TECHNOLOGY USAGES IN INDIA'S RURAL HEALTHCARE SECTOR

Dr.M.VADIVEL[1]

Abstract

India has huge Population most of the people living in rural areas. Usage of technology in rural public health care centers provides a low level of treatment due to insufficient technology and devices. Residents of rural areas have normal health care services and to be paid more health expenses than their own income. Once public health care services fail people are forced to take treatment in private hospitals charging money for using technology like urine tests, blood tests, Scan, X-ray, MRI Scan which Price ranges from Rs. 4000 to Rs. 8000 per single visit these expenses are very high for middle and low income earners.

Key notes: Internet of Thinks, Artificial Intelligence, Telemedicine, Rural Healthcare,

[1] Assistant Professor of Economics, Erode College of Law, Erode, Tamilnadu, India.

Introduction

The history of technology in public health is long and varied, with significant developments occurring over the past several centuries. In the modern era, technology in public health has continued to evolve and expand with the development of new technologies such as electronic health records, telemedicine platforms, and mobile health apps, modern diagnostics, imaging technologies, health information systems, and telemedicine and Health applications. Primary health care and the principle of "Appropriate Technology" Primary health care (PHC) is the foundation of a solid, effective healthcare system, and appropriate technology is critical in delivering PHC services. PHC is the first level of contact between individuals and the healthcare system and is characterised by accessibility, affordability, and community participation. Appropriate technology in PHC is essential to deliver high-quality, cost-effective services that meet the population's needs.

Past Studies

Panagariya A. (2014) explained that the accessibility of healthcare as well as utilization of available healthcare facilities, especially in rural areas, continues to be poor in India. Provision of healthcare for rural areas hinge on the affordability of treatment and diagnostic costs, in order to propel the indigenous production of medical devices, drugs, surgicals and diagnostics, the biomedical scientists in the hospitals, research institutions and elsewhere can come together and translate their knowledge into affordable medical products. **Roy A, Mitra A, Soman B (2023)** stated the healthcare industry is the primary adaptor of newer technologies in the world. Ironically it is mainly confined to the curative arena, and people in public health are a bit reluctant to utilise the newer technologies. Often the first encounter of rural folk in India with high-end technologies would be when they land in a hospital, and this could be confusing. However, the total denial of technology would do more harm to public health as resources are constrained, and technological innovations can be leveraged to ensure optimal utilisation of resources and address issues like health inequity. **Ayush Atul Mishra (2023)** told that as India has become fast-paced in terms of development, technological solutions are paving the way for affordable healthcare for the people. Especially in rural areas where there is less preventive care, a lack of medical practitioners and prolonged primary care generally lead to a delay in proper diagnosis. However, technological

infusion, along with appropriate infrastructure and efficient processes in place, has not only made healthcare in rural areas accessible but also affordable. With the help of technology, the best doctors are now able to cater to patients living in remote areas of the country. Let us discuss how technological intervention is revolutionizing the healthcare landscape. **Sathish (2023)** pointed out the potential of telemedicine technology in transforming the healthcare sector of India is marred with multiple challenges. It is to be noted that out of a 2.16 million health workforce in India, a large section is not familiar with the ICT technology and computer aided tools and software. The shortage of power supply and frequent cuts is a big issue in rural areas. In the nascent stage of Telemedicine in India, non-availability of technology at a relevant cost and a poor internet connectivity in rural areas pose a greater challenge for its effective implementation. This information needs to be properly archived, accessible, retrievable, secure and readable from remote location using different technology platforms. One patient-one record needs to be implemented, so as to avoid duplication of information.

Hemai Sheth (2021) told that the Covid-19 pandemic has accelerated the adoption of digital technologies by health and human services with India witnessing one of the highest adoption rates, according to a new survey from EY and Imperial College London's Institute for Global Health Innovation. EY has released its report 'Embracing Digital: is Covid-19 the catalyst for lasting change based on a survey of more than 2,000 global HHS professionals in six countries (India, Australia, Italy, UAE, the UK and the US), including 359 respondents from India. According to the report, 51 per cent of respondents in India have increased their use of digital technologies and data solutions since the Covid-19 outbreak. This has further led to increased staff productivity for 74 per cent of respondents. 75 per cent also reported that digital solutions have been effective in delivering better outcomes for patients and service users. Globally, 62 per cent of respondents reported an increase in the use of data and technology solutions. "The UAE and India appear to be ahead of other countries in our sample, in terms of the percentage of organizations adopting these tools," it added.

