

**A STUDY ON INDIA'S PREPAREDNESS FOR DIGITAL HEALTH AND
LEARNING OPPORTUNITIES FROM UK**

Dissertation Submitted to



The IIHMR University, Jaipur

For partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Akriti Dua

Under the Supervision and Guidance of

Dr Seema Mehta

2022

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DECLARATION BY STUDENT

By signing this document, I certify that my dissertation, A Study on India's Preparedness on Digital Health and Learning Opportunities from UK, is an accurate account of my original research. I certify that it has not been applied for a degree or diploma from any other university or institution. Information that was taken from other people's published or unpublished work has been properly acknowledged in the text.

Dr Akriti Dua

01.07.2022

CERTIFICATE

This is to certify that Dr. Akriti Dua completed her or his internship satisfactorily at IIHMR University, Jaipur from March 22, 2022, to June 19, 2022, in MBA (Hospital and Health Management) from the IIHMR University, Jaipur.

Place: IPE Global, New Delhi

Date: 01.07.2022

CERTIFICATE

This is to certify that dissertation titled A Study on India's Preparedness for Digital Health and Learnings from UK is a record of the research work undertaken by Dr Akriti Dua in MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

Dr Seema Mehta

IIHMR University, Jaipur

1.07.2022

ACKNOWLEDGEMENT

I would like to extend my sincere and heartfelt thanks towards my industry mentor Ms Deepika Joshi for providing me this opportunity opportunity and a great learning experience. I am grateful to the entire team of IPE Global Ltd who directly and indirectly helped me in completing the project.

I would also extend my warm regards to Dr Seema Mehta for her constant support and guidance during my internship period.

Finally, I want to thank my friend Aishwarya Satija for inspiring me every step of the way.

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ABBREVIATIONS

ABDM	Ayushman Bharat Digital Health Mission
NHA	National Health Authority
NDHM	National Digital Health Mission
HCP	Health Care Professional
AI	Artificial Intelligence
VR	Virtual Reality
DISHA	Digital Information Security in Healthcare Act
NHS	National Health Stack
PDPB	Personal Data Protection Bill
NDHS	National Digital Health Standards
AB-PMJAY	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana
ICT	Information and Communication Technology
HWC	Health and Wellness Centres
GDP	Gross Domestic Production
UHI	Unified Health Interface

ABSTRACT

Background

In any country, ensuring healthy lives and encouraging well-being are fundamental and critical demands (United Nations Sustainable Development Goal No. 3). Health promotion, preventive, primary care, and specialised care are among the several stages of healthcare delivery that are expected to be significantly impacted by the digital transformation of health services.

The Indo-Pacific and India-UK leadership in the areas of climate, clean energy, and health will have a positive impact on the global stage. The UK-India Digital Health Partnership envisions revitalised and dynamic connections between both countries; re-energized trade, investment, and technological collaboration that improves citizens' lives and livelihoods; increased defence and security cooperation that makes the Indian Ocean Region more secure; and Indo-Pacific and India-UK leadership in these areas. .These reforms form the bedrock of the digital transformation in the healthcare sector of the country and have opened multiple avenues for national as well as international businesses working in this domain.

Objectives

- To assess the preparedness of India for digital health using various indicators
- To analyse the possible learning prospects of India in digital health from UK

Methodology

A descriptive cross-sectional study was carried out with an aim to assess the preparedness of India for digital health using various indicators and to analyse the possible learning prospects of India in digital health from UK.

A mixed method approach was used where both primary and secondary research was carried out to meet the research objectives.

INDICATOR	METHOD OF DATA COLLECTION
Adoption and Utilisation Rate – User and Provider (Healthcare Professionals) Perspective	Primary Research
Infrastructure Readiness for Digital Health	Secondary Research
Investment Flows in Digital Health in Successive Years	Secondary Research
Existing Regulations and Policies for Digital Health	Secondary Research

Results and Conclusion

The present study evaluated the preparedness of India for digital health using four indicators- Adoption and Utilisation of Digital Health (Provider perspective), Infrastructure Readiness for

Digital health, Current Policies and Frameworks on Digital Health and Investment Flows in Digital Health in Successive Years (2019-2022).

India's work in the area of digital health has received acclaim on a global scale, as has its contribution to the World Health Organization's landmark decision on the subject.

The Aadhaar, Unified Payments Interface, widespread Internet, and mobile phone infrastructure that now exists a solid foundation for developing the ABDM building pieces. which aims to provide connected health services through a health card with a health ID for every person, was introduced by the honourable Prime Minister of India on August 15, 2020. Prior to the foundation of the NDHM, India made efforts in this area through its NHP.

The survey concluded that half (50%) of the HCPs are ready to adopt digital health technology in their clinical practice. However around 30% of them need technological guidance. Around 10% of the people do not want to adopt digital health technology in their practice for which the major reason can be that they do not want to embrace the change. Teleconsultation services are the most common digital health technology being used by the HCPs. The support from government policies and initiatives for telemedicine being a major force.

Chapter 1: Introduction

In any nation, promoting wellbeing and guaranteeing healthy lifestyles are important requirements. With the aim of enhancing citizen care and wellbeing, the development of digital health technology has inspired interest in both clinical and non-clinical usage. Digital transformation is projected to increase healthcare's availability, accessibility, affordability, and quality in order to overcome India's underdeveloped healthcare infrastructure, which contributes to a supply-demand imbalance.

In rural India, where more than two thirds of our population lives, access to modern, specialised healthcare is still a luxury. A primary health facility, a sub-center, and a hospital are only accessible to 13%, 33%, and 9.6% of the population in rural India, respectively. The many stages of healthcare delivery, such as health promotion, preventative care, primary care, and specialised treatment, are projected to be significantly impacted by the digital transformation of health services.

A wide, multidisciplinary notion called "digital health" or "digital healthcare" comprises ideas from the point where technology and healthcare converge. Software, technology, and services are all part of digital health, which applies digital transformation to the healthcare industry.

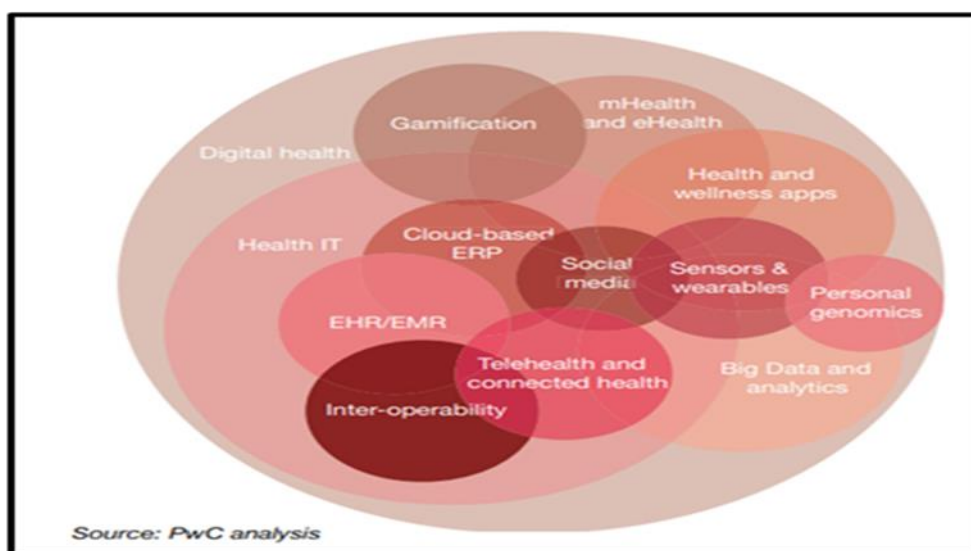


Figure 1.1: Digital Health Ecosystem

As the global pandemic raged across the world, the world saw the resilience of digital technologies to empower the healthcare system. In India, the central government had recognized the potential technologies in improving the healthcare landscape with the launch of following initiatives: AarogyaSethu App, e-Sanjeevani Telemedicine platform, CO-WIN vaccine management platform – to support the ongoing healthcare services. Emerging health technologies like wearable technology, telemedicine, genomics, etc.

The ability to smoothly integrate the digitalization of health data into initiative with the least opposition from the related systems and stakeholders for its effective and sustainable use to accomplish the desired goals is referred to as readiness in the context of digital health. India is on the threshold of a digital health transformation, which, if managed correctly, can drive the country's economic growth and serve as an example for rising countries. It is crucial to identify and analyse the numerous indicators of India's preparedness for this change.

India's journey toward digital health reforms began in 2015 with the launch of the Indian government's "Digital India" program. The 2017 release of the National Health Policy (NHP), which opened the door for multiple initiatives and business participation, was a significant turning point in the effort to start this mission in the healthcare sector. India started its road toward digital health reforms four years ago and has made great progress since then. With the aim of making India a global healthcare hub and accelerating the adoption of digital technologies to find better, more effective ways to providing quality treatment, it is anticipated that Indian healthcare spending as a percentage of GDP will rise in the wake of the Covid-19 outbreak.

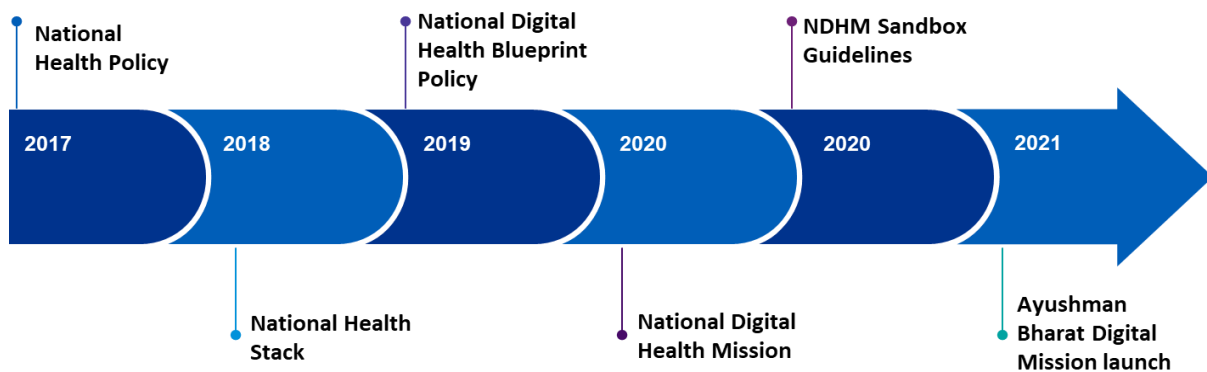


Figure 1.2: Digital Health Journey

India published the NDHM in August 2020 as a continuation of this objective. The NDHM aims to provide an effective, economical, timely, inclusive, and secure. In order to do this, a variety of data, information, and infrastructure services will be provided, and open, interoperable, standards-based digital technologies will be used in the right way. By 2025, a national health information network, a health information exchange, a peaceful data sharing infrastructure, and the adoption of open standards will all be realised as part of the anticipated digital infrastructure under NDHM.

