ability to improve patient outcomes and care. Shaikh et al. (2008) examined the impact of telemedicine consultations on paediatric obesity among patients. In this regard, 139 children and adolescents were given paediatric weight management consultations. Findings revealed that 80.7 percent patients showed improvement in clinical outcomes.

**4. Reduces operational costs:** Remote analysis services, like telepathology and teleradiology, allows use of services of highly trained professionals. This can lead to lower cost and high care. Such remote services enable low-volume providers to have around the clock coverage at a lower cost. Services such as televisits with physicians reduce expensive use of emergency room visits. Further, the home-bound patients can seek medical-help without actually going to the hospitals through ambulance. Fauchier et al. (2005) examined the potential cost savings for home monitoring (HM) of cardioverter defibrillators with its automated wireless remote data access. Database included 502 patients from six university hospitals. Over the 5 years of expected life of the device, decrease in costs for follow up visits was estimated to be \$2,149. The study concluded that home monitoring may reduce overall costs by saving on transportation costs especially when distance between home and medical facility is more than 100 kms.

**5. Availability of technology:** Availability of technology support services such as Face time, Microsoft Lync, Skype, WebEx services, or simply Google Video Chat video conferencing makes the adoption of telemedicine easy and successful. Many states in India have their own agencies for the development of technology in their areas like West Bengal Electronics Industry Development Corporation Limited (WEBEL) which has undertaken various initiatives to support telemedicine activities in rural areas in West Bengal.

## Section-II

### Telemedicine initiatives in India

Government of India has been working with various organizations and agencies such as Indian Space Research Organization (ISRO), Ministry of Health & Family Welfare, Department of IT etc. for the successful implementation of telemedicine projects in India. The Apollo group of hospitals played a crucial role in shaping the future of medical care in India. In fact, it was pioneer in introducing the concept of telemedicine in India. An initiative was taken in 1997 to make medical expertise available in suburban and rural areas of India by using ICT devices. It leads to the establishment of Apollo Telemedicine Networking Foundation (ATNF) which is the largest multispecialty telemedicine network that provides more than 57,000 teleconsultations (Ganapathy & Ravindra, 2009).

ISRO too has undertaken various telemedicine pilot projects. Such projects involve various super speciality hospitals located in major cities and smaller health centres in distant and rural areas. In 2001, ISRO conducted a pilot project on telemedicine in which Apollo Hospital at Chennai was linked with the Apollo Rural Hospital at Aragonda village in the Chittoor district of Andhra Pradesh. In the same year, ISRO also started Odisha telemedicine network with the support of Government of Odisha. The first phase of the project was implemented in 2003 in which VSAT connectivity was used to connect Sanjay Gandhi Postgraduate Institute of Medical

Sciences (SGPGIMS), Lucknow with three Government medical colleges. In 2004, telemedicine network expanded to include Sriram Chandra Bhanj (SCB) Medical College, Cuttack; All India Institute of Medical Sciences (AIIMS), New Delhi, and Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh. During implementation of second phase of project in 2007, 6 district headquarter hospitals were linked with three medical colleges in Odisha. The third phase of the project was launched in 2011. This phase focuses on linking 3 medical colleges and hospitals with 15 district headquarters hospitals.

Another telemedicine program was started by ISRO in Karnataka in 2002. Such program focuses on providing better emergency cardiac care to the patients. Telemedicine project in Karnataka is coordinated by Karnataka State Remote Sensing Applications Centre (KSRSAC). The project allows patients to interact with the speciality doctors by using satellites to link health centres and remote hospitals. A super specialty hospital for cardiac care, Narayana Hrudayalaya, Bangalore was linked with the Vivekananda Memorial Trust Hospital, Saragur and district hospital, Chamarajanagar under the Karnataka telemedicine project. Narayana Hrudayalaya has provided telecardiology consultations to various patients with the support of ISRO.

