

Chapter 13

Digital Health Literacy—A Prerequisite Competency for the Health Workforce to Improve Health Indicators in Times of COVID: A Case Study from Uttar Pradesh, India



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Introduction

The COVID-19 pandemic, its continuous waves, and the following lockdown have brought upon the entire world to a standstill. The pandemic raised some immediate questions on the capacity and access of the existing public healthcare system and the government relief measures. Furthermore, where the affluent sections of the society had access to smart devices and internet connection and were able to shift to online mode to access their basic needs and health services, whereas the other section of the society struggled to make their ends meet with no hope at sight.

The Uttar Pradesh state in India has had to address many challenges, unique to the complexities of the State giving a disproportionate proportion of global and India-specific burden of disease and deaths. The state developed, implemented, and drove state-wide adoption, of this comprehensive COVID-19 unified data platform, which has been able to bring together all (public and private) stakeholders engaged in the state's COVID-19 health response. The agility and layered architectural framework with which this integrated platform has been developed facilitates inter-linkage with modules developed for each key stakeholder, i.e., surveillance module for state/district surveillance teams and field tracking teams (via Case Tracking App), facility module for 1000+ facilities, and lab module for 350+ laboratories covering 98% COVID specific private and public facilities and labs in UP, to update

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D. Radovanović (ed.), *Digital Literacy and Inclusion*,
https://doi.org/10.1007/978-3-031-30808-6_13

information, review case wise progress and take prompt action, as required (IHAT 2020).

Given the context of the current health systems and processes in public health infrastructure and human resources, digital health literacy played a crucial role in ensuring the preparedness of the healthcare system and mitigate its effects on individual and societal health. Digital health literacy entails knowledge, competence and skills of health workforce or an individual to attain, process, communicate and comprehend health information and services to promote and improve personal and community health services through effective health decisions (Broucke et al. 2020; Dunn 2019). Moreover, the adequacy of health literacy combined with digital literacy skills creating an enabling environment, implementing health policies, processes, systems, and health outcomes (Nguyen et al. 2020).

In recent years, digital health literacy has gained significant attention, owing to its association with social determinants of health. The WHO commission on Social Determinants of Health also recognized health literacy in determining health inequalities within low- and middle-income countries (CSDH 2008). The chapter brings the case study of UP's Integrated Unified Data Platform and the digital health literacy skills imparted to over health workforce and frontline workers. Using the digital health literacy instrument (DHLI), the study measures the improvement in digital health literacy skills and the competency of health work officials based on the contextual level of digital health literacy training imparted to them. The chapter aims to establish digital health literacy as a prerequisite requirement for health professionals and workforce for effective delivery of healthcare services specifically in public health sector. The chapter argues that digital health literacy skills are mandatory to ensure how health workforce and practitioners can integrate their knowledge and digital health literacy skills into optimal health behaviour.

The chapter is organised as follows: the literature review section investigates various digital health literacy measurements (including DHLI 1.0, DHLI 2.0, eHLF, etc) and establishes a linkage between digital health literacy and digital literacy. The methodology section defines different theories that have been applied for measuring digital literacy knowledge and proficiency skills which were further used to measure digital health literacy. The case study of GoUP on unified data platform for COVID-19 was presented followed by results and discussions. The findings section identifies that state and district health workforce who had digital literacy knowledge and proficiency skills and also received digital health literacy trainings was able to use mobile application effectively by entering the correct data as well as able to track the patients and analyse it for making informed decisions. The last section of this chapter provides a conclusion and recommendation that can be used for further research studies.

Literature Review

The previous section has established the relationship between digital literacy and health literacy to have competent digital health skills for any individual. This section covers digital literacy skills and competencies that are required for health

officials and workforce to have for adopting digital health literacy skills through the literature review. This section covers different digital health literacy measurement instruments, including e-health literacy framework, DHLI 1.0, DHLI 2.0, and ehealth literacy scale (eHEALS).

Given issues of access to the internet and basic literacy, it is critical for health workforce and practitioners in public health settings to provide action-oriented health services or information that the recipient is able to benefit with the information or service. Digital literacy skills are critical for health workforce in the public health care with the emergence of patients involving digital healthcare services, for example, searching or looking health information online. Norman and Skinner in 2006 addressed the need of health workforce's digital competencies. Their 'Lily Model' for e-Health literacy defined digital health literacy as *'the ability to seek, find, understand and appraise health information from digital or electronic sources and apply the knowledge gained to addressing or solving a health problem'* (Norman and Skinner 2006). The Lily Model introduced eight-item eHealth Literacy Scale (eHEALS) instrument for measuring digital health literacy, comprising of three contextual literacies—(1) health literacy; (2) computer/digital literacy and science literacy and three analytical literacies—(1) traditional literacy, (2) information literacy, and (3) media literacy (Norman and Skinner 2006). Gilstad expanded the model by adding contextual, cultural, and social dimensions and defined it *'...ability to identify and define a health problem, to communicate, seek, understand, appraise and apply digital health information and welfare technologies in the cultural, social and situational frame and to use the knowledge critically in order to solve the health problem'* (Gilstad 2014).