The Global vs Indian Scenario for Health care sector

The global scenario for using technology in public health varies widely, with some countries adopting new technologies more quickly than others. High-income countries tend to have more advanced healthcare systems and can invest more heavily in developing and adopting new technologies. In India, the use of technology in public health is also rapidly evolving, with the

government making significant efforts to promote the adoption of digital health tools and services. However, there are significant challenges to adopting technology in public health in India. These include issues related to data privacy and security, the inherent property of technology in exacerbating inequalities, and the need for a systematic process for the development, implementation, adoption, evaluation and sustainability of technologies in the health system.

India's Rural Health Profile

According to the Department of Drinking Water and Sanitation, Ministry of Jal Shakti, government of India said that the number of Indians living in rural areas in the country is over 95 crores, as of April 1, 2023. The state with the highest number of Indians living in rural areas is Uttar Pradesh, where over 16 crores people live in rural areas, accounting for 16.6 per cent of the total number of people living in rural areas in India. According to The George Institute for Global Health India, a medical research institute reported that over 6,65,000 villages in India. Moreover, several adults were living in rural areas die prematurely due to diseases of the circulatory system, including heart disease, and conditions affecting the respiratory system. Over 25 million Indians living in rural areas in the country have diabetes. The challenges faced by people living in rural areas in India include a lack of access to healthcare, which leads to increased incidence of maternal mortality, neonatal mortality, malnutrition, and infectious diseases. Heart diseases and diabetes are responsible for premature deaths in rural Indians. Compared to the West, these conditions occur at a much younger age in India. These diseases have a major role to play in the increasing poverty rate in India, and are the most common killers of people of working age, especially in rural areas. People with heart diseases living in rural India do not receive regular medical care. The vaccination rates are also quite low in some rural areas. As a result, the life expectancy of people living in several rural areas in India is low. There is also a lack of skilled healthcare professionals in a large number of rural regions in India.

Chandra Ganjoo (2023) explained that according to a report by the United Nations 75 per cent of all healthcare infrastructure including medical specialists and doctors are concentrated in urban areas where only 27 per cent of the Indian population live. The Indian healthcare industry will increase from $160 billion in 2017 to $280 billion in 2020, according to the Indian Brand Equity Foundation (IBEF). Through the use of technology, a high level of personalization and care has become feasible since chronic diseases are on the rise, as is the demand for individualized care based on the patient's illness and psychological makeup.

Samaya Darmaraj (2019) reported that According to the Future Health Index (FHI) 2019 report**,** India is leading in the adoption of digital health technology with 76per cent of healthcare professionals in the country already using digital health records (DHRs) in their practice. The FHI is based on primary research conducted across 15 countries. India meets the 15-country average when it comes to the usage of artificial intelligence (AI) within healthcare at 46 per cent. The report confirms that digital health technology is a pivotal pillar in delivering value-based care across the healthcare continuum in India. Tools including telehealth and adaptive intelligence solutions can help lower the barriers between hospitals and patients, thereby improving access to care and enhancing overall patient satisfaction, particularity in tier II and III cities in India. 87 per cent of Indians with access to their digital health record say they want their healthcare professionals to have access as well. Providing education and information around the benefits of these technologies will be key in taking Indians along this technological healthcare journey.

Healthcare awareness among rural Indian

According to Mohapatra, these technologies can educate rural Indians about preventive measures, common illnesses, and available healthcare services. Community health workers play a major role in the healthcare sector because they serve as a bridge between healthcare facilities and rural communities. Since they are appropriately trained and have adequate knowledge, they can organise health camps, awareness drives, and provide essential information to rural Indians to improve health-seeking behavior. "Engaging in school programs and workshops, and focusing on health education, can ingrain healthy habits from an early age. Incorporating health modules in the school curriculum can be beneficial." Mohapatra added Local media can play an extremely important role in reaching a greater audience in rural areas. This is because local radio, newspapers, and television channels can broadcast healthcare information to increase awareness about diseases and enhance education in rural India.

