



DIGITAL TECHNOLOGY EVOLUTION IN HEALTHCARE: INDIA'S STRATEGY TO FIGHT AGAINST COVID-19

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ABSTRACT

The global healthcare services have failed considerably against coronavirus disease. People infected with coronavirus are increasing day by day, and healthcare resources are limited. In this unprecedented situation of COVID-19, traditional channels of interaction between patients, doctors, pharmacies, supply chain networks, healthcare, and pharmaceutical companies have been disrupted. With the second-highest global population, a country like India is facing several challenges in the healthcare sector. This paper intends to present how India's strategy works to fight against COVID-19 by utilizing digital technology to improve the public and private healthcare system. The research focuses on a case study where several digital technologies are used in Indian healthcare in this pandemic situation. It also involves reviewing the Nation Digital Health Blueprint (NDHB), which provides a framework to strengthen the National Health Policy, 2017 (NHP, 2017). The paper also discusses how healthcare professionals have responded towards digital technologies, its implementation, and the benefits of digital platforms for the patient in terms of efficiency, effectiveness, and affordability.

KEYWORDS: indian healthcare system, national digital health blueprint, telemedicine, digital therapeutics

JEL CLASSIFICATION: I18, M15, O32

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1. INTRODUCTION

The global healthcare system completely shattered now due to the outbreak of the COVID-19 pandemic, which is a global threat to the current healthcare system and has revealed the healthcare system's limitation. According to WHO, coronavirus vaccine or other specific drug treatment for this disease is not available yet, but various clinical trials of vaccines and drugs are under progress. (WHO) In the global scenario, the number of infected people is increasing day by day, and now it becomes a societal crisis for the global community. India is also facing many unprecedented challenges in the healthcare system due to the outbreak of COVID-19. To overcome this situation and provide proper healthcare services to the patients, digital technologies in the healthcare system are the current best option available in this pandemic situation. Digital technologies resolve the problems suffered by developed and developing countries in providing affordable, high-quality healthcare services and vast reachability. (WHO, Telemedicine, 2009) With the help of case studies, we understand how the Indian government is employing digital technology in the healthcare system in this COVID-19 situation and initiatives taken by public and private institutions to transform the Indian healthcare system with digital technologies.

2. LITERATURE REVIEW

Telemedicine technology is the best option available to improve the healthcare facilities in rural areas due to its cost-effectiveness. Matthew Berman and Andrea Fenaughty developed a model of service demand for telemedicine technology. After implementing this model, they conducted a survey where they found that patients in rural areas of Alaska save about USD 40. (Matthew Berman and Andrea Fenaughty, 2005). Recently published BCG report titled "future of work," which they have surveyed in the tier 1 metro cities where 200 registered medical practitioners participated and given feedback on the effectiveness of digital health. (Guha R., BCG, 2020) On that basis, The BCG has made a new commercial operating model which helps to understand the utilization of digital technology so innovatively that traditional channel of interaction between patients, doctors, pharmaceutical companies, and medical shops can be improved. (Guha R., BCG, 2020; Parker et al. (2013); conducted a study among the geriatric patients who willingly adapted m-health technology in the management of their chronic pain. In this study, six groups of geriatric patients are interviewed, and the results show that all the patients were satisfied and achieved the desired outcomes. They can manage their chronic pains and face some issues related to un-familiarity towards new technology, battery issue, network connectivity issues, and the most important high is the fixed price of mobile phones. (Parker et al., 2013)

National Digital Health Blueprint (NDHB) is the key to universality, citizen-centricity, quality of care, and performance accountability. (GOI, MoHFW, 2019) Its mission to create an interconnected database of electronic health records, which will be delivered as a reliance source for health data of every patient within India, apart from that other existing or creating new dataset of state-wise directories of health professionals, health facilities, disease registries, records of inventory and insurance claim history. (GOI, MoHFW, 2019) NHDB has a vision of building an integrated health information system for all stakeholders, to improve efficiency, transparency, and based on the citizen-centric health model. (GOI, MoHFW, 2019)



It aims to promote the digitalization to build a digital health system, mainly focusing on telemedicine, digital therapeutics, telehealth, hospital information system, etc. (GOI, MoHFW, 2019) NDHB has now become National Digital Health Mission under the National Health Policy 2017. It provides a strengthened to the healthcare system and a lot of future opportunities.

3. OBJECTIVES OF THE STUDY

1. Determine the effectiveness, efficiency, and affordability of digital technology in public and private healthcare sectors.
2. Evaluate the digital technology used in the COVID-19 pandemic situation with the help of a case study from the India perspective.
3. Review and understand the population using NDHB.
4. Determine the scope of digital therapeutics, e-prescription, e-pharmacy, telemedicine, and telehealth.