ehealth literacy framework (eHLF) by a research group from Deakin University (Norgaard et al. 2015) consisted of seven dimensions derived from a structured mapping process involving healthcare workforce and patients. These seven dimensions are categorised as (i) ability to process information, (ii) engagement in own health, (iii) ability to actively engage with digital health services; (iv) feel safe and control; (v) motivated to engage with digital services; (vi) access to digital services that work, and (vii) digital services that suit individual needs (Norgaard et al. 2015) together with a multifaceted understanding of digital health literacy. Subsequently, the ehealth literacy questionnaire (eHLQ) has been developed based on the aforementioned seven dimensions.

Other theories by Koopman et al. (2014) in their PRE-HIT instrument included *'readiness for health information technology'* predicting the use of health information from patient's point of view. Different models—eHLF, eHLQ and eHLA have been developed in combination of health literacy and digital literacy with self-assessment elements for screening purposes in projects involving health solutions.

Digital Health Literacy Instrument (DHLI) was introduced in 2017 having a similar approach of combining skill and self-assessment (Van der Vaart 2017). DHLI consisted of 21 self-assessed items supplemented with seven performance tasks that focuses on handling digital information, primarily related to using health services through internet and ability to connect health professionals. DHLI included both Health 1.0 tools and Health 2.0 tools promoting the feasibility of assessment

that is done with self-reportage of healthcare consumers' perceived skills. To measure the ability to use a broad spectrum of DHLI1.0 and DHLI2.0 skills, diverse range of digital literacy skills are important for retrieving health information alone for health workforce. DHLI 1.0 defines any health professional or practitioner who first need to have operational and navigational skills to use digital devices, including able to use touch screen, keyboard and search information on the internet. Second, they have the ability to evaluate skills to search, appraise and apply online information. Whereas to use Health2.0 applications, health workforce needs additional skills related to interactivity on the web. This includes adding self-generated content to the internet and be able to understand own and others' privacy and consent (Norman 2011; Van der Vaart 2017). The literature explains having necessary digital literacy and cooperating with digital services has become a critical skill for health professionals and public health workforce.

Relationship Between Digital Literacy and Digital Health Literacy Skills

The section also addresses the definitions of digital health literacy and preliminary digital literacy skills required to obtain the digital health skills in the current technological surroundings.

Globally, health literacy has been identified as a public health goal for facilitating healthcare services (Rootmanm 2003; Nutbeam 2000, JAMA 1999). Originally, health literacy has been conceived of as the '*...the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions*' (Sentell et al. 2021). Scholars have argued the limitation on the conceptualisation of health literacy, maintaining that a focus should be put on the ability to factually contribute to promoting healthcare services risk prevention services in light of the healthcare system's demand and complexity (Pleasant et.al, 2016). Based on these theories, health literacy is a combination of two components— (1) individual health literacy, i.e. any individual ability to use health-related information to navigate the healthcare service system (Ancker et al. 2020) and (2) organisational health literacy, i.e. health officials and workforce capability to understand health information (Palumbo 2016).

Digital health literacy emerges as a new concept that is defined as '*... an extension of health literacy within the context of technology or electronic sources of information to understand and address any health problems as defined in Fig. 13.1 (Zakar et al. 2021)*'. In particular, digital health literacy entails the ability to access and use ICT and digital tools to co-design and/or co-deliver services intended for promoting health information, preventing risks, and contributing to collective health well-being (Azzopardi-Muscat and Sørensen 2019).

The digital literacy skills include ability to use and navigate the internet for their purpose and able to retrieve the information for analytical and making informed decisions (Radovanović et al. 2020). The intersection of digital literacy and health literacy has been described by multiple research factors that are related to the