Mohapatra said rural healthcare is an extremely important sector that has been getting significant attention of late. A large number of rural Indians do not know how to leverage healthcare technologies. The villages in which they live may have advanced healthcare facilities, but the people living there may not be well-versed in those technologies. "Technology has ushered in a new era of healthcare in rural areas, making it more accessible, attentive, and affordable. It has the potential to bridge the healthcare gap, ensuring that rural communities receive the same high-quality care as their urban counterparts. India's government has been pushing for the adoption of

technology in the public healthcare sector. As OpenGov reported earlier, India's National Association of Software and Services Companies (NASSCOM) collaborated with an apex healthcare industry to leverage the benefits of IoT and AI. Focusing on Internet of Things, Artificial Intelligence, machine learning, robotics, virtual reality and block chain technologies that have a positive impact on improving healthcare in India. Also, the agencies will jointly work with central and state government organisations, NGOs and corporate CSR Teams to identify healthcare projects that have a significant impact on public health. They will work towards Sustainable Development Goals (SDGs) and support the government in achieving healthcare goals.

Increase in phone and video consultations

Remote consultations have also witnessed an uptick. As per the survey, phone and video consultations have witnessed the highest uptake across all technology solutions. Phone consultations are being offered by 81 per cent of HHS organizations and while 71 per cent of organizations are offering video consultations. The uptake has been higher in India with 86 per cent of organisations offering phone consultation and 83 per cent for video consultations. "The public sector organisations in India preferred digital tools for self-help that 92 per cent organisations) and online self-assessment tools of 89 per cent organisations over the phone consultation and video consultation.

Telemedicine for Healthcare Sector in India

The involvement of **Information and Communication Technology (ICT)** is increasing exponentially in almost all the socio-economic activities in India. One can behold the fusion of ICT and Medical Sciences that has fuelled researches and innovations in the healthcare sector round the globe and Telemedicine is one of the most precious gifts of this technological amalgamation. Telemedicine is the use of telecommunications and information technology to provide clinical healthcare at a distance. Telemedicine is not only confined to the dissemination of medical information from one nodal point to another with the help of electronic communications but it also includes a variety of applications such as Telepathology, Telecardiology, Teleradiology, Telesurgery, Teleopthalmology. The latest wireless and mobility technologies have spread both tentacles and benefits of this revolutionary discipline and after the advent of digital stethoscopes, Otoscopes and blood pressure monitors, consultation through telemedicine has become more scientific and authentic. The healthcare sector in India faces the challenge of skewed distribution of health professionals in urban India. In a country like India, where 70 percent of its population

is non-agrarian whereas 75 percent of its qualified doctors live in urban areas, Telemedicine can emerge as a panacea to Indian health sector's existing problems.

Challenges for Technology in Indian rural areas

The multiple challenges in implementation of telemedicine are creating bottlenecks in the rise and growth of telemedicine in India. But, through an effective public private partnership (PPP) model, these blocks can be easily averted and India can witness an anticipated boom in the health care sector in future. Moreover, the Government of India should join hands with the global ICT players for more cost effective, easy to install and pragmatic telemedicine solutions. Private hospitals can also play a big role in educating the masses about the benefits of telemedicine and can also provide training to doctors, technicians and paramedical professionals.

Advantages of Technology in India

Technology like Telemedicine has multiple advantages for healthcare sector in India. It bridges the gap between the people and medical institutions in a vast and diversified country like India. Telemedicine can resolve resource crisis in India's healthcare sector to a great extent and it can act as a boon for a country where the majority of patients in the rural areas are still deprived of basic health care facilities. Secondly, Telemedicine helps to overcome the shortage of healthcare professionals in India. India currently has only 0.7 physicians per 1000 people while China and Russia have 5 and 1.5 respectively. On long term basis, it would also reduce the financial and infrastructure burden on governments for provision of healthcare services to its population. Telemedicine would reduce the inequalities in distribution and provision of quality healthcare services to its population. Telemedicine is also very useful in Tele-education and Tele- CME.