These reforms form the bedrock of the digital transformation in the healthcare sector of the country and have opened multiple avenues for national as well as international businesses working in this domain.

Key Levers of Digital Health Transformation in India

National Digital Health Blueprint (NDHB) <i>National Digital Health Blueprint (NDHB) provides a framework for the evolution of Digital Health Eco-system in the country. It contains a high-level action plan designed as a layered framework, with the Vision and a set of Principles at the core, surrounded by the other layers relating to Digital Health Infrastructure, Digital Health Data Hubs, Building Blocks, Standards & Regulations, and an Institutional Framework for its implementation.</i>	Digital Information Security in Healthcare Act (DISHA) <i>Digital Information Security in Healthcare Act (DISHA) aims to provide for establishment of National and State eHealth Authorities and Health Information Exchanges; to standardize and regulate the processes related to collection, storing, transmission and use of digital health data; and to ensure reliability, data privacy, confidentiality and security of digital health data and such other matters related and incidental thereto.</i>	Personal Data Protection Bill (PDPB) <i>Personal Data Protection Bill, 2019 ("PDPB") aims to provide protection of privacy of individuals relating to their Personal Data and to establish a Data Protection Authority of India for said purposes and matters concerning personal data of an individual. Organizations will have to review and update data protection policies and implement appropriate technical and organizational measures to prevent misuse of data.</i>
National Health Stack (NHS) <i>National Health Stack is designed to provide the foundational components that will be required across health programs in India. NHS is a nationally shared digital infrastructure usable by both public and private sectors, to bring a holistic view across multiple health verticals and enable rapid creation of diverse solutions in health, including digital health: Electronic Registries, Claims & Coverage platforms, Federated PHR, Health Analytics Platform.</i>	National Digital Health Standards (NDHS) <i>National Accreditation Board for Hospitals and Healthcare Providers (NABH) has setup a drafting committee for NDHS. Digital Health Standards aims to consider all relevant aspects of the application of patient interfacing technologies across the continuum of care applicable for outpatient, inpatient, and remote patient monitoring. Digital Health Standards will also act as a catalyst in the faster adoption of technology</i>	National Program on Artificial Intelligence <i>National Program on AI has been set up with a view to guide the research and development in new and emerging technologies. The research would focus to encourage Big Data, cybersecurity and Robotics and explore use cases in healthcare in the areas of AI driven diagnostics, personalised treatment, early identification of potential pandemics, and imaging diagnostics, among others.</i>

Figure 1.3: Key levers of digital health transformation in India

The fourth edition of the India-UK Healthcare Annual Conference was held at the Royal College of Physicians in London. India's role in bringing "affordable, adaptable and accessible" technology to all emerged as a central theme for the conference. This is because of the synergetic strengths of India and UK in this sector. The conference also focussed on India's huge collaborative potential for the UK in digital technology, which is now embedded in biosciences. The UK's expertise in biotech innovation, healthcare services, infrastructure provision, and healthcare education is complementary to India's capabilities in contract manufacturing and medical training as well as its fast-growing ecosystem of technology start-ups. The success of India-UK partnership for COVID-19 vaccination is considered to be an inspiration behind this India-UK partnership in digital health landscape.



Figure 1.4: Key Focus Areas of Partnership

The UK-India Digital Health Partnership envisions revived and vibrant ties between the two nations; revived commerce, investment, and technical cooperation that enhances citizens' quality of life; improved defence. These reforms form the bedrock of the digital transformation in the

healthcare sector of the country and have opened multiple avenues for national as well as international businesses working in this domain.

The partnership is further defined as the development of a federated enterprise digital architecture that is secure, interoperable, and promotes the implementation of health-cloud-network to achieve optimum information exchange through common applications.

The objectives of the study include:

- To assess the preparedness of India for digital health using various indicators
- To analyse the possible learning prospects of India in digital health from UK

Chapter 2 : Review of Literature

A robust, cutting-edge digital health infrastructure has been proposed in this study in order to deliver comprehensive primary healthcare that is efficient and effective and to establish an enterprise architectural framework for overcoming the challenges of interoperability and standardisation of healthcare data. Interoperability of health information is crucial for ensuring continuity of care and improving health outcomes in the primary care setting. A primary care enterprise architecture is the bedrock of a prosperous national digital health ecosystem. As citizens take charge of their health, the country's health-seeking behavior and usage trajectory will be determined by primary care's future-proof digital infrastructure. 2021 Shuta Nadhamuni

This study describes how to assess the healthcare system's readiness to support digital health treatments. Diagnostics, drugs, key clinical personnel, and IT infrastructure were among the covered topics. This was done especially for programs to manage high blood pressure. It was found that apex healthcare facilities in India often have more IT infrastructure to facilitate digital health treatments than lower and mid-tier healthcare facilities. Physical infrastructure deficits sometimes outweighed staffing gaps, demonstrating that IT infrastructure, a fundamental barrier to the adoption of digital health solutions is a lack of important employees. Shivani A. Patel, Kushagra Vashist, 2021

The primary subjects of this study are the digitalization of healthcare data and how it relates to the delivery of healthcare. It examines a wide range of topics, such as hospital and doctor attitudes and practises regarding the digitization of healthcare data, data security, the digital divide, the role of the government and other stakeholders, and more. Additionally, the phrase "Internet of Medical Things" (IoMT), which describes connected medtech products, is used. Wearables, networked imaging, in-patient monitoring, hospital operations, and workflow management are all part of the consumer healthcare market. This area also includes telemedicine and remote consultation (IoMT). 2020 Bright Prakash Dash

In India, the Mental Health Care Act of 2017 attempted to alter how mental health treatments were delivered across the country while making reference to the protection of digital data. Healthcare data linking to the Unique Health ID (UHID) issued to every Indian citizen raises significant concerns about how well the system and the community as a whole are prepared for such a large-scale data linkage and its implications for privacy. Protecting the privacy of those who suffer from mental illness is especially important because doing so lowers their risk of being judged or experiencing stigma, hostility, or problems in interpersonal or professional relationships.

The study also emphasises the necessity of AI researchers working to fill data and technological literacy gaps for both patients.

Chapter 3: Methodology

Nature and Scope of Study

A descriptive cross-sectional study was carried out with an aim to assess the preparedness of India for digital health using various indicators and to analyse the possible learning prospects of India in digital health from UK

Study Setting: The research was conducted at IPE Global, New Delhi

Study Duration: The study was conducted from 22.3.22 to 17.06.22

Research Question

Is India prepared for digital health transformation? What are the learning opportunities for India in digital health from UK?

Data Collection Method

A mixed method approach was used where both primary and secondary research was carried out to meet the research objectives.

INDICATOR	METHOD OF DATA COLLECTION
Adoption and Utilisation Rate – User and Provider (Healthcare Professionals) Perspective	Primary Research
Infrastructure Readiness for Digital Health	Secondary Research
Investment Flows in Digital Health in Successive Years	Secondary Research
Existing Regulations and Policies for Digital Health	Secondary Research

Primary data was collected by using a self-administered study questionnaire. The questionnaire included basic close-ended questions to assess the adoption and utilisation of digital health services by healthcare professionals as well as by users. The survey questionnaire was prepared in google form and circulated via whatsapp link and data was collected. Informed consent was taken from the respondents before filling the survey form. The participant entries and the data were completely anonymous and no personal details were collected in the survey. Completeness of responses were checked after distributing the questionnaire.

Sample Size: 102

Sampling Technique: Convenience Sampling

A rigorous secondary research was done with inference concluded from different research papers, reports, books, journals, websites to collect the data. Healthcare industry market was assessed and the data was extracted and analysed to arrive at conclusion.

Data Analysis Plan

MS-Excel software was used to analyse the data collected from the respondents and the results and findings are presented.

Chapter 4: Results and Analysis**a) Adoption and Utilisation of Digital Health**

A significant portion of the 102 responders were in the 18–29 age range. 50 percent of the respondents were between the ages of 18 and 29; 28.4 percent were between the ages of 30-44; 12.7% were between the ages of 45 and 59; and just 8.8 percent were over the age of 60. Male respondents made up 57.84 percent of the sample, while female respondents made up 42.16 percent.

The gathered information was entered into Microsoft Excel. The information was investigated by using excel platform. The results of the survey were evaluated to check the adoption and utilisation of digital health by the HCPs.