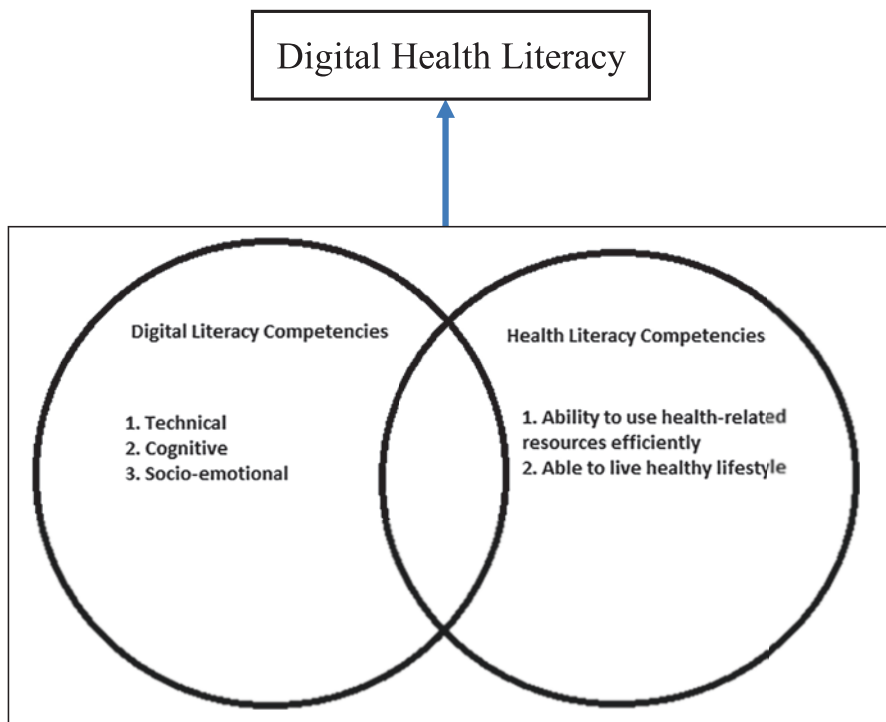


Fig. 13.1 Digital literacy vs. health literacy

acceptance of technological solutions for health management purposes. Most of these research factors have emphasized on the usefulness, ease of use, social factors, effectiveness, facilitating conditions, performing and effort expectancy of a given technology in an everyday context (Sohn and Kwon 2020).

Digital literacy in many theories has been defined as ‘...the ability to understand and use information in multiple formats from a wide variety of sources when it presented via digitally’ (Eshet-alkalai 2004) (Gilster 1997). Gapski sub-divides digital literacy into two main strands (1) instrumental technological; and (2) normative media educational referring to usage/functionality of the technology (Gapski 2007). These strands are further described in three forms of competencies (a) interpreting messages, (b) selecting/choosing messages, and (c) articulating messages (Pietrass 2007).

In context of digital health technology usage, these models have not considered digital literacy as a tool to determine individual’s intention towards the adoption of digital health technologies for health managing purposes. These competencies further measure functional, cognitive, and socio-emotional proficiencies of any individual. The cognitive dimension refers to the individual’s ability to understand how to use and produce digital sources. The socio-emotional dimension refers to an individual’s skills in using technology responsibly and has specific usefulness. Several case stories have identified if any individual has been exposed to technology and the

use of digital health devices, digital learning or digital literacy happens automatically (Wang et al. 2013). All these aspects of digital literacy are fundamentally related to critical digital literacy or to the information that is produced or created by someone on the digital platform for a specific purpose and it is accessed or assessed by people.

Therefore, using any digital device effectively, users must or acquire the ability or ‘inherent digital literacy’ skills to use digital health technologies efficiently (Webber and Johnston 2017). This raises a recognition that digital literacy as an inherent skill to understand the impact of social and environmental conditions on the digital health literacy. In a practical sense, digital health literacy skilled health workforce is able to do the following:

1. Understand the potential of health services to support in doing their job better
2. Use various digital technological tools to
 - a. Access and understand online health information in a range of multimedia formats
 - b. Search, prioritise and bookmark relevant online resources
 - c. Search for, learn, form and participate in online communities whether one to one or one to many or many to many
 - d. Reproduce and share existing online health resources to build others understanding
3. Evaluate the appropriateness of what they find for their community

For each of these skills, individuals may have beginner, intermediate or advanced abilities.

Methodology

The study has applied cross-sectional method to measure digital health literacy of health workforce and practitioners. The literature has established the connection between digital literacy knowledge and skills and digital health literacy. In this paper, the digital health literacy training parameters are defined based on the key responsibilities given to state and district health officials and workforce (including frontline workers). The training on digital health literacy was imparted to the state health officials, workforce and frontline workers.

For this purpose, authors have used Aviram and Eshet-Alkalai (2006) theory for measuring digital literacy knowledge and for digital literacy proficiency skills and used Lynch and Swing (2006) theory for measuring the knowledge and proficiency skills digital literacy knowledge of stakeholders is defined on the level of their stakeholders’ ability to use digital devices. Authors used observational method for measuring existing digital skills and proficiency levels of stakeholders. Observational method was applied to 50 stakeholders (trainees) representing state- and district-level health officials. Based on observational method, authors have categorized the digital literacy knowledge and proficiency level (Table 13.1) of trainees based on the knowledge of using digital devices and web and mobile applications.