Technological Intervention: Changing the Dialogue of Healthcare

Ayush Atul Mishra (2022) acknowledged the intervention of technology has also pushed the traditional workings of healthcare institutions aside and laid the foundation for more accessible and affordable care. The doctor-patient ratio in the country is 1:834, which makes tech-enabled healthcare services a need of the hour, especially for the remote areas of the country. Here, tech-enabled healthcare facilities play a very significant role in providing the proper healthcare in rural areas. Tech-enabled healthcare facilities are becoming the norm now. One of the most common examples of technological interventions in the healthcare structure of the country today is telemedicine. Telemedicine started as a solution to cater to the needs of patients during the pandemic, reduce exposure and save the lives of essential workers at the forefront. However, this

modern practice has gained momentum and is now being rapidly used as a means of affordable healthcare for people residing in rural areas.

Technology Contribution in Rural Health

Most importantly, a large number of rural Indians do not know how to leverage healthcare technologies. The villages in which they live may have advanced healthcare facilities, but the people living there may not be well-versed in those technologies. Therefore, it is important to educate rural Indians about the significance of advanced healthcare technologies, and workshops and training programmes must be conducted to teach them how to use these facilities.

According to The George Institute for Global Health India, innovative, simple and low-cost smartphone technologies can help address the rural healthcare challenges in India. Because, these technologies will be affordable as well as accessible, and rural Indians will be able to learn how to use them with ease. Since several villages lack trained healthcare professionals, state-of-the-art electronic decision support systems must be built. Community healthcare workers such as Anganwadi should learn how to use these technologies, and also teach others how to access them. It is important to leverage this technology because wireless networks reach over 80 per cent of India's population.

Technology is helping improve accessibility and affordability of rural healthcare

Telemedicine, teleconsultation, remote monitoring, and telecardiology have reduced the overall health burden in India, especially in rural areas. This is because real-time medical consultations, interventions and prescriptions are possible through digital technology, said Sen. Not only are these technologies affordable, but also easily accessible. They have also helped decrease travel expenses because several rural Indians no longer need to travel to cities to meet healthcare experts. Doctors can seamlessly share electronic health records with rural patients. Thus, electronic health records are allowing personalised attention, and telemedicine, telecardiology, and teleconsultations are enhancing the affordability of healthcare services.

Role of Technology in health centres and e-clinics

Role of Technology in health centres and e-clinics play in improving rural healthcare. Microsatellite centres are revolutionizing rural healthcare in India because they wirelessly connect remote locations to healthcare providers. E-clinics, which provide virtual doctor consultations to rural Indians, are also helpful. They are offline centres in rural areas equipped with medical

facilities such as basic check-ups, and first aid. People can also undergo blood tests at e-clinics. Through a hybrid model of microsatellite centres, e-clinics and healthcare providers, a seamless connection is established. This hybrid model ensures healthcare is accessible and readily available to all, even in the most remote areas. E-clinics serve as collection points for diagnostic samples and facilitate referrals when necessary. They facilitate timely diagnosis, prescribe appropriate treatments, and guide patients through their healthcare journeys said Priyadarshi Mohapatra, Founder, CureBay, an Odisha-based online platform providing healthcare services.

Using telecardiology, doctors remotely interpret electrocardiogram recordings. "Microsatellite centres help rural populations and remote locations connect with urban healthcare facilities and deliver essential medical services. They facilitate healthcare providers' online participation and enable the sharing of medical records and electronic health records (EHR) between physicians and patients. These centres leverage a robust telecommunication infrastructure, including satellite technology, high-speed internet, and mobile networks, to support immediate remote consultations and medical assessments. This real-time communication is particularly beneficial for conditions like cardiovascular diseases (CVD) and other critical complications that require continuous monitoring. In India, numerous telecardiology, telemedicine and teleconsultation platforms have harnessed these advancements, expanding healthcare access to rural areas with limited healthcare infrastructure. Additionally, healthcare providers in remote areas can electronically send prescriptions to pharmacies through microsatellite centres, ensuring timely access to medications," said Arindam Sen, Director, i2i TeleSolutions, a Bangalore-based digital platform providing healthcare services and offering specialist training.