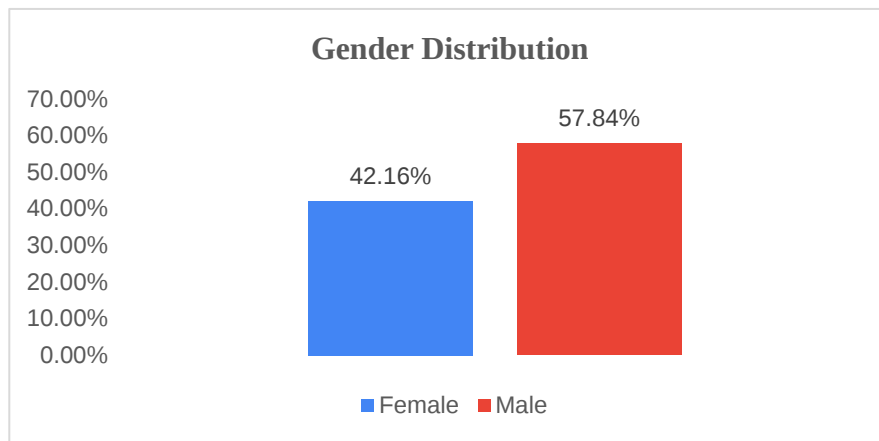


Figure 4.1: Gender Distribution of HCP

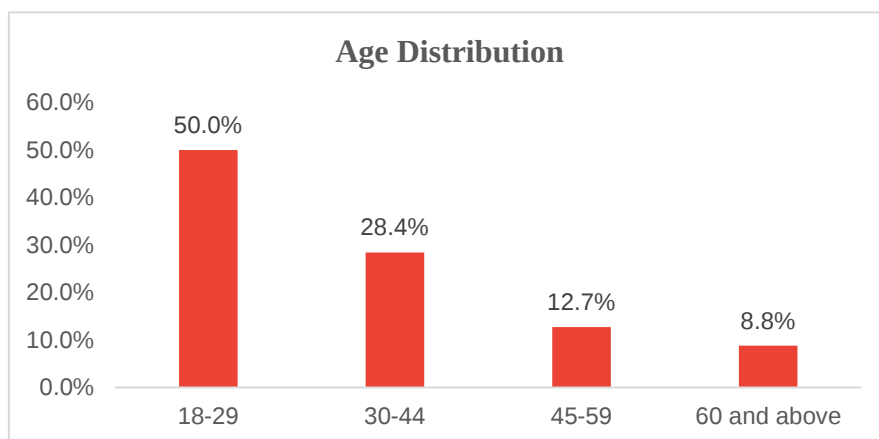


Figure 4.2: Age Distribution of HCP

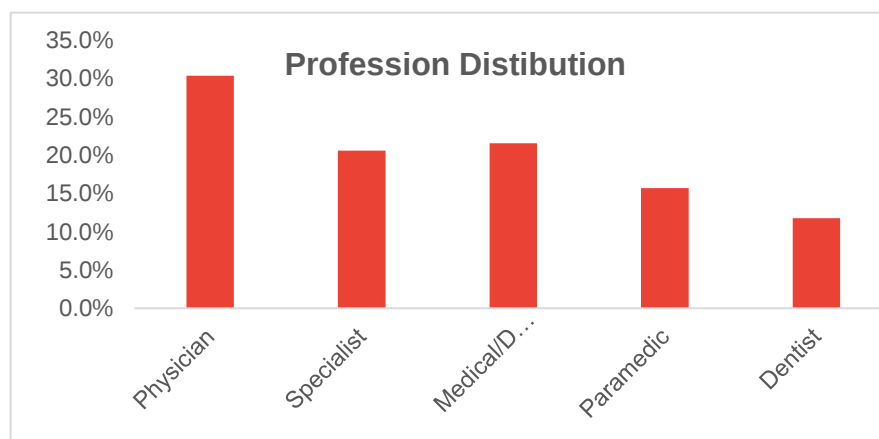


Figure 4.3: Profession-wise Distribution of HCP



Figure 4.4: Distribution of HCP based on Professional Experience

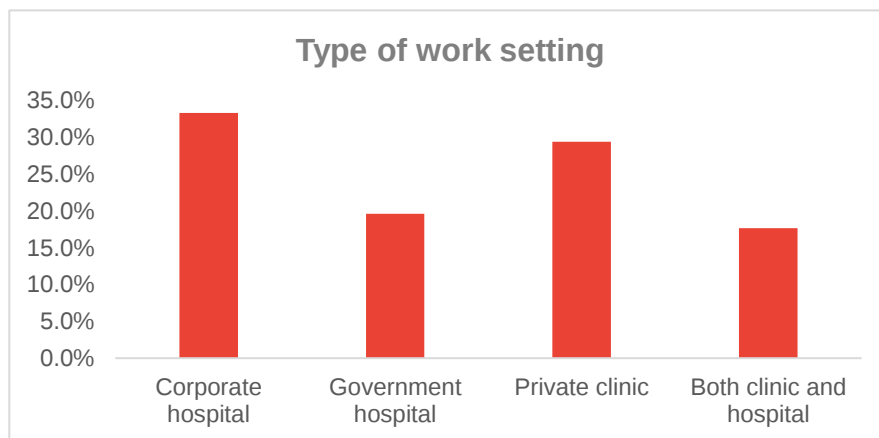


Figure 4.5: Distribution of HCP based on Type of Work Setting

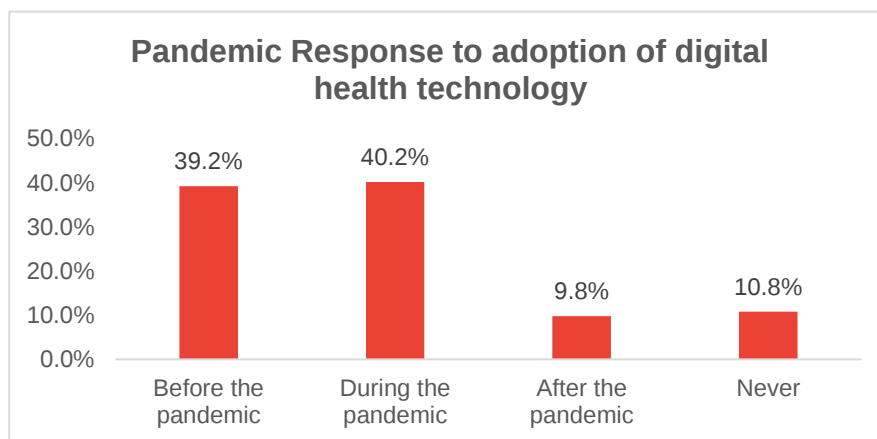


Figure 4.6 : Pandemic response to adoption of digital health

39.2% of HCP were using digital health technology before the pandemic whereas 50% of HCP adopted digital health technology during and after the pandemic marking an increase of more than 10% in adoption. Around 10% HCPs did not adopt digital health technology.

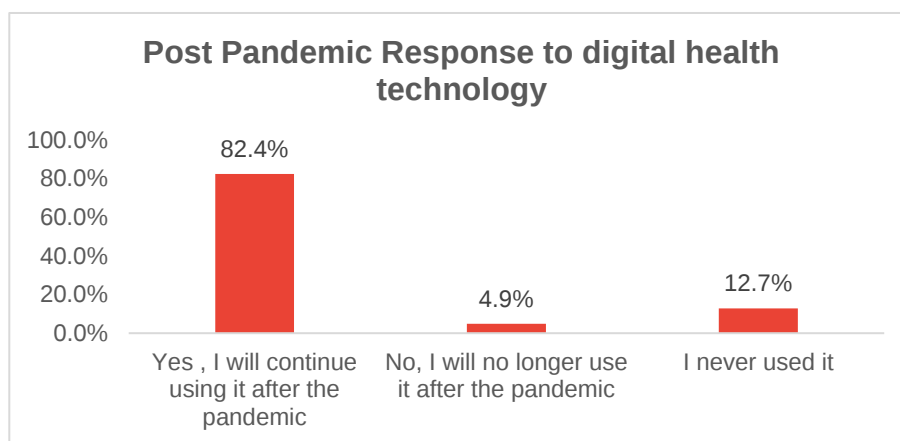


Figure 4.7: Pandemic response to digital health technology

82.4% HCP will prefer to continue using digital health technology after the pandemic which shows the increased adoption of digital health due to the pandemic. Whereas less than 5% of HCP will not prefer to use digital health technology after the pandemic and around 10% never adopted digital health technology in their clinical practice.

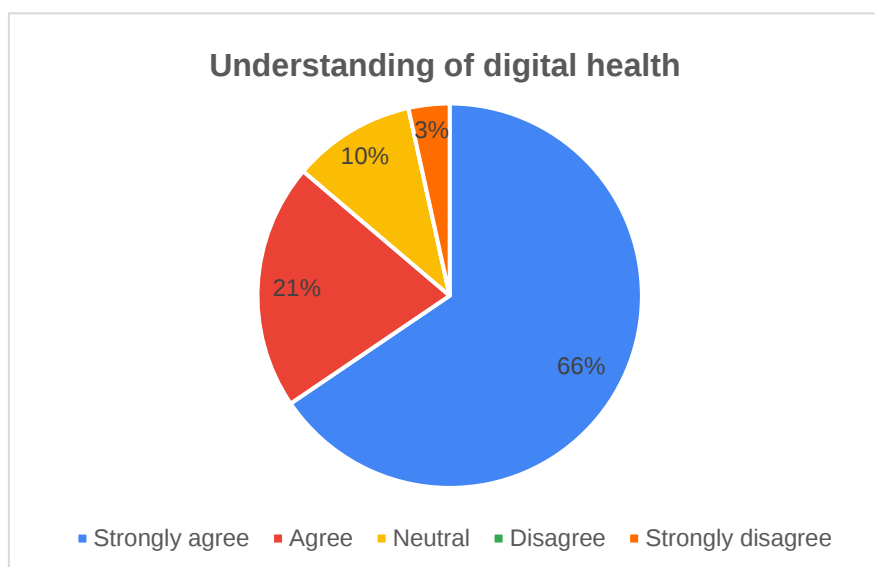


Figure 4.8 : Basic understanding of digital health terminologies

Current understanding of digital health terminologies among the healthcare professionals is quite high. 87% of the HCPs agree that they understand the basic terminologies of digital health. Less than 5% of the healthcare professionals are unaware about digital health. Higher levels of understanding would make adoption of digital health easy for the HCP.

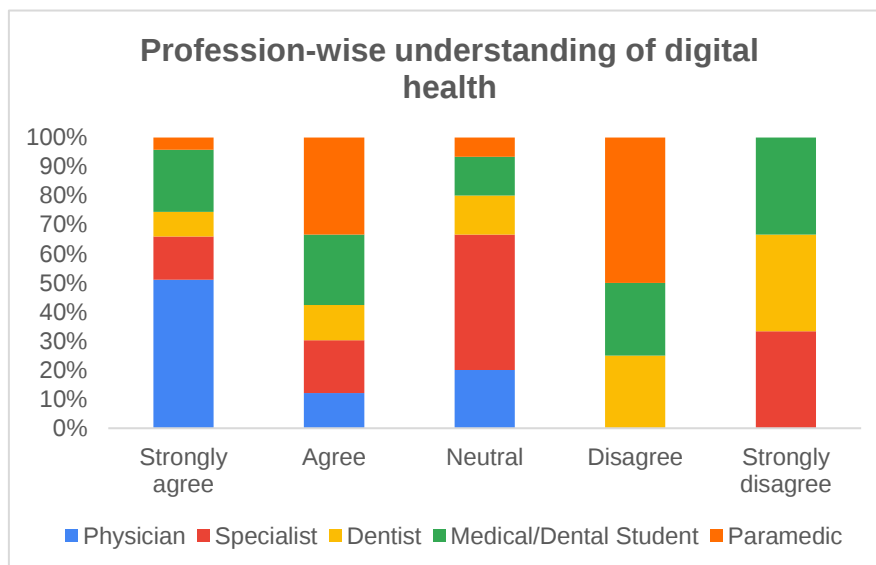


Figure 4.9: Basic understanding of digital health based on

From the above graph 60% of the physicians and 35% of specialists understand the basic terminologies of digital health. Around 50% or half of the dentists and medical/dental students do not have basic understanding about digital health terminologies. More than half of paramedics do not understand the digital health technologies. This shows that more efforts would be required for adoption of digital health technologies by the paramedics , dentists and medical/dental students.