Table 13.1 Categorisation of digital literacy knowledge and proficiency level

#	Stakeholders (trainees)	Responsibility	State/district	Digital literacy knowledge level ^a	Digital skills – proficiency level ^b
1	State Surveillance Officer (SSO)	Monitoring of COVID platform. From admin perspective, s/ he can oversee from DSO to Death Committee users' work	State	DLK4	DLP5
2	Chief Medical Officer (CMO)	Monitoring & maintaining repository for surveillance cases, sampling, facilities transaction	District	DLK4	DLP5
3	District Surveillance Officer (DSO)	Monitoring repository for surveillance cases, sampling, facilities transaction	District	DLK4	DLP5
4	Epidemiologist	Monitoring & maintaining repository for surveillance cases, sampling, facilities transaction	District	DLK4	DLP5
5	Data Manager	Monitoring & maintaining repository for surveillance cases, sampling, facilities transaction	District	DLK3	DLP3
6	RRT (Rapid Response Team)	Follow-up of surveillance cases, contact tracing and home eligibility check for home isolation	District/Block	DLK3	DLP3
7	Block Community Process Manager (BCPM)	Follow-up of surveillance cases, contact tracing and home eligibility check for home isolation	Block	DLK3	DLP3
8	Health Facilities (public & private) hospitals	Updating day-to-day transaction of positive cases	District/Block	DLK2	DLP2
9	Lab admin and staff members	Uploading the result, maintaining CT value	District	DLK2	DLP2
10	Death committee users	Auditing of death ^a 11 Medical college staff members are designated as death committees	State	DLK3	DLP3

^aDigital literacy knowledge defined on the basis of literature review. Digital literacy knowledge is defined in Table 13.2

^bDigital literacy skill proficiency is defined on the basis of different proficiency skills

Table 13.2 Literature review on digital literacy knowledge level

Digital literacy sub-discipline	Ability to do	Literature	DL knowledge level
Computer literacy	An understanding of how to use computers /smartphone and application software for practical purposes	Martin and Grudziecki (2006)	DKL1
Technology literacy	Computer skills and the ability to use computers and other technology to improve learning, productivity, and performance	U.S. Department of Education (1996)	
Information literacy	Finding and locating sources, analysing and synthesizing the material, evaluating the credibility of the source, using and citing ethically and legally, focusing topics and formulating questions in an accurate, effective, and efficient manner	Eisenberg, Lowe, and Spitzer, in Meyer et al. (2008, p. 2)	DKL2
Media literacy	A series of communication competencies, including the ability to access, analyze, evaluate and communicate information in a variety of forms including print and non-print messages	Alliance for a Media Literate America (2010)	
Communication Literacy	Learners must be able to communicate effectively as individuals and work collaboratively in groups, using publishing technologies (word processor, database, spreadsheet, drawing tools...), the Internet, as well as other electronic and telecommunication tools	Winnepeg School Division (2010)	DKL3
Visual literacy	The ability to ‘read,’ interpret, and understand information presented in pictorial or graphic images; the ability to turn information of all types into pictures, graphics, or forms that help communicate the information;	Stokes (2002)	DKL4

To measure digital health literacy skills, authors have used abbreviated version of the DHLI 2.0 used by the global COVID-HL Consortium. The literature review section identifies that digital health literacy skills play a vital role in accessing and using digital health services to seek health-related information and make informed decisions (Xie et al., 2020). The literature also proves that if digital health literacy training is imparted effectively to health workforce and practitioners, the use of digital health platform is further improved, and collection of data is recorded accurately. In order to measure the effectiveness of the digital health literacy training, the paper attempts to evaluate the pre-and-post training knowledge and skill improvement of trainees.

Post training, the paper measures advancement in trainees’ digital health literacy skills using DHLI 2.0 framework based on their ability to access the platform in different modules. To measure the effectiveness of the digital health literacy

training, the number of COVID-positive and probable cases captured by different stakeholders/trainees (health workforce and practitioners) on the platform. The data on Unified COVID platform is recorded from May 2020 to September 2021 for three modules—Surveillance, Laboratory and Facility.

Limitations

As the Unified data COVID platform was developed and implemented in the span of two months and rolled out and implemented across the state in 2020 therefore, the paper did not conduct the baseline study to understand the existing basic digital literacy skills and digital health literacy of health workforce. Moreover, the training was imparted to over 200,000 health workforces, therefore mapping out the existing digital health literacy skills was not possible for this paper. Therefore, for the benefit of this study authors focused on end-line usage of the application (mobile and web) and applied observation method to selected trainees for measuring the effectiveness of the training.