Role of Artificial Intelligence in improving rural healthcare in India

AI can revolutionise the healthcare sector, especially rural healthcare, if used to complement the expertise of healthcare professionals. AI can also be used to educate rural Indians about diseases, heart rate and blood pressure of patient data can detect conditions. Some AI algorithms can also be used for initial consultations in regions where medical infrastructure is inadequate. Rural Indians must also be trained how to use AI-driven apps such as chatbots which can give people medical information in different local languages. In rural areas, access to specialised medical expertise is limited said Mohapatra.

AI-driven tools such as mobile apps, wearable monitoring devices and teleconsultation or Telecardiology platforms provide an opportunity to address these disparities and advance

healthcare services for rural populations. Presently, AI is being incorporated into diagnostic algorithms to screen for various illnesses, including cancer, diabetic retinopathy, and cardiovascular diseases. By analysing clinical and lab data from patients, the digital tools with AI solution can identify new risk factors and deliver precise heart risk scores and other rapid health diagnostic results to patients without requiring an extensive health examination, facilitating early disease detection.

ICT infrastructure supporting Telehealth

The increased digital penetration in the rural parts of the country has helped the introduction of telemedicine. Patients have the opportunity to have in-depth disease information, communicate with physicians from their homes or E-clinics, and manage their chronic conditions efficiently with continuous monitoring. Telemedicine systems can help healthcare providers reduce doctor-patient visits and break the chain of infection transmission. Because the majority of the population in rural areas is not tech-savvy, telemedicine centres such as Tattvan E Clinics play an important role in providing easy access to doctors to patients from the comfort of their homes.

Conclusion

Rural healthcare infrastructure has always been a priority for the government of India. Several government initiatives, such as the National Rural Health Mission and programs such as the Basic Minimum Needs Program, have been implemented. The role of technology in the future of public health in India is immense. Many health problems that frequently go unnoticed affect a sizeable portion of India's rural population. Compared with urban India, rural India has low level of technology and usages in various fields particularly in health sector. people should know thoroughly how they use the technology to find out he health problems and related treatment based on the knowledge of the rural people. Government of India should initiate the program that explore the knowledge to learn usages of technology in healthcare sectors then only patients and health professionals will access and receive the benefits.

References:

Ayush Atul Mishra (2022) “How has technology helped rural India’s healthcare system become more accessible and affordable?”, News blogs india, Voices, Times of India, October 31, 2022, 2:52 pm IST. https://timesofindia.indiatimes.com/blogs/voices/how-has-technology-helped-rural-indias-healthcare-system-become-more-accessible-and-affordable/

Chandra Ganjoo (2023) “What role can technology play in improving the health infrastructure of India”, Voices, Times of India, March 6, 2023, 3:17 PM IST.

Deeny S, Elwell-Sutton T, Keith J, Stafford M. (2019) “Harnessing data and technology for public health: five challenges”, Responding to the government’s prevention green paper, The Health foundation: 2019. Available from: https://www.health.org.uk/publications/long-reads/harnessing-data-andtechnology-for-public-health-five-challenges

Hemai Sheth (2021) “India witnessed highest adoptions of digital technologies by health and human services organisations: Survey”, Business line, the Hindu, Mumbai, March 18, 2021 at 01:12 PM.

Panagariya A. The Challenges and innovative solutions to rural health dilemma. Ann Neurosci. 2014, Oct;21(4):125-7. doi: 10.5214/ans.0972.7531.210401. PMID:25452670; PMCID: PMC4248476.

Radifah Kabir (2023) “The Science of Health: How Technology Helps Improve Accessibility and Affordability of India's Rural Healthcare”, 25 Sep 2023 10:18 PM (IST).

Roy A, Mitra A, Soman B (2023) Public health in India: Leveraging technology for a brighter future, Opn. Med. Sci. Technol. Health, 2023; 1(2): e23014

Samaya Dharmaraj (2019) “Digital health tech on the rise in India”, August 23, 2019.

Sathish (2023) “Telemedicine For Healthcare Sector In India”, MGMICE ,March 26, 2019.

*****