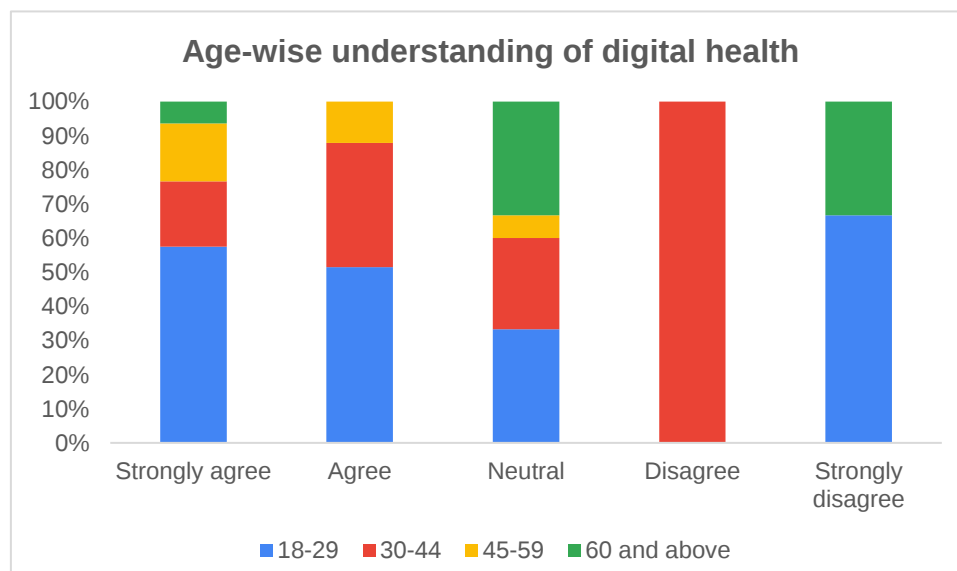


Figure 4.10: Basic understanding of digital health based on age

The young population of HCPs has maximum understanding about basic digital health terminologies whereas the elder HCPs have the least understanding about basic terminologies of digital health.

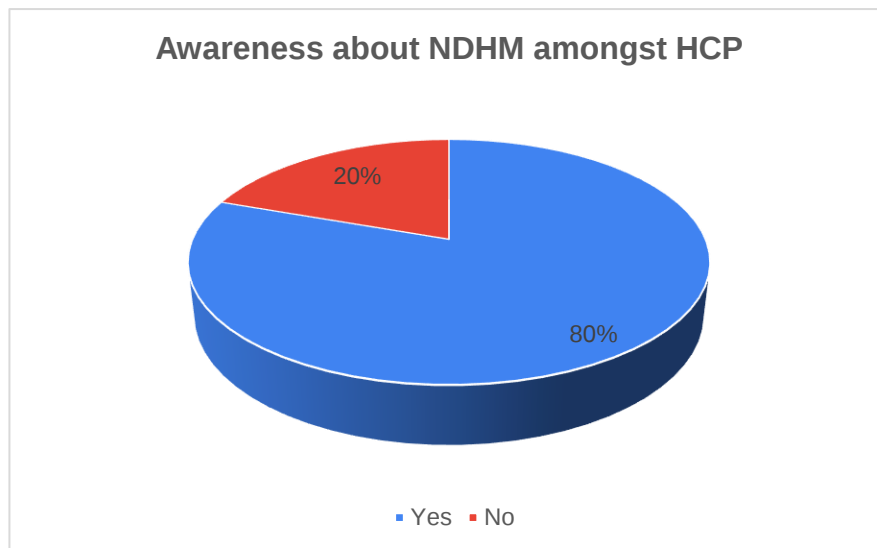


Figure 4.11: Awareness about NDHM amongst HCP

80% of the HCPs are aware about National Digital Health Mission (NDHM). Awareness about NDHM, a government's initiative towards digital health would help in building their trust in digital health leading to easier adoption. This question has been asked to know whether there is lack of awareness that is leading to reduced adoption of digital health amongst HCP or their attitude towards digital health.

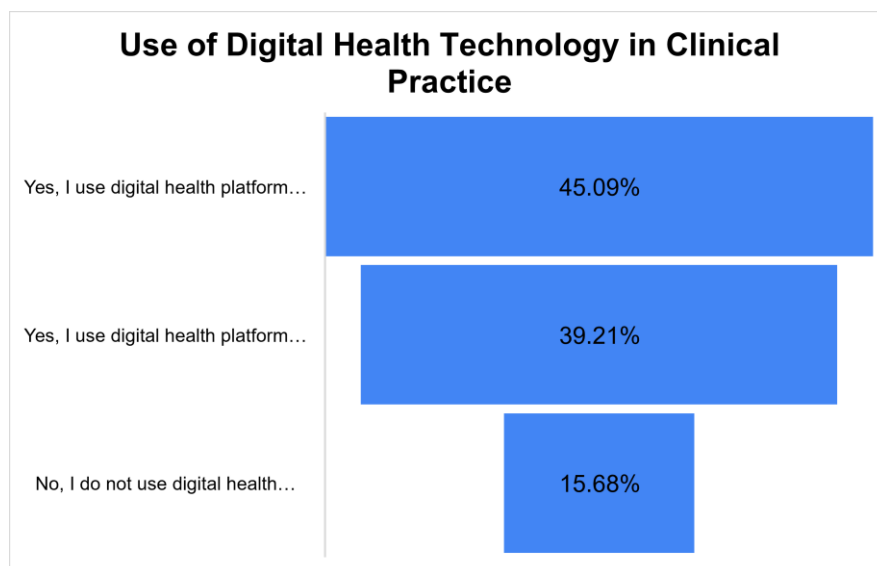


Figure 4.12: Awareness about NDHM amongst HCP

45.09% of HCP use digital health platforms regularly and 39.21% HCP use digital health platforms selectively. Less than 20% of HCP do not use digital health platforms in their clinical practice.

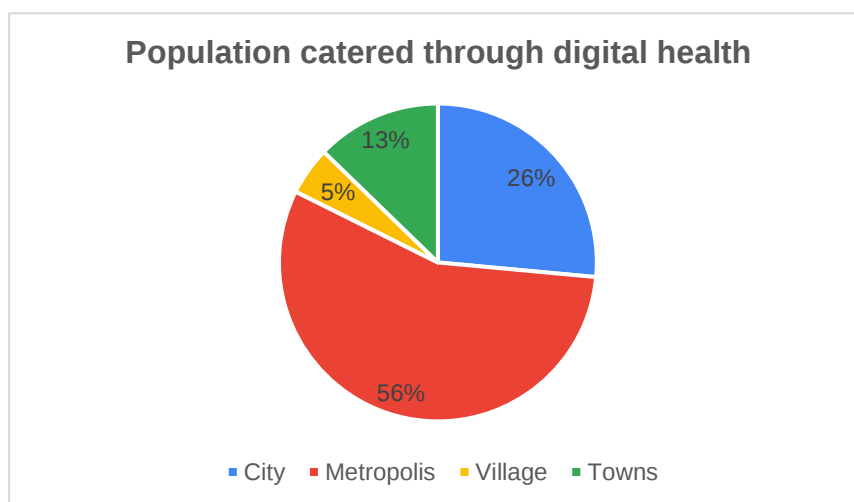


Figure 4.13 : Type of population catered through digital health

The maximum population catered through digital health belongs to metropolitan cities (56%) followed by cities (26%). The least adoption of digital health services is in the villages (5%).

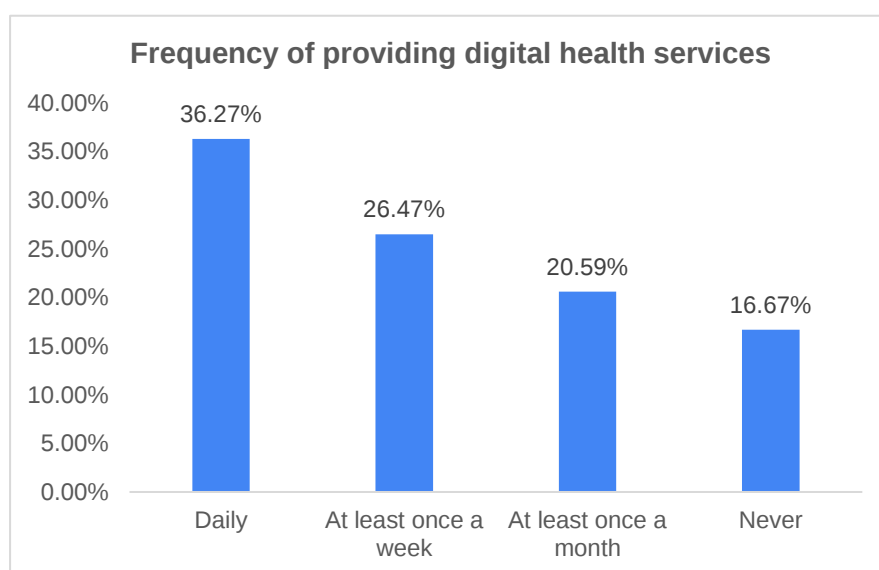


Figure 4.14: Type of population catered through digital

Most of the HCP provide digital health services daily (36.3%). But also around 17% of HCP still not provide digital health services which is quite significant. Around 26% HCP provide digital health services at least once a week and around 20% provide digital health services once a month.