DATA COLLECTION AND METHODOLOGY

Data for this study is collected from published Articles, News, Reports from the Boston Consulting Group), Press Releases of MoHFW, Government of India (GOI), Indian Brand Equity Foundation (IBEF), Reports of WHO (World Health Organization), amongst others. A descriptive study is performed.

DISCUSSION

In this, we discuss the scope of the NDHB, which is now the National Digital Health Mission for the patients, health professionals, and other stakeholders. Digital healthcare case studies discuss resolving various issues like security, affordability, efficiency, and effectiveness of digital healthcare.

SCOPE FOR PATIENT

NDHB follows the universal standards for creating the Electronic Health Records (EHR) system. It has a unique secure digital Health ID for all citizens, which is integrated with other digital healthcare system components to avail healthcare services either online (Indian health portal) or through mobile phones (my health apps). Value-added services included are telemedicine, digital therapeutics, e-prescription service, and teleconsultation. It delivers better healthcare quality through real-time monitoring and interventions in remote areas. Data security is maintained using National “Opt-out” (for privacy), and digital health locker is available to maintain personal health records.

Limitations

Patients were unable to control or access their health records without the intervention of doctors or hospitals. Due to a lack of monitoring authority, it is difficult to track patient safety and quality of care through a digital healthcare system. Other factors such as low digital literacy program, awareness, availability of resources, and connectivity in rural areas are the key issues which not consider in the NDHB.



SCOPE FOR HEALTH PROFESSIONALS (SUCH AS DOCTORS, NURSES, PARAMEDICS)

The NDHB encourages creating national and regional registries to integrate healthcare professionals, health-workers, pharmacies and provide a scientific framework for data collection and its screening. NDHB promotes the unification of health communication center and voice-based services that will help in evidence-based planning, decision-making, and improving training efficiency. It also helps in the case transfer/ digital referrals, one platform to access the emergency cases, dissemination of appropriate content, information, alerts, updates, and online education through registered mediums or channels such as smartphones and various web portals. It also includes the Clinical Decision Support (CDS) system, and digital diagnostics has ameliorated healthcare quality. Digitalization of hospital and Digital pharmacy improve the delivery of healthcare services.

Limitations

The safety of healthcare professional, nurses and paramedics from electronic equipment which are used during treatment is not monitored due to the lack of a regulatory system that takes care of Standard Treatment Guidelines (STGs) issued from the MoHFW.

SCOPE FOR STAKEHOLDERS (EDUCATIONAL INSTITUTE, RESEARCH INSTITUTE, PUBLIC AND PRIVATE AGENCY, ETC)

The NDHB focuses on building up a network for the sharing of health information and health services. The database is intended for personal, clinical and other personnel to preserve their health records and connected to numerous databases that can be accessed by public and private entities, including in the absence of a personal health identifier system that would ultimately help to classify health care system facilities, diseases, and devices. It improves efficiency through health data analytics and various medical research.

Limitation

There is no provision for providing financial support to the stakeholder who contributes to digital technology improvement and innovation. Not mention the cost or a charge which is taken by the government for utilizing data for research.

CASE STUDIES

GOVERNMENT INITIATIVES TOWARDS DIGITAL TECHNOLOGY AT THE PANDEMIC SITUATION

Aarogya Setu App

Aarogya Setu app is a remarkable example of collaboration between government, industries, citizen and academics to form a digital platform which enables Bluetooth based contact tracing, mapping of likely hotspots and collecting details of relevant information. (GOI, Aarogya Setu, Press Release, 26th May 2020) The analytics of Bluetooth contacts and location data helps identify potential hotspots with a higher probability of COVID-19 cases allowing state government, district administration, and health authorities to take the necessary measures suggested by the ministry of health and family welfare containment zones. (GOI, Aarogya Setu,



Press Release, 26th May 2020) Bluetooth-based contact tracing and hotspots identification may hold the key to effectively breaking the chain of infection, flattening the curve, and saving lives in this pandemic situation. It is available in 12 languages on Android, iOS, and KaiOS platforms. (GOI, Aarogya Setu, Press Release, 26th May 2020) The key pillars of this app are transparency, privacy, and security. For the improvement and to make secure and robust, the government takes helps from various software developer communities, and they launched the Bug Bounty Programme. (GOI, Aarogya Setu, Press Release, 26th May 2020) In this program, various security researchers and the Indian developer community are welcomed to test the security, effectiveness, and enhance user's trust. (GOI, Aarogya Setu, Press Release, 26th May 2020) Currently, Aarogya Setu digital platform is used by 150 million users and thereby has received wide acceptance. (Upadhyay H., 2020)