COVID-19 and Digital Health Services in Uttar Pradesh

The COVID-19 continues to impact lives across the world, hampering health equity and creating socio-economic growth of countries. The healthcare facilities were overwhelmed and finding it difficult to manage the sudden demand in hospital beds, medicines and supplies.

This pandemic has exposed the vulnerabilities of our healthcare system, but at the same time, it also led to unprecedented growth towards adopting digital technologies in healthcare systems and management for delivering efficient healthcare services despite maintaining social distancing. Preparing for this crisis, the Government of India made significant advancements in the way digital healthcare systems and innovative digital solutions adopted and developed for effective healthcare service delivery. In response to COVID-19 outbreak, along with the state governments and private stakeholders, the Indian government took immediate and necessary actions to tackle the pandemic by setting up dedicated COVID-19 hospitals, isolation centres and tech-enabled mapping of resources. Within a span of few months, the Government of India initiated a platform at scale and end-to-end workflow-based solutions.

While health being a state subject, many states in India initiated development and deployment of new digital tools and digital services as per their citizen needs. In an effort to deal with the COVID-19 pandemic holistically, Uttar Pradesh (UP) was one of the first states to develop mobile applications and digital information systems, moving towards developing an end-to-end integrated surveillance platform to monitor and track COVID-19 patients.

Over 235 million people live in Uttar Pradesh living in 107688 villages distributed in 75 districts. In terms of the public health infrastructure, there are 25812 public health facilities comprising 141 district hospitals (DH), 278 special hospitals (SH), 943 community health centres (CHCs), 3602 public health centres (PHCs) and 20848 sub-centres, according to UP Ke Swasthya Kendra portal.

The COVID-19 pandemic has disproportionately affected individuals, putting them at the risk of increased morbidity and mortality, underscoring the urgent need to provide basic healthcare services and maintain global good health and well-being for achieving SDG goals (The Global Goals). Moreover, 5 million migrant workers which were making back to their home in May 2020 (The Hindu 2020), it became crucial for the UP government to take necessary measurements not only to ensure that migrant workers reach home safely but also to provide relevant information and health services to people living in rural areas.

Keeping the size and scale of the state in mind, UP Government developed a COVID-19 Unified Data Platform as a single source of information and end-to-end case management platform across the continuum of care for COVID-19. The platform was kicked off on March 2020 and was stabilized by May 2020 and has been leveraged across both the waves for effective management of the pandemic.

A Unified Data Platform for COVID-19 – A Case Study of Uttar Pradesh

This section covers the case study of Unified Data Platform development, implementation and statewide adoption through various capacity building and digital health training on the platform to its 200,000 state and district health officials spread across 75 districts and over 59000 village councils of the state. These health officials included facility staff members, laboratories and district-level health nodal officials, surveillance team and helpline coordinators.

The Unified COVID-19 platform was designed to facilitate end-to-end case management of patients and health workers digitally. The mobile-and web-based data platform gives real-time view of the status of the cases across local districts by collecting and aggregating data from its tracking and contact modules (Fig. 13.2).

The surveillance of COVID-19 patients was one of the prime aspect of this Unified platform. It included the steps from case registration, case assigning, tracking application, assigning the test type and lab, lab module, allocation of facility or home isolation in case of positive case, case update at the facility level, referral to other facility, closure of the case to handling of death. It included the following human resources for capturing the data systematically:

1. Case registration by SSO, DSO, lab or field team
2. Case is assigned for in-person verification by the DSO to the tracking team
3. Reviewing and verifying the case details by tracking team through the case tracking application

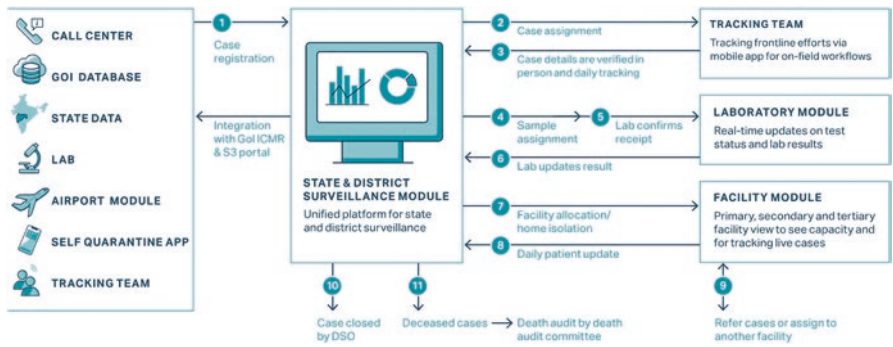


Fig. 13.2 An integrated work-flow based system for COVID cases management (Source: Redesigned from IHAT, the Uttar Pradesh COVID-19 Unified Data Platform)