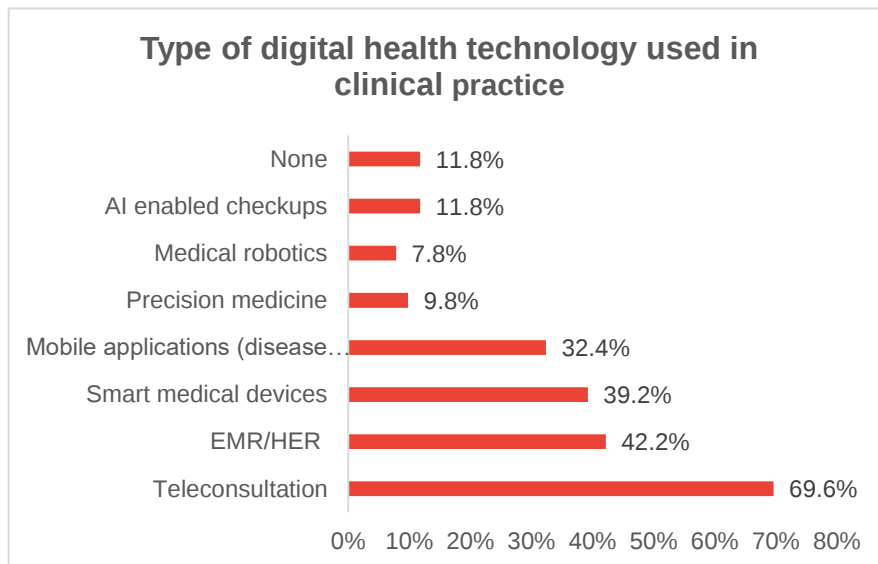
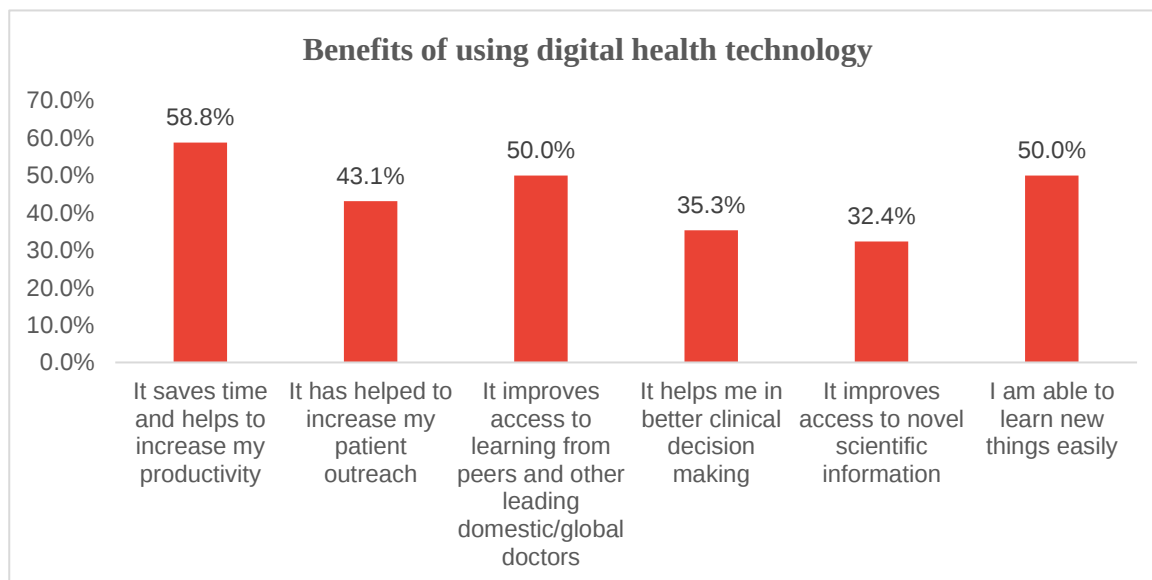


Figure 4.15: Type of digital health technology used in clinical practice

Maximum number of HCP (70%) provide teleconsultation services followed by EMR/HER(42%) and smart medical devices (39.2%). Around 10% of the HCPs still do not provide any digital health services.



According to majority of HCP (58.8%) the major benefit of using digital health technology is that it helps them to save time and increases their productivity. Along with this around 50% of HCP believe that digital health technology improves their access to learning new things as well as learning from their peers and other leading doctors. Moreover, around 43% believe that using digital health technology increases their patient outreach.

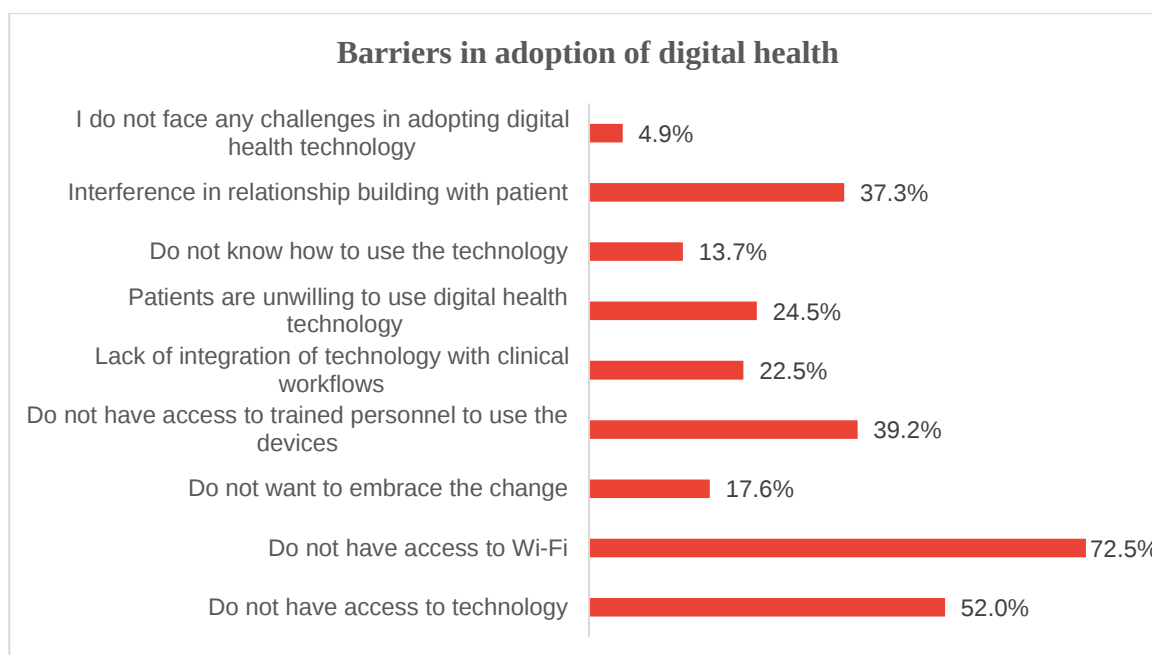


Figure 4.17: Barriers to adoption of digital health in clinical practice

Majority (72.5%) of HCP believe that they do not have access to Wi-Fi at their work settings. More than half of them (52%) also believe that they do not have access to technology. 39.2% of HCP do not have access to trained personnel to use the devices whereas 37.3% believe that it interferes with relationship building with the patient. Only less than 5% HCP feel that they do not face any challenges while using digital health technologies.

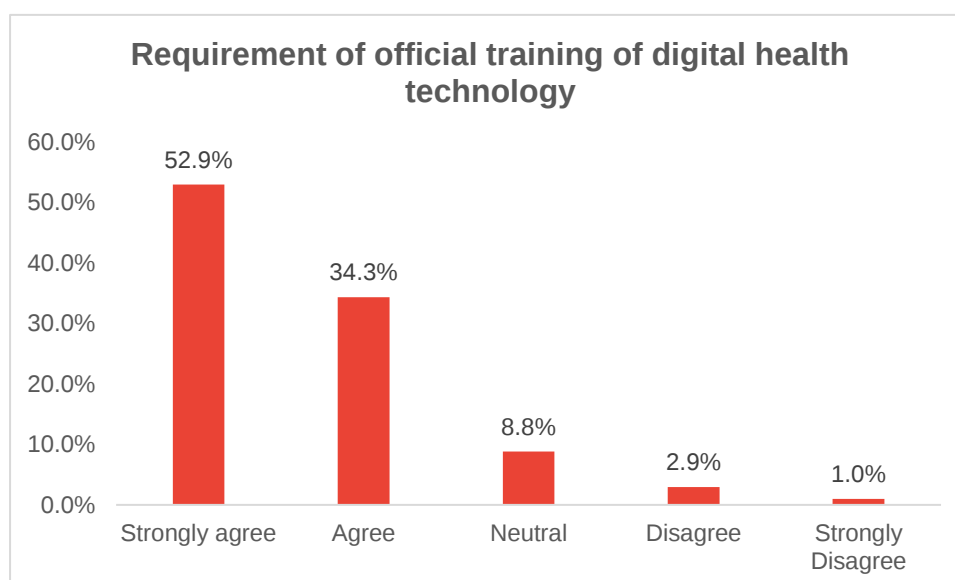


Figure 4.18: Requirement of official training of digital health

87.2% of HCP believe that official training is required for digital health technology which is a significant number. Only less than 5% of the HCP believe that official training for digital health is not required.

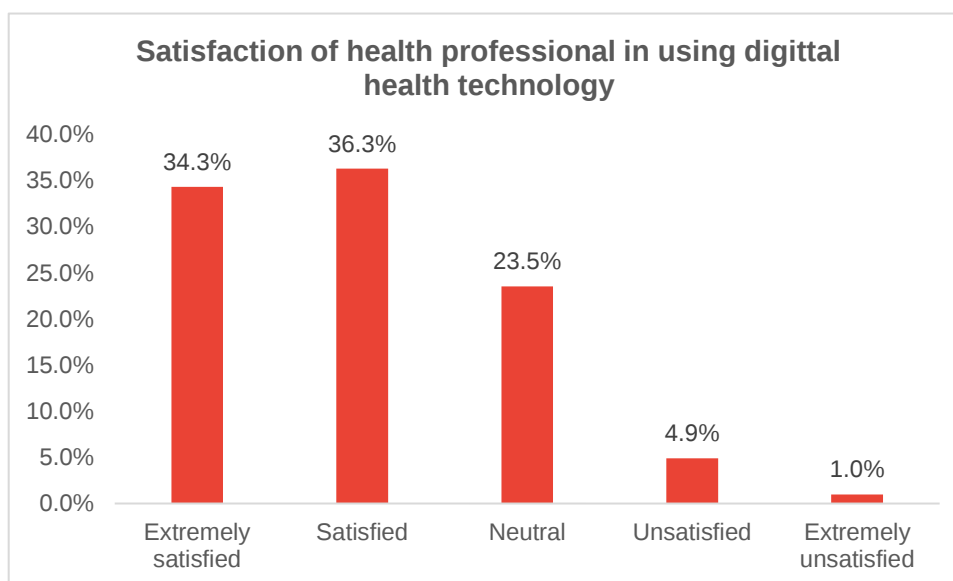


Figure 4.19: Satisfaction of HCP in using digital health technology

An important percentage of 70.6 percent of HCP reported having a positive experience with digital health technologies. About 6% of HCPs express dissatisfaction with the application of digital health technologies.