'e-Sanjeevani' Telemedicine

e-Sanjeevani Telemedicine is a national telehealth consultation service. It is the first online OPD platform developed by the Centre for Development of Advanced Computing (C-DAC), which provides the connection between medical practitioner to a medical practitioner (e-Sanjeevani), and sick person to medical practitioner (e-Sanjeevani OPD) telehealth consultation. (GOI, MoHFW, NTS) It aims to provide healthcare services to patients at their doorstep and works on the "Hub and Spoke" model in which hospitals and medical colleges are transformed into health and wellness centers. (ET, Health, 2020) Its key features are Online OPD, real-time interaction, e-prescription, state services doctors providing virtual video visits, and enhanced communication services. (GOI, MoHFW, NTS) to reduce the financial burden in healthcare. According to the article published in the daily press The Hindu, this platform has provided nearly 2 lakh telehealth consultations and has provided telehealth services to 75 percent of the population. Currently, it is serving in 23 states of India where Tamil Nadu (56346), Uttar Pradesh (32325), Andhra Pradesh (29400), Himachal Pradesh (26535), and Kerala (21433) are the top states using the e-sanjeevani platform. It has better efficiency and accessibility in rural areas. (The Hindu, 2020) Through this e-sanjeevani platform, around 5000 telehealth consultations were provided daily to the patients, a boon for rural areas where 3000 health and wellness centers are present in 10 states of India. 40 e-sanjeevani OPDs are helping patients in this pandemic situation. (TOI, 2020)

PUBLIC SECTOR AND PRIVATE SECTOR INITIATIVES TOWARDS DIGITAL TECHNOLOGIES AT THE PANDEMIC SITUATION

COPAL-19

COPAL-19 app was developed by a resident medical practitioner of AIIMS and Indian Institute Technology Delhi students. The tracking and management system helps track the availability of beds in the hospital and provide plasma donors for the treatment of COVID-19. This application helps COVID-19 patients to detect the hospital for the treatment of coronavirus. It provides real-time information of COVID-19 patients in the hospital and discharged patients who have developed immunity against it. It is available as an open-source platform for users. It further provides detailed information for the treatment of COVID-19. (Hindustan times,



2020) This initiative was taken from the public domain to contribute to the digital healthcare system in India.

Apollo Telemedicine Network Foundation

Apollo Telemedicine Network Foundation (ATNF) was founded in the year 1999. It now has 21 years of experience in telemedicine and teleconsultation services. (Bollineni R., 2011). The ATNF teleconsultation services cover 25 disciplines ranging from ENT to heart surgery and is available in six different languages. Apollo Telemedicine Network Foundation (ATNF) is divided into two categories, one is the Telemedicine Specialty Center (TSC), and another is the Telemedicine Consultation Center (TCC). (Bollineni R., 2011) As far as TSC is concerned, technicians help the patients provide digital healthcare in a sophisticated manner. Apollo hospital uses the ISDN telephone line connected with the VSAT (Very Small Aperture Terminal) system to provide better connectivity for video conferencing and voice transmission (Bollineni R., 2011). Medical records in TSC are viewed by using the digital interface (Bollineni R., 2011). ATNF has a custom-made web-based software called “medinategra” is used by many peripheral centers to transmit ECG images, X-rays films, Computed Tomography (CT) scan, ultrasound images, MRI, and other reports (Bollineni R., 2011). Nearly 2500 doctors are available on board 1, 00,000 individuals use it for different healthcare purposes. Apollo Telemedicine Network Foundation (ATNF) has given 9,72,339 telehealth consultations during COVID-19. (Ganapathy k., 2020) Furthermore, it has used telemedicine to examine, investigate, monitor, and treat patients in remote areas. Services like e-prescription, e-pharmacy, and digital diagnostics are the services which are offered by Apollo Telemedicine Network Foundation (ATNF). The Apollo 24/7 illustrates progressive changes in virtual healthcare services with an artificial intelligence-powered chatbot technology used by 115 million people from 440 Indian cities. (Dev S., EC, 2020)

RECOMMENDATIONS

Few recommendations for the NDHB are:

1. To establish technological advancement, digital infrastructure and provide better safety standards for a digital healthcare monitoring system.
2. To separate the auditory body, which ensures the verification and authenticity of patients' clinical data collected from healthcare professionals, and to provide the digital healthcare training.
3. Foster the formation of digital healthcare governing organizations to maintain the patient's digital privacy and the secrecy of health records.
4. To increase awareness of digital healthcare technologies such as telemedicine and telehealth in society.

CONCLUSION

In this pandemic situation, a lot of digital technologies and innovations have been taking into account. The initiative was taken by the government, public and private sector in healthcare by using digital technologies to strengthen the Indian healthcare sector that covers 75 percent of the population and helps in the determination of COVID-19 affected areas. Digital



technologies provide security concerns and programs such as bug-bounty programs, which enhance trust and reliability towards the digital platform and focus on providing affordable health services. An initiative like telemedicine, teleconsultation, e-prescription, digital therapeutics, telehealth is boon for healthcare and creates many opportunities in digital healthcare systems in India. As we discussed, the scope of the NDHB that is now the NDHM helps transform the future of the Indian healthcare system.

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