To provide healthcare services to people suffering from cancer in North East region of the country, a telemedicine centre was established at Dr. Bhubaneswar Borooah Cancer Institute (BBCI), Guwahati in 2003. The financial support for the implementation of project was provided by Assam Government, North Eastern Council and Department of Atomic Energy. ISRO provided technical support such as satellite connectivity to link BBCI with Tata Memorial Hospital, Mumbai.

In Punjab state also, ISRO has provided assistance to Sub District Hospitals at Amritsar, Hoshiarpur and Mata Kaushalya Hospital, Patiala. In 2006, eSanjeevani, Punjab Health Systems Corporation and Department of Information Technology launched Punjab state wide telemedicine project. Under this project, more than 15 telemedicine sites were established in the remote and rural areas of Punjab. These sites were connected to PGIMER, Chandigarh through Virtual Private Network (VPN) with broadband connectivity. The telemedicine sites located at Civil Hospital in Amritsar, Hoshiarpur, Kapurthala and Sangrur have provided more than 200 consultations each upto July, 2012<sup>3</sup>. The Ministry of Health and Family Welfare also funded Mobile Tele-Ophthalmology Project, in Punjab, in 2007 to deliver eye care services to 100 villages in the district of Ropar.

Similarly, Maharashtra Government also launched a pilot project on telemedicine in 2007 that primarily focuses on tribal areas in Maharashtra such as Satara, Nandurbar, Beed and Sindhudurg. The specialist end of telemedicine project was located at King Edward Memorial Hospital at Mumbai. ISRO provided technical support during the first phase of telemedicine in Maharashtra. During the second phase,

<sup>3</sup> Punjab Health Systems Corporation, Department of Health and family welfare, Government of Punjab, Telemedicine reports, Retrieved from <http://punjabhealth.co.in/downloads.aspx?ID=6s2R5ZOLv4c=&&Header=8ZK01RUjWG96iUXHPGooEBZYmKAhfmB>

Maharashtra telemedicine project was expanded to 5 specialist ends such as KEM Hospital, Mumbai; B. J. Medical College, Pune; GMC Aurangabad; GMC Nagpur and Sir J. J. Hospital, Mumbai, 23 district hospitals and 4 sub-district hospitals (Kumar et al., 2012).

In 2007-2008, telemedicine project was launched in Madhya Pradesh by the joint efforts of ISRO, Department of Health, Government of Madhya Pradesh and Madhya Pradesh Council of Science & Technology. The telemedicine network provided various services such as teledermatology, teleradiology, telecardiology etc. to certain tertiary centres connected to district level hospitals in Madhya Pradesh (Bali et al., 2016).

Apart from the above discussed telemedicine projects, Ministry of External Affairs (MEA), Government of India has also implemented other projects such as Pan-African e-Network project and the SAARC e-Network Tele-Medicine project to provide specialist healthcare facilities to citizens living in these countries and to share expertise in medical knowledge among doctors. Further, to ensure realistic implementation of telemedicine projects, Indian Government allocated a grant of ₹122 crore for e-health including telemedicine in the 12th five year plan. In the past, ₹19.83 crore was granted to National Rural Telemedicine Network in 2007-08 and 2008-09. This whole amount was released immediately, at that moment, to the States/UTs to kick start the ambitious project at the earliest. In 2012-13 also a grant of ₹2032.78 lakhs was released to seven States/UTs as mentioned in Table 1.

**TABLE 1: ALLOCATION OF FUNDS TO KEY STATES FOR TELEMEDICINE ACTIVITIES**

Sr. No.	State	Grant (in lakhs) ₹
1.	Assam	1559.92
2.	Maharashtra	317.82
3.	Himachal Pradesh	50
4.	West Bengal	45
5.	Punjab	40
6.	Dadra & Nagar Haveli	10.69
7.	Tripura	9.35

Source: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=98549>

### Section-III

#### Challenges for Telemedicine in India

The major challenges in the successful implementation of telemedicine in India are as follows:

**1. Security and Privacy issues:** One of the most important challenges in implementing telemedicine technology is to ensure security and privacy of patients' information and data. While telemedicine technology provides various means to access and transfer medical information, it also compromises on the security of the patients' information due to ease of manipulation and replication through various security related attacks such as masquerade, modification of messages and denial of service (Zain & Clarke, 2005; Das & Mukhopadhyaya, 2011). Telemedicine security concerns include the problems of confidentiality, authentication, integrity and

accountability (Savastano et al., 2008; Garg & Brewer, 2011). Medical Council of India's Code of Ethics Regulations, 2002 necessitates that physicians must protect the confidentiality of patients including their personal and domestic lives. However various security attacks such as interruption, interception, modification makes protection of patients' electronically stored and transmitted data difficult.