4. DSO assigns the test type and lab
5. Lab confirms sample delivery and receipt
6. Lab confirms and updates results
7. In case of positive case identified, the DSO allocates a facility or home isolation
8. Facility user updates case details daily
9. Referral to other facility
10. Case closure by DSO
11. Handling of death cases

Based on the work-flow based system and following brick-mortar model, the platform was designed to assist the following stakeholders. The digital health literacy training was structured around key features of Unified Data Platform for COVID-19 modules (Table 13.3).

The platform architecture was designed to enable clear, immediate and easy coordination and referral linkages among state and district surveillance teams, field-tracking teams, laboratories and state’s 235 million inhabitants.

Capacity Building and Training Method

The Unified COVID-19 data platform (mobile- and web-based) was ready to be rolled out in mid-March 2020, therefore, one of the tasks is to roll out state-wide training and capacity-building sessions for health workforce (including doctors, laboratory staff members, facility staff members) and frontline workers (including ANMs and ASHAs). The Directorate of Medical and Health Services (DGMH), GoUP adopted a structured approach for the training of health officials) and front-line workers.

The digital health literacy training on COVID cases management was given at two levels—(1) facility level and (2) community-level trainings. Facility-level trainings were given to 714 medical teams, 12051 doctors, 12983 staff nurses and 43,140

Table 13.3 Key stakeholders and key features

Key stakeholders	Key features
Policy and decision-makers	<ol style="list-style-type: none"> 1. Single source for all data and analytics across stakeholder groups 2. Integrated dashboard for swift decision making
State/district surveillance teams	<ol style="list-style-type: none"> 1. Singular point of case registration with end-to-end case management and post discharge case follow up 2. Integration of multiple data sources (lab, facility, field, citizen, call centre)
Lab team	<ol style="list-style-type: none"> 1. System team generated real-time receipt status updates for samples and consignments 2. Ability to upload the results at the lab – updated real time at district/facility/field team level
Facility team	<ol style="list-style-type: none"> 1. Medical and epidemiology record maintained against the unique case ID across the case life cycle 2. Seamless inter-facility referral
Field team	<ol style="list-style-type: none"> 1. Integrated with real time updates to and from state/district and lab team 2. In-person and verification and daily follow up of each registered case 3. Contact tracing on the field 4. Collaboration with all field teams, facility, lab and state/district team
State residents	<ol style="list-style-type: none"> 1. Direct beneficiary engagement through advisory messages for registered users 2. Geo-fencing and movement alerts 3. Self-assessment, tracking and helpline support 4. Self-registration of passengers traveling to UP via air 5. Easy access to COVID lab test results via an online single platform for the public across facility and test types 6. Access and search COVID test and collection centre details

Source: Restructured based on the work-flow designed for the Unified data COVID application

paramedical staff whereas community-level training was imparted to 589 district officials (including CMO, DSO), 3138 block officials (including BCPM) and further to health frontline workers (IHAT, Unified Data Platform). The below Fig. 13.3a gives the overview of training method and the use of different technologies for conducting trainings.

DGMH, GoUP conducted digital health literacy training(s) on using Unified COVID-19 Data platform. On the basis of platform workflow, the state and district health workforce were given different responsibilities for the management of COVID-19 cases and probable cases. The digital health literacy training was structured around different modules and the key responsibilities for managing the platform given to trainees. These trainings were conducted through various online channels such as Zoom in small groups or the advent of remote training via different mediums as referred in Fig. 13.3b.