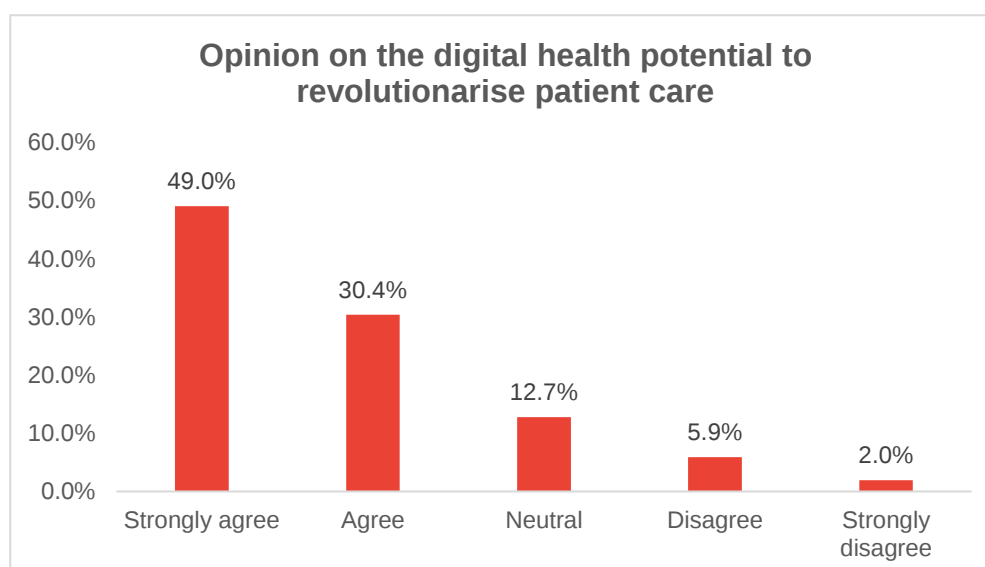


Figure 4.20: Opinion of HCP on digital health potential to revolutionise patient care

Around 8% of HCP disagree with the idea that digital health has the ability to revolutionize patient care, whereas 79.4% do.

(ii) Infrastructure readiness for digital health

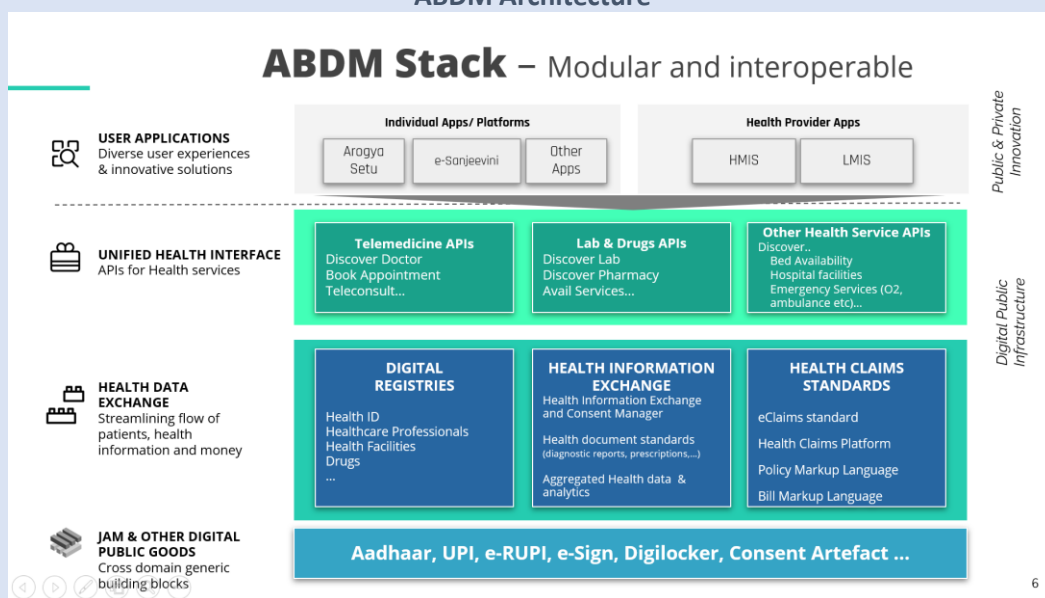
Infrastructure Readiness for Digital Health

Year	Milestone Achieved
2011	National Resource Centre for Telemedicine: It was established in Lucknow by the government to develop and strengthen telemedicine technologies as well as provide necessary technical assistance to state governments.
2012	Clinical Facilities (Central Government) Rules: The regulations mandate that all clinical establishments provide and preserve electronic patient health records. The regulations, however, do not specify the security guidelines that must be adhered to while keeping electronic health records.
2013	<i>The National Institute of Health and Family Welfare in Delhi established the Centre for Health Informatics to oversee the national health site and other E-health activities.</i>
2014	The National Institute of Health and Family Welfare in Delhi established the Centre for Health Informatics to oversee various E-health programmes as well as the national health portal.
2017	National Health Policy: Given the "integral role of technology (Wearable, etc.) in the delivery of healthcare," the policy called for the The Policy recommended creating public health registries and using Aadhaar for identification verification.
2018	The Draft Digital Information Security in Healthcare Act: The draught Act was created the standardisation, privacy, and security of electronic. The parliament, however, never gave this idea any thought. <i>National Health Stack (NHS) is a digital health infrastructure released by Niti Aayog that is necessary for the implementation of digital health programmes in order to facilitate data collecting. National health electronic registries, a coverage and claims platform, a framework for federated personal health data, a national health analytics platform, and other horizontal components make up the National Health Stack.</i>
2019	National Digital Health Blueprint: IT The National Digital Health Blueprint (NDHB) was introduced in mid-2019, according to the National Health Policy-2017's objective and following the maxim "Think Big, Start Small, Scale Fast." It was started with the intention of building a foundational infrastructure for digital health data sharing, developing an electronic health record system, and advancing medical research and health data analytics.
2020	The National Digital Health Marketplace (NDHM), which was introduced on August 15, 2020, aims to create a national ecosystem for digital health that promotes universal health coverage in a rapid, simple, efficient, inclusive, and inexpensive manner. Six union territories, including Chandigarh, Ladakh, Dadra & Nagar Haveli and Daman & Diu, Puducherry, Andaman & Nicobar Islands, and Lakshadweep, have participated in the NDHM pilot programme. Everything in these UTs was sparked by the introduction of Health IDs.
2021	Launch of ABDM: The PM introduced the Ayushman Bharat Digital Mission (ABDM) on September 27, 2021.
2022	ABDM rolled out: The Finance Minister stated in her Budget Speech on February 1, 2022, that the ABDM would be implemented this year. The national rollout of the initiative, was authorised by the Union Cabinet on February 26.

Table 4.1: Timeline of development in digital health

ABDM Building Blocks			
The design of the building blocks of ABDM will adopt and conform to India Enterprise Architecture Framework (IndEA) by default.			
#	Building Block	Details	Current Status
1	Health ID	Creation of a Digital Health ID for all citizens through which store, access and share their health data. This Health ID may be linked to the Aadhar and/or the mobile number of the individual	Now known as Ayushman Bharat Health Account Link: https://healthid.abdm.gov.in/ Open for voluntary registration
2	Healthcare Professionals Registry (HPR)	Hospitals, clinics, diagnostic labs, imaging centres, and pharmacies are just a few examples of the public and private health establishments that can register under the ABDM. Upon registration, the policies under the ABDM shall be binding and the Health Facility shall digitise their systems accordingly	Link: https://facility.ndhm.gov.in/ Open for voluntary registration
3	Health Facility Registry (HFR)	The ABDM allows for the self-registration of individual healthcare providers. Healthcare providers, both traditional and modern, can increase their online exposure and presence.	Link: https://hpr.ndhm.gov.in/en Open for voluntary registration
4	ABHA App(PHR) Mobile	A PHR is an electronic record of a person's health-related data. The most notable aspect of the PHR, which sets it apart from the EMR and EHR, is that the information it includes is in the person's hands.	Available on play store to download

ABDM Architecture



(iii) Investment flows in digital health in successive years

Public Sector Perspective

Annual Budget

For the 2019–2020 budget year, the healthcare sector would get Rs 62,659.12 crore, a boost of roughly 19 percent over the previous year and the largest increase in the preceding two fiscal years. Ayushman Bharat and Pradhan Mantri Of the whole funding, Rs 6,400 crore will go to Jan Arogya Yojna, the government's top health insurance scheme (AB-PMJAY). the Ayushman Bharat With money set aside for the National Urban Health Mission, health and wellness centres will be constructed nearby to offer comprehensive primary care. HWC shows progress in the government's goal to digitalize healthcare by transforming almost 1.5 lakh subcenters and primary health clinics into health and wellness centres by 2022.

In 2020-2021 fiscal, the health sector was allocated a budget of Rs 67,112 crores which marks an increase of only 3.9% from 2019-2020.

It was established in 2020. (NDHM). As of July 2020, the Ministry of Health and Family Welfare had allocated over 1.4 billion Indian rupees to support the National Digital Health Mission's implementation in India.

The biggest values were accounted for by digital ICT systems and application development, with 660 and 220 million Indian rupees, respectively. Although the NDHM budget for Health IDs for 2020–21 was \$1.06 crore, only half of it, or \$52.02 lakhs, had been used by the end of the year.