**2. Technical issues:** Telemedicine systems also face the problem of technical failures or malfunctions. Effective execution of telehealth and telemedicine practices requires uninterrupted and continuous availability of power supply, but in India, especially in rural areas, frequent occurrence of long power cuts poses a challenge to the successful implementation of telemedicine applications. Gulube & Wynchank (2001) evaluated the performance of a national telemedicine system in South Africa and found that one of the major reasons for unsuccessful implementation of telemedicine system in South Africa includes technical problems experienced during the first year of operation. Acharya and Rai (2016) conducted a study to determine the problems encountered during delivery of healthcare services through telemedicine at Apollo Tele Health Services, Hyderabad. Findings of the study revealed that 47 percent of the problems encountered during telemedicine consultations were related to technical issues.

**3. Medical malpractice:** Medical malpractice involves injury or death of a patient due to deviation from the accepted standards of practice in medical community. Moreover, in case of medical malpractice especially during cross border consultations, it may become difficult to identify the party liable for such practice.

**4. Shortage of trained staff and healthcare professionals/manpower:** The doctor-patient ratio in India is very poor as indicated by National Health Profile (2015). Every Government allopathic doctor serves 11528 persons on an average. In a country like India with a population of over 1.3 billion, such poor doctor-patient ratio poses a big hindrance to effective implementation of telemedicine applications.

**5. Linguistic diversity:** India is one of the most multilingual countries in the world. As per Census of India (2001) there are 122 languages and 234 mother tongues in India. Another survey known as People's Linguistic Survey of India (2013), reported that total number of languages in India has increased to 780<sup>4</sup>. The presence of such diversity in languages might pose a threat to effective communication between patient and healthcare professional belonging to different regions of the country.

**6. Depersonalization of patient-doctor relationship:** Evidence suggests that telemedicine may negatively impact interpersonal relationship between patients and doctors (Matusitz & Breen, 2007; Miller, 2010). During a teleconsultation, images of both patient and doctor can be seen on the monitor and all interactions between two parties are indirect. One's perceptions of what is seen on a monitor are

<sup>4</sup> Retrieved from <http://www.hindustantimes.com/books/780-languages-spoken-in-india-250-died-out-in-last-50-years/story-Y3by800YbXRA77xP2AEWKN.html>

very much influenced by his experience of watching television, therefore it is quite possible that both the parties involved in teleconsultation might not consider it as a real experience (Hjelm, 2005). The absence of personal face to face contact with the doctor during teleconsultation also contributes to the dissatisfaction with the treatment amongst the patients (Acharya & Rai, 2016).

### 7. Perspective of health care professionals and patients:

Realizing the increased usage of ICT in healthcare sector in the present scenario, many institutions have been providing training programmes to make medical professionals proficient in the use of ICT tools. However, healthcare professionals in rural and remote areas of India might not be well trained and comfortable in using such ICT tools. Moreover fear of the patients regarding effectiveness of telemedicine outcomes makes them reluctant to accept and adopt telemedicine practices.

**8. Absence of law related with telemedicine:** Telemedicine activities in India are governed by laws like Indian Medical Council Act, 1956; Code of Ethics Regulations, 2002; Information Technology Act, 2000 etc. However, as such there is no law that is solely dedicated to telemedicine in India. Thus, the absence of legislation that directly deals with telemedicine makes it difficult for the healthcare professionals to keep track of so many legislations governing telemedicine in India.



### SUGGESTIONS

To confront the above mentioned challenges, following measures can be adopted by the concerned authorities for the advancement of telemedicine in India.