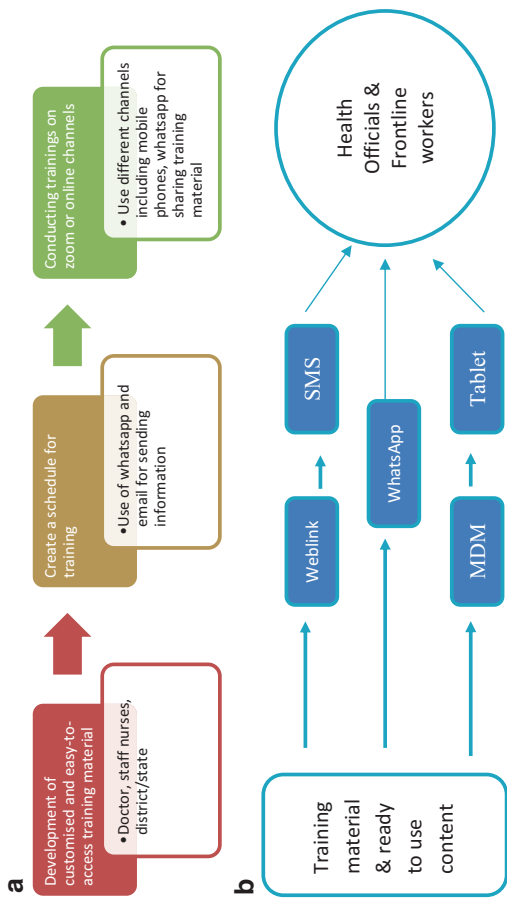


Fig. 13.3 (a) Training process flow. (b) Use of technology for training

Results and Discussion

This section of the paper analyses digital health literacy training based on different modules of the platform aligning with DHL2.0 skills and also measures the improvement in their digital health skills if trainees (health workforce and practitioners) have already digital literacy knowledge and proficiency skills. The effectiveness of the digital health literacy training is measured based on the number of recorded COVID-19 positive and probable cases captured by different stakeholders/trainees (health workforce and practitioners) on the digital mobile-and-web platform.

The training on digital health literacy was imparted in the phase-1 of COVID-19 pandemic. Health workforce and practitioners working at the district and below levels, have basic literacy knowledge, including ability to use digital devices, ability to navigate and search information. In addition to leveraging Zoom as a platform to train the state, district, RRT, facility and lab teams on the end-to-end surveillance module short, easy-to-view videos were developed and disseminated for each module.

At the state level, SSO, CMO and DSO at district level have received training on all four modules for monitoring and surveillance of the platform (Table 13.4). DSO acts as a nodal officer at district to monitor and analyse surveillance cases (COVID positive and probable cases). Whereas below district level, facility staff members of public health centre received training on facility module. Frontline workers (ANMs) were proactively informed and updated about new content material available on the website via SMS reminders and updates. This helped officials and health providers across the state to become more confident to use the platform.

The surveillance module is larger than other modules, including facility, laboratory and other modules as per the architecture of the platform. The training on digital health literacy was imparted in the phase 1 of COVID-19 pandemic and support to record the data continued. Health workforce and practitioners working at district and below levels have basic literacy knowledge, including ability to use digital devices, ability to navigate and search information.

At the district level, DSOs received training on all three modules and have the capability to monitor and analyse surveillance cases. Whereas below district level health workforce, facility staff members of public health centre received training on facility module.

The data in Table 13.5 shows that during the peak time of COVID-19 phase 1 (2020) and phase 2 (2021) health workforce and practitioners are able to record the data. District- and block-level health workforce, including labs, public health centres located in rural areas are able to enter data of cases on the platform. It reflects that district- and block-level health workforce and officials who have received digital health literacy training and continuous support through other digital channels, including helpdesk are able to enter the record of cases on the ground.

On a macro level, decision-makers often use specific, quantifiable markets to guide the commissioning of new digital health services and strategies. Collection of

Table 13.4 Categorisation of trainees on digital health literacy modules

State and district level	Digital health literacy training on modules of COVID platform				Improvement in digital health	Digital health literacy Scale ^a
	Surveillance module	Lab module	Facilities module	Death module		
State Surveillance Officer (SSO)	√	√	√	√	1. Ability to monitor the cases effectively 2. Able to analyse the work of DSO to Death Committee work 3. Able to analyse positive and probable cases and protect patient's information	DHL6
Chief Medical Officer (CMO)	√	√	√	√	1. Improvement in maintaining COVID-19 repository cases for surveillance purpose 2. Able to visualise and analyse the number of sampling required for efficient monitoring 3. Able to visualise and analyse number of additional facilities required for monitoring of COVID-19 cases	DHL6
District Surveillance Officer (DSO)	√	√	√	√	1. Knowledge of monitor and analysis surveillance cases 2. Able to transfer cases to referral facility	DHL1 5

(continued)

Table 13.4 (continued)

State and district level	Digital health literacy training on modules of COVID platform				Improvement in digital health	Digital health literacy Scale ^a
	Surveillance module	Lab module	Facilities module	Death module		
Epidemiologist	√	×	×	×	1. Improvement in maintaining COVID-19 repository cases for surveillance purpose 2. Able to visualise and analyse the number of sampling required for efficient monitoring 3. Able to visualise and analyse number of additional facilities required for monitoring of COVID-19 cases	DHLI 5
Data Manager	√	×	×	×	1. Knowledge of COVID portal 2. Knowledge to retrieve information from COVID portal 3. Team alignment w.r.t COVID portal 4. Able to identify case and transfer the case to specific facility as per case requirement 5. Ability to evaluate cases 6. Able to create analytical reports 7. Able to communicate with state team for the addition of facility and inactive of private facility	DHLI 4