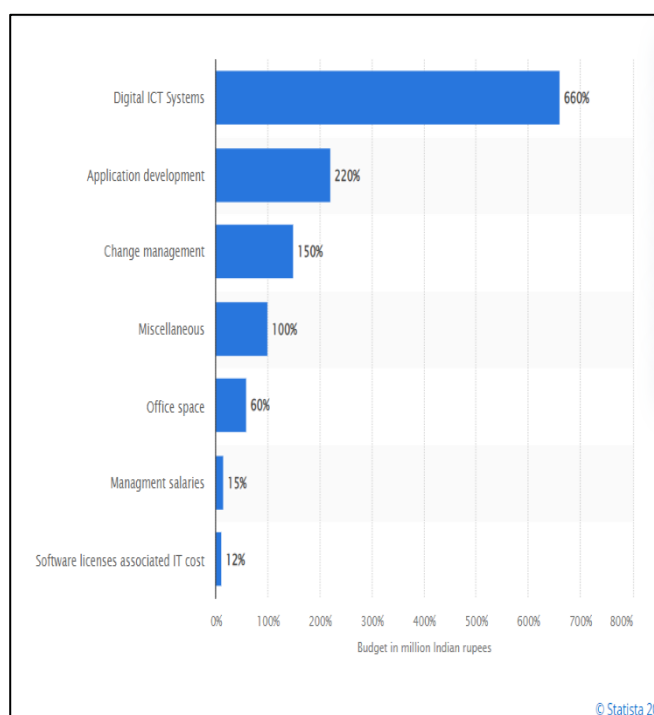


Figure 4.21: Digital Health Budget allocation 2020

Post pandemic, in the year 2021, health and well-being have been given top priority by the government in the union budget with an impressive increase of 137% over the previous year's health sector budget.

The Indian market for digital healthcare, which was valued at INR 116.61 billion in 2018, is predicted to compounded annually growth rate (CAGR) of 27.41 percent from 2019 to 2024, reaching an estimated INR 485.43 billion. The country's health infrastructure will be improved with an investment of Rs 64,000 crore.

Overall, health budget estimates for 2022-2023 stand at over Rs 86,600 crore, up merely 0.8% over the current fiscal's revised estimates of Rs 85,915 crore and 16% over the budgetary estimates.

The budget focuses on rolling out an open platform for the National Digital health Ecosystem (NDHE), setting up of National Telehealth Mental Scheme, incentivizing health-tech start-ups, unique health identities and digital health registries.

Nirmala Sitharaman, the finance minister, ordered a more than 2.5-fold boost in financing for the national digital health initiative, from just Rs 75 crore in the budget 2022's revised forecasts for the current fiscal year to Rs 200 crore for 2022-2023.

By 2022, In addition, the Center wants to see healthcare spending reach 3% of GDP. By 2027, there will be a 19.7 percent increase in healthcare's GDP share. The healthcare sector is seeing an increase in the number of new services offered by established hospitals through technological platforms, investments in cutting-edge diagnostic equipment, alliances with insurance providers, and geographic expansion with a goal of delivering high-quality healthcare at a reasonable cost.

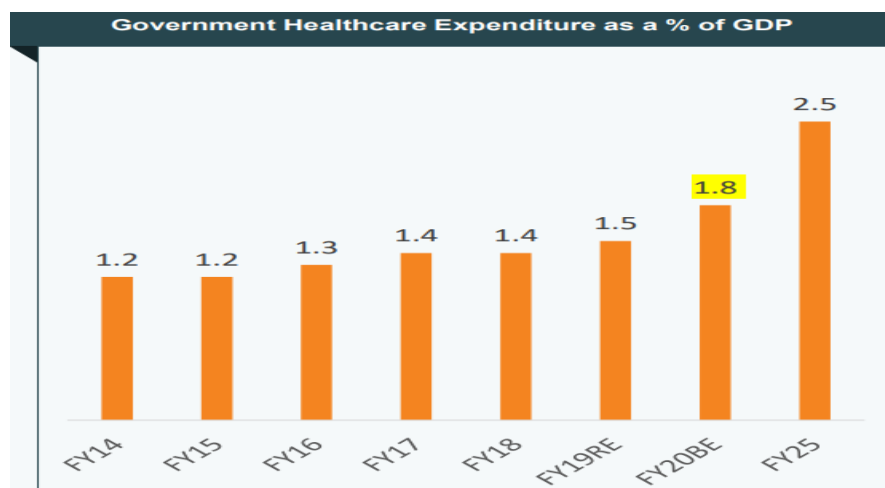


Figure 4.22: Government healthcare expenditure as percentage of GDP

Private Sector Perspective:

The finance minister, Nirmala Sitharaman, mandated an increase in funding for the national digital health project of more than 2.5 times, from just Rs 75 crore in the budget 2022's revised forecasts for the current fiscal year to Rs 200 crore for 2022-2023.

To unleash and cultivate the nation's collective entrepreneurial spirit, the Indian government has been actively supporting the digitalization of the Indian economy. Recently, a number of businesses have emerged to invest in digital health with a variety of tech-driven digital healthcare solutions and products.

(iv) Existing Regulations and Policies for Digital Health in India

	Name of the Policy/Act	Policy/Act Brief	Remarks
A. General Acts and Guidelines			
i	Drugs and Cosmetics Act (DCA) 1940 read with Drugs and Cosmetics Rules 1945 and Draft E-Pharmacy Rules, 2018	administered by: the Drug Controller General of India ("DCGI"), who is the head of the Central Drugs Standard Control Organization ("CDSCO"). Act: All drug sales must comply with DCA regulations and be authorised. There is a distinction between prescription and over-the-counter pharmaceuticals that can only be made with a prescription that has been issued by a licenced physician.	E-pharmacies are regulated on the basis of this principle in India. A notification allowing medicine doorstep delivery was released by the Health Ministry in March 2020 in response to the COVID-19 epidemic. It is not yet known how long this notification will be in force or whether comparable home delivery methods will be accepted once the COVID-19 pandemic has passed.
ii	The National Medical Commission Act, 2019	Administered by: National Medical Commission Act: Only individuals with a recognised medical degree and having passed the National Exit Test will be eligible to enrol with the State or National Registers to obtain a license for practising medicine in India	The provisions of the NMC Act and the MCI Code are applicable to digital health applications to the extent that the services involve the delivery of healthcare by a physician to Indian patients.
iii	Telemedicine Practice Guidelines, 2020	Issued by: In response to the COVID-19 pandemic, the Health Ministry issued a notification in March 2020 permitting medication doorstep delivery. The length of time that this notification will be in effect and the acceptance of equivalent home delivery options after the COVID-19 epidemic have not yet been determined.	part of the MCI Code and, as such, are enforceable against allopathic medical professionals. Due to the COVID-19 pandemic's requirements, only a stopgap measure was implemented until a more thorough regulation could be implemented.
B. Under ABDM			
i	The Health Data Management Policy, 2020 ("HDM")	According to the HDM, three distinct Health IDs will be created: one for patients (Health ID), one for doctors (Health Practitioner ID), and one for medical facilities (Health Facility ID). The HDM Policy also establishes a framework for how this data may be used and gives the patient complete ownership of the health data.	In order to make it simpler for patients and healthcare professionals to access each patient's medical history when making clinical choices, the ABDM will link all patient data with a single Health ID. To help the government make data-driven healthcare policy decisions and to better understand public health trends, the data may also be used in an anonymized form.
ii	Sandbox	ABDM Sandbox is a framework that will allow	Only firms or entities

Name of the Policy/Act		Policy/Act Brief	Remarks
		technologies or products to be tested in the contained environment in compliance with NDHM standards and judge the consumer and market reactions to the same before introducing it on a larger scale. Enrolling in the Sandbox has the advantage of allowing for product testing on a wider spectrum of consumers without requiring a large-scale rollout.	incorporated or registered in India or licensed to operate in India can enter the sandbox after demonstrating compliance with applicable laws on data protection and privacy including the proposed laws. It should be noted that the Sandbox is not a legal release, and the company will still be responsible for any violations of laws that may have been broken as well as for consumer complaints.
	Proposed Health Data Retention Policy	It suggests the ABDM architecture's health data retention structure. In accordance with global best practises, the adoption of a health data retention policy will establish universal guidelines for the retention, use, storage, and accessibility of health data.	The National Health Authority invited comments from the public on its Consultation Paper on proposed Health Data Retention Policy The Consultation Paper also considers the applicability of the proposed health data retention policy to the entire healthcare system
C. Data Protection			
i	appropriate security and sensitive personal information methods are covered by The Information Technology Act of 2000.Rules, The Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 and 2011, respectively	Sensitive Personal Data or Information ("SPDI"), such as medical histories and physiological conditions, are classified as such under the Information Technology Act of 2000's "Data Protection Rules"	
ii	The Clinical Establishments (Registration and Regulation) Act, 2010,	Issued under the CE Act requires clinical establishments to maintain Electronic Health Records ("EHRs") in accordance with standards determined by the Central Government.	The EHR standards will be applicable to Digital Health Entities which fall under the ambit of the CE Act.

	Name of the Policy/Act	Policy/Act Brief	Remarks
	Clinical Establishments Rules, 2012, and Electronic Health Record Standards, 2016	The Electronic Health Record Standards, 2016 ("EHR Standards") has been formulated for the creation of a uniform standard-based system for EHRs in India.	
iii	Data Protection Bill, 2021	The DPB is intended to be an exhaustive data protection law. It intends to impose restrictions on the gathering and use of both personal and non-personal data (including anonymized and de-identified data).	The Personal Data Protection Bill, 2019 ("PDP Bill") report from the Joint Parliamentary Committee was submitted to Parliament in December 2021. The report advises changing the PDP Bill's name to Data Protection Bill, 2021 ("DPB"), among other amendments.

Table 4.3: Existing policies on Digital Health

Current Policies and Guidelines in India

1. Health Data Management

The Health Data Management Policy, 2020 ("HDM") establishes the basis for security by design for the digital health ecosystem under ABDM. The HDM states that three separate Health IDs will be produced: a Patient Health ID, a Doctor Health Practitioner ID, and a Medical Facility Health ID (Health Facility ID). The rights and privileges for data access are specific to each ID. The HDM Policy also gives patients complete ownership of their health data and specifies criteria for its use. All patient information will be connected to a single Health ID once the ABDM is fully operational, making it easier for patients and medical professionals to access patient medical histories when making clinical decisions.

2. Sandbox

Before being made broadly available, innovations or products can be evaluated in a controlled environment in accordance with NDHM standards and the market and customer response to the same. This is possible thanks to the ABDM Sandbox architecture. All goods, services, and technological advancements will be put to the test within this framework. Healthcare or health-tech service providers, hospitals, labs, healthcare aggregators, health tech firms, public health initiatives at the federal and state levels, software companies, and hospitals are among the target applicants for the ABDM Sandbox.