- Data security solutions: Advance data security solutions such as data masking, backups, disk encryption, data erasure, and disk encryption etc<sup>5</sup>. must be implemented to protect patients' electronic data from various security attacks and to ensure the privacy and confidentiality of data.
- Custom electronic health records: With the help of dedicated software, medical records of patients must be converted into electronic form in such a way that it integrates their medical data and records from all the hospitals and clinics at one place. Moreover patients must be allowed to access their medical records at any time or from any place all over the world. Such electronic health records offer various benefits such as reduced medical errors and costs, improved quality and other operational benefits. Realising such benefits of electronic health records, the Health Information Technology for Economic and Clinical Health (HITECH) Act has been introduced in 2009 in U.S.A. to focus on the promotion of adoption and meaningful usage of health information technology (Menachemi & Collum, 2011).
- Portable equipments: Effective portable equipments such as telemedicine carts, electronic stethoscopes, smart band-aids or plasters, mobile medical devices etc. must be

provided to ensure the availability of effective healthcare services to people especially living in the rural or remote areas.

- Collaboration of public and private sector: Effective implementation of telemedicine applications in India requires the support of both Government and private sector. Active participation of NGOs can also prove to be very beneficial.
- Training programmes: Appropriate training programmes must be conducted on regular intervals of time to make the healthcare professionals and staff proficient in advanced ICT tools to implement telemedicine applications effectively.



### FUTURE PROSPECTS OF TELEMEDICINE

Government of India and other organizations have been planning and gradually implementing various telemedicine projects to provide better healthcare services to people throughout the country. A healthcare initiative called Social Endeavour for Health and Telemedicine (SEHAT) has been launched in 2015 by Government of India based on the vision of 'Digital India'. SEHAT focuses on usage of digital technologies to allow people living in rural areas to easily and efficiently access knowledge, skills, information and other services in various sectors<sup>6</sup>. To extend healthcare facilities to the remotest and rural areas of country through telemedicine networks, ISRO has decided to collaborate with Union Ministry of AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha & Homoeopathy) to launch a project called "Tele-AYUSH" (Pharmabiz, 2016).

Telemedicine and health care practices are expected to grow in India due to prioritization by the Government in telecommunication and health sectors. With the development of state-of-art technologies and infrastructure in India, telemedicine projects have been able to extend healthcare services even to remote areas. Telemedicine market has also emerged as a fast growing healthcare sector in India. According to a study conducted by the Associated Chambers of Commerce & Industry of India (2016), telemedicine market in India is expected to be around \$32 million by 2020. Establishment of legal framework, availability of trained human resources, development of national e-health policies, availability of regular and adequate funds are some of the factors that will determine growth of sustainable telemedicine network in India.



### CONCLUSIONS

In a nutshell, telemedicine consists of various procedures, that makes it more beneficial from other healthcare practices. In the current scenario of rising healthcare costs, shortage of trained healthcare professionals, rising chronic diseases, application of ICT in healthcare sector in the form of telemedicine plays a vital role in improving the efficiency and

<sup>5</sup> Retrieved from [https://en.wikipedia.org/wiki/Data\\_security](https://en.wikipedia.org/wiki/Data_security)

<sup>6</sup> Press Information Bureau, Government of India, Ministry of Communications & Information Technology, Retrieved from, <http://www.pib.nic.in/newsite/printrelease.aspx?relid=126318>

effectiveness of healthcare system. The healthcare sector in India is facing a growing demand for diagnostic and expensive therapeutic resources. To meet such demand, measures such as data security solutions, portable equipments, collaboration of public and private sector can be adopted. The presence of electronic interconnectedness in telemedicine allows physicians to keep a better record of patients' health. A large number of initiatives have been undertaken at the

Government level along with other public and private organizations to use telemedicine as an effective tool to extend healthcare services and health education to people of India. Thus, it can be said that telemedicine applications have a bright promising scope in India. An ideal integration of health care system and ICT tools will play an important role in redefining health care in India.

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