(continued)

Table 13.4 (continued)

State and district level	Digital health literacy training on modules of COVID platform				Improvement in digital health	Digital health literacy Scale ^a
	Surveillance module	Lab module	Facilities module	Death module		
RRT (Rapid Response Team) & BCPM (Block Community Process Manager)	√	×	×	×	1. Able to handle assigned cases 2. Able to identify cases w.r.t home-isolation or required facility 3. Communicate to DSO for providing facility	DHLI 4
Health Facilities (public & private) hospitals	×	×	√	√	1. Able to enter data of positive cases on the portal 2. Able to monitor day-to-day transaction of cases	DHLI 3
Lab admin and staff members	×	√	×	×	1. Able to enter the lab result on digital device 2. Able to modify and or update the case result	DHLI 3
Death committee users	×	×	×	√	1. Able to upload data on the portal regarding case result 2. Able to identify death of patients due to COVID	DHLI 3

^aDigital health literacy dimensions: The table is reproduction of the digital health literacy scale and its measurement in consultation with stakeholder's knowledge and skill improvement post-training. The definition of DHLI on different dimensions of using digital skills for their work purpose

accurate record helped decision-makers to make decisions on imposing lockdown, necessary action for vaccination drive and development of new facilities.

Therefore, if digital literacy skills and proficiency become an integral part of digital health literacy for all health professionals, including health front-line workers it will be easy for the public health sector to deal with such pandemic. It also emphasised that there is a need to undertake specialised leadership training for programme roles similar to the SSO and DSO in order to equip the Government officials, to lead any programme intervention end-to-end at the state/district level.

Table 13.5 No of cases recorded on Integrated Unified Data Platform on COVID

	Surveillance module	Lab module	Facilities module
Month-year	Total surveillance cases	Total sample tested	Total number of cases registered in facility
May-20	340,724	242,127	7981
Jun-20	523,867	543,781	19,293
Jul-20	1,624,329	1,947,410	55,061
Aug-20	2,926,060	3,645,869	62,901
Sep-20	3,693,786	4,755,498	59,175
Oct-20	3,646,693	4,912,499	29,827
Nov-20	3,312,061	4,661,428	23,247
Dec-20	3,285,872	4,672,275	13,170
Jan-21	2,744,440	3,922,135	4646
Feb-21	2,430,247	3,477,913	1332
Mar-21	2,618,294	3,688,435	4839
Apr-21	5,077,220	6,872,381	68,288
May-21	6,292,801	8,497,322	41,093
Jun-21	5,631,871	8,229,408	2322
Jul-21	5,200,770	7,677,149	503
Aug-21	4,596,422	6,762,318	241
Sep-21	4,197,227	6,217,581	132

Data Source: *UPCovidtracks.in*

Conclusion

Digitally enabled competent health workforce improve in maintaining health records and strengthen health systems and able to meet the challenges of responding to the changing health needs of the public. Digital health literacy (DHL) is crucial for health workforce as it enabled them not only to ensure patient safety but to monitor and track them and enable them to refer nearby lab and healthcare facilities.

Moreover, health workforce can be relieved from time-consuming routine tasks and interact better with patients (OECD, 2019). It has been emphasised that digital transformation in health sector is much more than going paperless but it is linking the existing database or digitalising existing tasks. Digital transformation means that the various digital technologies need to be leveraged to design appropriate, effective and efficient models of care and delivering health services. Hence, digitally skilled health practitioners are able to adapt these models effectively and use data to improve health service delivery—through, for example designing structured and tailored or better-coordinated health services—remain rare.

The digital health literacy training(s) should focus on different skills and competencies. These training(s) should have a tailored approach required for particular healthcare worker group, role, level of seniority and different geographical (including urban, semi-urban and rural) setting. Moreover, these digital health literacy framework and training(s) should be regularly updated with novel digital health

technologies, to be applicable to low-and middle-income countries. Emerging economies like India need to have a dedicated digital health team especially focusing on rural population.

The case study has showcased that if digital health literacy training is imparted structurally, it helps government officials to target health workforce with specific responsibilities to monitor and track emergency health crisis. The prevalent competency domains identified represent essential inter-professional skills to be incorporated into healthcare workers' training.

Acknowledgement Authors acknowledge our colleague, Specialist, Mr. Vishan Sharma, who helped us with collection of data and given its insights for the case study.

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