- The major objective of the ABDM's Sandbox is to promote the fusion of current healthcare IT platforms and systems with the ABDM building blocks. It also intends to increase productivity, help consumers, and promote responsible innovation in the area of health IT services. Only companies or organisations that are either established, registered, or have a licence to operate in India are allowed to use the sandbox after demonstrating compliance with all applicable data protection and privacy laws, including the proposed guidelines. If the entity is unable to fully adhere to the relevant requirements or is unsuccessful in achieving its intended aim, the Sandbox will be terminated. Joining the Sandbox has the advantage of allowing for product testing on a

4. Unified Health Interface (UHI)

In January 2022, the National Health Authority launched the Unified Health Interface (“UHI”) - a digital healthcare service platform under the ABDM. Policy guidelines on the governance of the system are yet to follow. Previously, in July 2021, the National Health Authority had released a Consultation Paper on UHI to invite comments on the design and functionality of this proposed system under the ABDM.

In order to develop an effective digital framework for patients and healthcare providers, the consultation paper proposed an open network UHI system that would standardise the technology paths of digital health services. The intended design, scope, and features of UHI are described in order to ensure the interoperability of health services throughout the nation.

The UHI Gateway, which will allow all ABDM participants to connect and interact using industry-standard protocols, will be managed by the ABDM. Patients and health service providers, such as hospitals, doctors, nurses, pharmacies, etc., will be able to connect through UHI for appointments, consultations, e-prescriptions, etc., as well as the secure transmission of medical records. The UHI aims to automate a number of important services, including: Scheduling OPD appointments at hospitals and clinics; Scheduling Tele-Consultation; Finding critical care beds; Finding lab and diagnostic services; Scheduling home visits for lab sample collection; Scheduling an ambulance; and Finding nearby pharmacies.

The UHI's implementation of a patient-centered healthcare delivery system is a key component. It aims to encourage transparent pricing, and health service providers will be forced to post rates for services like consultations, scans, tests, etc. This will enable people make informed decisions about using the online platform to get these services. Additionally, a feature would make it easier for people to keep track of the drug supplies in pharmacies nearby and even place orders with those that offer home delivery. For faster emergency response and care, UHI also plans to include ambulance service providers within its purview. Through this interface, registered ambulance operators can receive patient requests.

5. Proposed Health Data Retention Policy

The Consultation Paper ("Consultation Paper"), which was published on November 23, 2021, sought feedback from the general public. It suggests the ABDM architecture's health data retention structure. The proposed health data retention policy's application to the overall healthcare system is also taken into account in the consultation paper. In accordance with global best practises, the adoption of a health data retention policy will establish universal guidelines for the preservation, utilisation, storage, and accessibility of health data.

Important Laws, Regulations and Policies governing Digital Health in India

- **Drugs and Cosmetics Act 1940 read with Drugs and Cosmetics Rules 1945 and Draft E-Pharmacy Rules, 2018**

The Drugs and Cosmetics Act, 1940 ("DCA") along with the Drugs and Cosmetics Rules, 1945 is the primary regulatory framework that governs the manufacturing, sale, import, and distribution of drugs in India ("DCR"). The DCA's enforcement is the responsibility of both the federal and state governments. The Drug Controller General of India is in charge of the Central Drugs Standard Control Organization (CDSCO), which is largely in charge of organising the efforts of the State Drugs Control Organization, creating policies, and making sure that the DCA is applied consistently throughout India (DCGI). The State Licensing Authorities are another entity that controls how the DCA is applied in different areas ("SLA").

The DCA mandates that all drug sales be authorised. The DCR clearly specifies which drugs may only be dispensed in accordance with a prescription issued by a licenced doctor, implying a

differentiation between prescription and over-the-counter medicines. According to the DCR, prescription medications can only be dispensed upon presentation of a valid prescription that complies with the guidelines. A prescription is only considered valid if it is written down, has the prescribing doctor's signature, and is date-stamped. Along with the patient's name, address, and the justification for the prescription, the prescription must also include the quantity to be given.

E-pharmacies are regulated on the basis of this principle in India. Accordingly, to operate a e-pharmacy, a license must be obtained from the respective SLA. However, unlike a traditional pharmacy, which has a territorial restriction and can only operate in one state at a time, an online pharmacy can run simultaneously across all of India. Additionally, there were several other issues associated with e-pharmacies such as acceptability of scan/ photograph of prescription, prohibition on storage of drugs by courier carriers without license, obligation of registered pharmacist to hand over drugs to patient etc. To clarify these aspects, Draft E-pharmacy Rules, 2018 (“Draft Rules”) were published.

The Central Government was then prompted to ensure that no prescription medication is offered online without a licence by the High Court of Madras³³ on October 31, 2018. On the other hand, the Delhi High Court issued a temporary injunction prohibiting some online pharmacies from offering medications for sale without a prescription. To guarantee that the Delhi High Court's interim judgement is followed, the DCGI issued a directive to drug controllers throughout India in November. The drug controllers are required to make sure that drugs were not sold online without a licence, although these rules do not forbid the online sale of pharmaceuticals.

The Health Ministry announced in March 2020 that doorstep medicine delivery was now permitted. Notably, the Notification was issued in accordance with Section 26B of the D&C Act, which enables the Central Government to control the production, sale, and distribution of drugs when doing so is in the public interest, such as during epidemics or other natural disasters. Until the COVID-19 pandemic diminishes, it is unknown how long this notification will be in place or whether comparable home delivery models will be accepted.

- **The Indian Medical Council (Professional conduct, Etiquette and Ethics) Regulations, 2002**
- In India, medical education and practise are governed which is under its control. According to the NMC Act, only individuals with a recognised medical degree and who have completed the National Exit Test are eligible to register with the State or National Registers.

Draft E-pharmacy Rules

- Draft E-pharmacy Rules were published by the Ministry of Health and Family Welfare ("Health Ministry") as guidelines for e-pharmacies. By giving them legal legitimacy, the Draft E-Pharmacy Rules will establish a registration process for online pharmacies and enable them to operate on par with conventional pharmacies. Additionally, it places restrictions on online pharmacies by mandating that they keep a private record of prescriptions and information about the medications they sell to customers.
- For violations of the D&C Rules, consumers have the authority to file complaints with the drug regulator.
- The regulator may also revoke the e-license pharmacy's if it is determined that it has broken the law, in addition to the other sanctions that may be imposed.

Draft Personal Data Protection Bill, 2019 (“PDP Bill”)

- The PDP Bill, which was introduced in the Lok Sabha, will replace India's current primary data protection law. The PDP Bill is now being discussed in a Joint Parliamentary Committee. processing of all personal information collected, transferred, disclosed, or otherwise handled on Indian soil.
- Processing of personal data outside of Indian territory by data fiduciaries or data processors, provided the processing is connected to any digital information. Any Indian company, any Indian citizen, or any person or group of persons organised or constituted in accordance with Indian law. The Nation (Central or State Government, public authority, government institution, or any organisation performing a public function).

In order to standardise and regulate the process for collecting, storing, sending, and using digital health data, DISHA, which is still in draught form, was created. If passed, DISHA will enhance the interoperability of patient data among healthcare service providers by establishing a health information exchange.

Additionally, DISHA specifies how to transmit and store digital health data as well as under what conditions it may be accessed. A notable restriction imposed by DISHA on the commercial use of digital health is the complete ban on pharmaceutical and insurance firms' access to the information held in the health information exchange.

Learning Opportunities from UK

- Early adoption of digital health technology
- Integrated digital health systems (NHS-Spine)
- EHR, home consultation, MHealth and telehealth coverage
- Recognizing the need to move from curative health to preventive health – Population Health management
- Strong operational policies for digital health and Quality structure
- Strong Health and social network which manages the connectivity issues across NHS England
- Universal Health coverage
- Integration of Health and Social sector as done in Northern Ireland and Scotland
- UK govt. is promoting international collaborations in the area of digital health through UK Trade and Investment International
- Further strengthening of Cybersecurity
- Integration of wearable devices data with NHS data

Chapter 5: Discussion and Conclusion

The present study evaluated the preparedness of India for digital health using four indicators- Adoption and Utilisation of Digital Health (Provider perspective), Infrastructure Readiness for Digital health, Current Policies and Frameworks on Digital Health and Investment Flows in Digital Health in Successive Years (2019-2022).

Global recognition has been accorded to India's efforts in the field of digital health and its contribution to the World Health Organization's historic resolution on the subject. India's decision to digitalize public health was prompted by the country's expanding population, which has led to a widening disparity between the number of medical personnel and patients and an increase in

healthcare costs. The pandemic has made the Indian state's efforts to create the country's digital health ecosystem more urgent. (1)

The current infrastructure of Aadhaar, Unified Payments Interface, pervasive Internet, and mobile phones (the "JAM trinity") offers a strong base for creating the ABDM building blocks. On August 15, 2020, the honourable Prime Minister of India announced the National Digital Health Mission (NDHM), which seeks to offer connected health services via a health card with a health ID for every person. Prior to the foundation of the NDHM, India made efforts in this area through its National Health Policy (NHP) and the national digital health blueprint (NDHB). (2) Through careful NDHM implementation, it is predicted that the health sector will gain additional economic value worth more than USD 200 billion over the next 10 years. (3)

The Sandbox environment of NDHM, the healthcare data management policy and policies on UHI will play an important role in shaping the future of digital health in India.

The survey concluded that half (50%) of the HCPs are ready to adopt digital health technology in their clinical practice. However around 30% of them need technological guidance. Around 10% of the people do not want to adopt digital health technology in their practice for which the major reason can be that they do not want to embrace the change. Teleconsultation services are the most common digital health technology being used by the HCPs. The support from government policies and initiatives for telemedicine being a major force.

The study has advantages and limitations. Advantage is that it highlighted the current strengths and areas of improvement in digital health landscape based on indicators including current policy environment, digital health infrastructure, financial investments and adoption and utilisation. It also highlights the areas in which India could benefit from UK's expertise in healthtech and help to overcome the challenges faced in the implementation of Ayushman Bharat in the country. The limitation is that to assess the adoption and utilisation an online survey was conducted due to which real time response recording could not be done.

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